



HIGHLIGHTS

Cambridge, Massachusetts

Fall 2004

National Transportation Systems Center

Focus

Center Leadership Encourages Excellence in Management

The Volpe Center is pleased to announce that U.S. Department of Transportation Secretary Norman Y. Mineta has appointed Dr. Curtis J. Tompkins to a two-year term as Director of Management Improvement Initiatives. Dr. Tompkins will work with Volpe senior management in implementing DOT-initiated enhancements designed to create a new vision for the Volpe Center, in which the quality of management will match the Center's technical excellence. Dr. Tompkins will lead, develop, and institute systems and processes for cost-based financial management, project management, procurement reform, and organizational restructuring. He will also promote and encourage the increased use of technologies that will create a more effective and productive organization.

Since the summer of 2003, the Center has deployed a series of carefully planned efforts that will improve its performance and transform its operation. There are two main thrusts to the initiatives. The first is a standardized approach to how projects are initiated, planned, managed,

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Measuring the effectiveness of **motor carrier safety** programs

Sharing findings on **rail switching safety**

Enhancing navigation on the St. Lawrence Seaway

Balancing **security and mobility**: a Volpe symposium



Drivers are being offered an expanding array of advanced technologies, but using multiple devices while driving can distract a driver and lead to a collision. Driver distraction is an issue of growing concern to the National Highway Transportation Safety Administration (NHTSA). The Volpe Center is supporting NHTSA's advanced research program that will develop, demonstrate, and evaluate SAVE-IT, a prototype vehicle designed to manage driver workload and minimize adverse safety consequences of emerging technologies.

Reducing Distraction-Related Automotive Crashes with SAVE-IT (NHTSA)

Each year, distracted drivers cause up to 30 percent of the 6 million automotive crashes in the United States. Driver distraction has always been a safety issue, but as more complex controls, displays, communications devices, and entertainment systems appear in cars, the level of driver distraction is expected to increase. The National Highway Traffic Safety Administration (NHTSA) is directing a program that could help minimize the safety risk of distraction and improve the effectiveness of in-vehicle technologies.

Advanced Technologies Can Cause Information Overload

Today's drivers often deal with an onslaught of information that can divert their attention from their primary task of driving. In addition to observing and reacting to weather, road, vehicle, and traffic conditions, drivers may use technologies such as:

- Entertainment systems such as radio, CD or MP3 player, movie screen
- Telematic systems for navigation, email, cell phones, or traffic information
- Driver assistance systems such as cruise control or collision warning.

Although some in-vehicle technologies are intended to improve safety, the use of multiple devices may distract the driver and actually jeopardize safety. When multi-tasking, drivers divert their attention from the road to glance at displays, operate controls, or listen and speak to a voice interface.

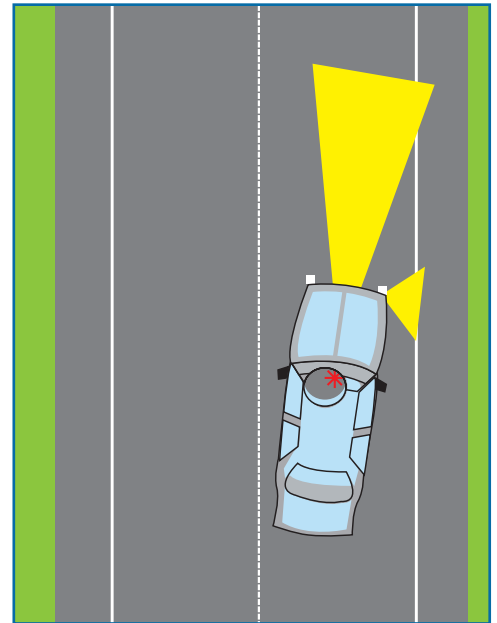
Vehicles in which electronic systems and devices are embedded or operated must be designed so that the demands on drivers match their capabilities to process and respond to safety-critical information. A promising approach being pursued by academic and industry researchers involves a central monitoring system that integrates data from in-vehicle technologies and controls the information flow to the driver through an adaptive driver-vehicle interface.

SAVE-IT Integrates Information to Manage Driver Workload

To determine what safety benefits such an integrated system might achieve, NHTSA is developing a test vehicle, SAVE-IT (the SAFETY VEHICLE using adaptive Interface Technology). Volpe's Operator Performance and Safety Analysis Division manages the multi-year SAVE-IT program for NHTSA's Office of Vehicle Safety Research. The Center also provides technical expertise and product evaluation.

The SAVE-IT mission is to demonstrate a viable proof-of-concept vehicle capable of reducing distraction-related crashes and enhancing the effectiveness of collision-warning systems. Phase 1 of the program – completed in spring 2004 – involved extensive human factors research to determine driver distraction and workload measures as well as user acceptance of distraction mitigation and safety warnings, and the development of a rudimentary vehicle prototype. Phase 2 is underway, with the objectives of enhancing and evaluating the SAVE-IT prototype, further exploring and evaluating technologies to measure driver distraction, and developing decision rules to prioritize in-vehicle information demands on the driver. The prototype will be evaluated in simulated environments and in on-road testing.

The SAVE-IT prototype is envisioned as a system that can assess the driving environment, monitor the driver's workload and distraction level, and



Crash-avoidance systems actively assess the driving environment and alert the driver to dangerous situations. In the future, they will recommend actions and possibly assume partial control of the vehicle to avoid collisions. As such technology becomes prevalent, human factors research becomes vital to understanding not only how and why drivers become distracted, but what countermeasures work best in a dynamic driving environment. A run-off-road crash avoidance system is illustrated above.

adapt the flow of information to the driver accordingly. In concept, sensors monitoring the roadway, nearby traffic, vehicle operation, and driver state could provide information to a system that “decides” how to adapt the vehicle based on the demands of the task relative to the distraction state of the driver.

Sharing Knowledge to Advance Adaptive Interface Technology

The development of adaptive interface technology presents substantial technical challenges. In keeping with its expertise in knowledge sharing and in support of the SAVE-IT program, the Volpe Center organized a research workshop, bringing together experts who presented the major current efforts in adaptive interface development and to discuss the future of this emerging field. The “International Workshop on Progress and Future Directions of Adaptive Driver Assistance Research” was held on May 13 and 14, 2004 at DOT Headquarters in Washington, D.C. (See <http://www.volpe.dot.gov/opsad/saveit/workshop.html>.) Workshop goals were to understand the prior research and obstacles encountered in developing adaptive driver assistance, describe the current research approaches, specify key human factors and system integration challenges, identify features that may need standardization, and recommend methods and metrics to evaluate the enhanced safety of adaptive interfaces.

Plenary discussions at the Adaptive Driver Assistance Research workshop addressed critical issues such as:

- Components of distraction that lead to safety risks, e.g., visual, mental preoccupation, physical demands
- Measurements needed to capture safety risks
- Best direct cognitive demand measures
- Whether measurement is required under all conditions
- When to intervene and what interventions can mitigate distraction
- Interval from detection to introduction of mitigation strategies
- Individual difference in acceptance, performance, and multi-tasking capability
- Standards to minimize driver confusion when using different adaptive interfaces
- Tradeoffs between safety, driver annoyance, and other acceptance costs
- Human factors research needed to understand influences on driver acceptance
- Evaluation of the safety benefits of a prototype
- Role of driver education in operation of adaptive systems
- The usability paradox – if a tool makes a task easier, drivers will use it, rely on it more, and possibly increase their exposure to risk.



The initial SAVE-IT prototype instrumented with integrated technologies was demonstrated at a recent NHTSA workshop on adaptive driver assistance research. The development of SAVE-IT will spur ongoing industry efforts and create a basis for possible industry standards needed to achieve widespread application of a common adaptive interface.



Measuring the Effectiveness of HAZMAT Safety Programs (FMCSA)

The Federal Motor Carrier Safety Administration (FMCSA) was established in 2000 to reduce the number of crashes, deaths, and injuries involving large trucks and buses. The Volpe Center actively supports FMCSA in several areas, one being the development and application of analytic models for the agency's motor carrier safety programs. These models enable FMCSA to judge the relative performance of each program; results provide a basis for resource allocation and budgeting decisions that optimize program effectiveness and efficiency. Based on the success of these models, the FMCSA asked Volpe to develop and implement similar models and measurement processes to the agency's hazardous materials (HM) programs. The Volpe team, led by Ms. Julie Nixon of the Motor Carrier Safety Assessment Division, includes Mr. Kevin Gay, Ms. Nancy Kennedy, Mr. John Ohman, and Mr. Don Wright of the Division, and Messrs. Kha Nguyen, Leon Parkin, and Dennis Piccolo of CASE, LLC (an onsite Volpe Center contractor).

The project involves conducting a feasibility study and developing an approach and methodology, and estimating the benefits of several safety programs focused on carriers and shippers of hazardous materials: the Compliance Review, Roadside Inspection, Traffic Enforcement, Package Inspection, Cargo Tank Facility Inspection, and Shipper Review programs. The first three programs will be studied in phases to determine the effectiveness each has in reducing crashes, injuries, and fatalities. The HM Compliance Review Effectiveness Model, the first to be developed, was implemented and published in July 2004; the analysis will be updated and published on an annual basis. The HM Intervention Model, which estimates the effectiveness of Roadside Inspections and Traffic Enforcements conducted on HM carriers, will be developed in the first half of FY05. The remaining three programs will be studied to determine the effectiveness each has in reducing enroute incidents (i.e., hazardous materials spills) and incidents that occur during the loading and unloading processes.

The Division also supports FMCSA in developing, deploying, and maintaining Web-based information sources; conducting statistical analysis; and performing safety fitness assessments.

Working Group Updates Rail Switching Safety Findings (FRA)

Each year, on average 10 rail employees are killed and 135 are severely injured in switching operations. The Switching Operations Fatalities

Volpe developed analytic models that provide FMCSA with the information it needs to address the requirements of the Government Performance and Results Act of 1993 (GPRA), which obligates Federal agencies to measure the effectiveness of their programs as part of the budget cycle process.

Analysis (SOFA) Working Group (SWG) was formed in 1998 to bring together stakeholders from the Federal Railroad Administration (FRA), the railroad industry, and labor organizations to determine the causes of these events and to make preventative recommendations. The SWG regularly issues safety information directed at employees engaged in switching operations. The Volpe Center has contributed to the SWG since its inception.

In October 1999, SWG issued the *SOFA Report: Findings and Recommendations of the SOFA Working Group*, in which five safety recommendations were made to the industry. The recommendations focus on 1) improved communication among crew members, 2) regular job briefings on the nature of work, 3) discussions of safety issues, 4) minimum distance guidelines for certain types of equipment moves, and 5) mentoring of inexperienced employees.

Since that time, SWG has undertaken many activities directed toward its goal of Zero Switching Fatalities. In August 2004, the group issued an update to the *SOFA Report*, which describes its recent work, provides updated information on the number and type of switching fatalities occurring since the release of the *SOFA Report*, and discusses how fatalities occur and can be prevented. (See <http://www.fra.dot.gov/us/content/102> for safety information and SOFA publications.)

Also in August, Mr. David Skinner of Volpe's Operator Performance and Safety Analysis Division spoke at the Brotherhood of Locomotive Engineers and Trainmen's Meeting in Kalispell, Montana, as a SOFA member and on behalf of the FRA. Mr. Skinner discussed the history of switching operations fatalities, the SOFA recommendations, and the updated SOFA report. The SOFA Working Group is composed of representatives from the FRA, the American Short Line and Regional Railroad Association, the Association of American Railroads, the Brotherhood of Locomotive Engineers, the United Transportation Union, and the Volpe Center.

Outstanding Technical Papers in Crash Avoidance Research (NHTSA)

Three publications by Volpe Center technical staff, prepared on behalf of the National Highway Traffic Safety Administration (NHTSA), have been judged by a panel of engineering experts to be among the most outstanding technical papers submitted to the Society of Automotive Engineers (SAE) in 2003. These papers appear in the *SAE Journal of Passenger Cars – Electronic and Electrical Systems*, published in September 2004. Dr. Wassim Najm and Mr. Andy Lam of the Advanced Safety Technology Division co-authored "Analysis of Braking and Steering Performance in Car-Following Scenarios" (SAE paper 2003-01-0283). Find this paper at <http://www-nrd.nhtsa.dot.gov/pdf/nrd-12/SAE2003-01-0283.pdf>. Dr. Najm and Mr. Jonathan Koopmann, also of the Division, co-authored "Characterizing the Capability of a Rear-End

Crash Avoidance System” (SAE paper 2003-01-2262) and “Identification of Traffic States from Onboard Vehicle Sensors” (SAE paper 2003-01-0535). These papers resulted from the Volpe Center's research, on behalf of NHTSA's Office of Advanced Vehicle Safety Research, to assess the safety effectiveness of an automotive rear-end crash avoidance system built by General Motors and Delphi Electronics.



Continued Refinement of Congestion Management Tool (FAA)

Among the many challenges facing U.S. aviation, one of the most important is enhancing the efficiency of air-traffic flow while maintaining safety. Accordingly, the Volpe Center supports the Federal Aviation Administration (FAA) in addressing the integration of new technologies and techniques that enable more effective responses to changing conditions, such as flight delays and weather. The Enhanced Traffic Management System (ETMS) — a decision-support tool and automation system developed and operated by the Center for the FAA — integrates real-time flight and weather data from multiple sources, presenting information graphically in a highly adaptable format. Traffic managers throughout the country use ETMS to track, anticipate, and manage the flow of air traffic throughout U.S. airspace, and ETMS supports the FAA's Collaborative Decision Making program, which enables collaborative and more effective airspace management (see sidebar).

Since introducing ETMS in 1988, Volpe's ETMS team continues to refine the system to meet evolving user needs and to incorporate emerging technologies. Recent innovations include improved weather-information sharing, the inclusion of business aviation users, and expanded international capabilities.

In fall 2004, new functionality was added to ETMS to support FAA's planned implementation of Reduced Vertical Separation Minimum (RVSM) in January 2005. RVSM technology will permit reduction of aircraft vertical separations from 2,000 feet to 1,000 feet and thereby increase airspace capacity. ETMS will flag non-RVSM equipped aircraft so air traffic managers can provide those flights with special attention. Other recent innovations include improved weather-information sharing, the inclusion of business aviation users, and expanded international capabilities.

The FAA's Collaborative Decision Making (CDM) Program is a government-industry partnership that aims to improve information sharing and collaboration among the airlines, other users, and the FAA's air traffic management and control organization. The general aviation industry recently joined CDM.

St. Lawrence Seaway Buoy Positioning System Upgraded (SLSDC)

In 2002, on behalf of the Saint Lawrence Seaway Development Corporation (SLSDC), the Volpe Center implemented a vessel communications and tracking network based on the latest Automatic Identification System (AIS) technology. The Center provides technical support to SLSDC in maintaining full operational status of its AIS network, which promises improved safety, security, and efficiency throughout the Seaway. Project tasks include optimizing the AIS network and providing support to resolve operational issues. The Center also provides training to Seaway technical staff for configurations, operation, and maintenance of AIS network control software.

In August 2004, the existing buoy positioning system on Seaway tugs was upgraded with state-of-the-art electronics and chart-display software to provide all-weather navigation and buoy-placement capabilities. As part of system deployment, the Center installed and integrated vessel-tracking transponders and Differential Global Positioning System navigation receivers on Seaway workboats, and provided training in system operations. The Volpe team includes Mr. Kam Chin, Mr. David Phinney, Mr. Daniel Nim, and Mr. Henry Wychorski of the Technology Applications and Deployment Division.



Volpe Center Hosts Symposium on Balancing Security and Mobility

On May 6, 2004, the Volpe Center hosted a one-day symposium on Balancing Security and Mobility, the third in a series of recent outreach events sponsored by the Center to highlight current research and development efforts in innovative transportation technologies. The symposium featured three panels. The first examined the different objectives of DOT and Department of Homeland Security (DHS), and the challenges of incorporating homeland security requirements into the existing procedures for meeting the nation's transportation safety and mobility needs. The speakers emphasized that the DOT response-and-recovery operations reinforce the DHS security goals, and that making infrastructures and vehicles safer and more robust would also support the DHS goals, as they create a system that is more resistant to catastrophic attacks.

The second panel focused on new frontiers in biotechnology, nanotechnology, robotics, remote sensing, and simulation, and highlighted the applications of these technologies for traffic monitoring, security surveillance, and the processing of passenger and vehicular traffic at ports and border

crossings. The final panel examined the challenges and prospects of integrating security into the global transportation system. Panelists discussed ways to make security countermeasures economically and operationally sustainable, globally enforceable, and conducive to infrastructure resilience and transparent supply chains. The symposium concluded with a plenary session where the attendees and speakers agreed that significant progress had been made in aligning the two agencies' security and transportation mobility objectives, but that challenges remain in ensuring operational feasibility, user acceptance, economic viability, and long-run sustainability of many security countermeasures. Dr. Bahar Barami of Volpe's Economic and Industry Analysis Division organized the symposium.

Controlling Hazardous Materials in the U.S. and Military Mail Systems (USPS)

One of the greatest challenges facing the U.S. Postal Service (USPS) is the control of hazardous materials (HAZMAT), both declared and undeclared, in the mailstream. Many of these materials are common household items, such as cosmetics, cleaning supplies, alcoholic beverages, and aerosols. In the wrong circumstances, seemingly mundane items can become deadly. The Volpe Center is supporting the USPS in its efforts to train postal employees and military personnel, and to inform the public, about HAZMAT. For the Army Post Office/Fleet Post Office, the Center developed a set of training materials consisting of a 30-minute video titled *Keep the Mail Safe One Parcel at a Time*, job aides, and posters for military personnel that staff overseas, domestic, and fleet mail-acceptance facilities. Mr. Terry Sheehan of the Service and Operations Assessment Division assisted in the video production, as well as in training validation aboard the USS *Harry S. Truman* and the USS *Iwo Jima* in Norfolk, Virginia.

The Center also developed HAZMAT training materials to help the USPS streamline the standard operating procedures for retail facilities and for processing and distribution facilities to ensure that all USPS mailing guidelines are uniformly understood, implemented, and communicated to employees and the public. In March 2004, Mr. Sheehan joined USPS officials in Seattle, Chicago, Salt Lake City, and Denver to lead focus groups assessing the training materials. Two training videos were produced in spring 2004: a retailing video, *Be Part of the Solution*, and a processing and distribution video, *Thinking Outside of the Box*. Input from the focus groups and early response to the videos was used to prepare train-the-trainer sessions delivered throughout the summer. More than 600 USPS trainers are now delivering HAZMAT training to more than 300,000 USPS employees nationwide.

Awards

- **FAA Safe Flight 21 Team Achievement Award.** On April 13, 2004, Volpe staff from the Surveillance and Assessment Division and the Airport Surface Division received the Federal Aviation Administration Safe Flight 21 Team Achievement Award for outstanding work in the Gulf of Mexico and the East Coast ADS-B (Automatic Dependent Surveillance-Broadcast) Deployment effort. Dr. Mike Geyer, Mr. Chris Daskalakis, Mr. Khang Nguyen, Ms. Sarasina Suljoadikusumo, Mr. Steve Nuzzi, Mr. Allen Mackey, Mr. Angelo V. Rallo, Mr. Ray Lambert, Mr. Brent Midwood, and Mr. Theofilos Papadopolous earned the award for developing and demonstrating improved aviation surveillance capabilities for the FAA.
- **Transportation Research Forum Student Paper Award.** On March 22, 2004, Ms. Sarah Dammen of the Economic and Industry Analysis Division presented a paper at the 45th Annual Transportation Research Forum (TRF) in Evanston, Illinois. Ms. Dammen's paper, "The Effects of Safety Practices, Technology, and Firm Characteristics on Motor Carrier Safety," won the TRF's graduate student paper contest.
- **International Society of Logistics (SOLE) Award.** Dr. Bahar Barami of the Economic and Industry Analysis Division received recognition from SOLE for her paper, "Technology Fixes for the New Global Risks: Do They Address Asymmetric and Non-linear Threats," which appeared in the January-March 2003 edition of Logistics Spectrum. SOLE selected it as the best paper published during 2003. Find the paper at http://www.volpe.dot.gov/library/published/spectrum_1102.doc.

Published & Presented

- Dr. Bahar Barami of the Economic and Industry Analysis Division presented:
 - **"Embedded Technologies to Secure the Supply Chain from End to End"** on September 2, 2004, at SOLE 2004, the annual conference of the International Society of Logistics, in Norfolk, Virginia. Find the paper at http://www.volpe.dot.gov/library/published/sole_2004.doc.
 - **"Market Trends in Homeland Security Technologies"** at the 2004 IEEE Conference on Technologies for Homeland Security, Cambridge, Massachusetts, April 21 and 22, 2004.
- Dr. Aviva Brecher of the Center's Office of Environmental Preservation and Systems Modernization presented the lecture **"Balancing Transportation, Energy and the Environment"** on March 9, 2004, at the Claremont Athenaeum, Claremont McKenna College, Claremont, California. The lecture was part of the Volpe Center's Outreach and Education Activity.
- Mr. Jeffrey Bryan and Ms. Ann Steffes of the Planning and Policy Analysis Division were the primary authors of the **"District of Columbia Motor Carrier Management and Threat Assessment Study,"** August 2004 which was submitted to the District of Columbia Department of Transportation.

- Dr. Judith Burki-Cohen of the Operator Performance and Safety Analysis Division co-authored “**Task and Vehicle Dynamics Based Assessment of Motion Cueing Requirements,**” *Proceedings of the American Institute of Astronautics Modeling and Simulation Technologies Conference*, August 16-19, 2004, Providence, Rhode Island. (Paper 2004-5154)
- Ms. Brittany Campbell of the Advanced Safety Technology Division presented “**Safety and Business Benefit Analysis of NASA’s Aviation Safety Program**” at the American Institute of Aeronautics and Astronautics 4th Aviation Technology, Integration, and Operations Forum, Chicago, Illinois, September 20-23, 2004.
- Dr. Kim Cardosi of the Operator Performance and Safety Analysis Division wrote *Human Factors Integration Challenges in the Air Route Traffic Control Center (ARTCC) Environment*, published May 2004. (DOT-VNTSC-FAA-04-07, DOT/FAA/AR-04/18)
- Dr. Kim Cardosi of the Operator Performance and Safety Analysis Division presented “**Rating the Severity of Runway Incursions,**” at the International Conference on Human-Computer Interaction in Aeronautics held in Toulouse, France, September 29-October 1, 2004.
- Ms. Anya A. Carroll of the Railroad Systems Division Division presented “**The Future of Intrusion and Obstacle Detection along High-Speed Rail Corridors with Highway Rail Intersections in the United States**” at the 10th International Conference on Information Systems Analysis and Synthesis: ISAS 2004 and International Conference on Cybernetics and Information Technologies, Systems and Applications: CITSA 2004, held in Orlando, Florida, July 22-25, 2004. She also presented “**A Global Perspective on Grade Crossing Safety**” at FTA’s 8th Annual State Safety Oversight Workshop, Boston, Massachusetts, September 19-23, 2004.
- Dr. James V. Carroll of the Surveillance and Assessment Division presented “**Radio-frequency Interference Mitigation Technologies for Aviation Precision Approach Operations**” at the Fourth Integrated Communications, Navigation and Surveillance Conference and Workshop held in Fairfax, Virginia, April 26, 2004.
- Mr. Kevin L. Clark and Ms. Melanie Soares of the Surveillance and Assessment Division authored *FogEye UV Sensor System Performance Characteristics*, published March 2004. (DOT-VNTSC-FAA-04-06)
- Ms. Sarah Dammen presented “**The Effects of Safety Practices, Technology Adoption, and Firm Characteristics on Motor Carrier Safety**” at the 45th Annual Forum of the Transportation Research Forum held in Evanston, Illinois, March 21-23, 2004.
- Mr. Marco daSilva of the Accident Prevention Division presented “**Railroad Infrastructure Security Research**” at the 2004 IEEE Conference on Technologies for Homeland Security, Cambridge, Massachusetts, April 21-22, 2004.

- Mr. Marco DaSilva of the Accident Prevention Division presented **“U.S. Prototype Research in Railroad Infrastructure Security Systems”** at the 8th International Level Crossing Symposium in Sheffield, United Kingdom, April 13, 2004. The paper was co-authored with Ms. Anya A. Carroll of the Railroad Systems Division and Mr. William Baron of the Infrastructure Protection and Operations Division.
- Mr. Allan J. DeBlasio of the Planning and Policy Analysis Division presented:
 - **“Effects of Catastrophic Events on Transportation System Management and Operations”** at the Workshop on Optimizing Resource Allocation for Transportation Infrastructure Protection, Madison, Wisconsin, May 20, 2004.
 - **“ITS During and After the 2003 Blackout”** at the ITS America 2004 14th Annual Meeting and Exposition, San Antonio, Texas, April 26-28, 2004.
- Mr. Allan J. DeBlasio of the Planning and Policy Analysis Division, Mr. Terrance J. Regan of Planners Collaborative, and Ms. Margaret E. Zirker of Cambridge Systematics co-authored:

- **Effects of Catastrophic Events on Transportation System Management and Operations: August 2003 Northeast Blackout Great Lakes Region**, published May 2004. (DOT-VNTSC-FHWA-04-02)
http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE//14021.html

- **Effects of Catastrophic Events on Transportation System Management and Operations: August 2003 Northeast Blackout New York City**, published March 2004. (DOT-VNTSC-FHWA-04-04)
http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE//14023.html

- **Effects of Catastrophic Events on Transportation System Management and Operations: Comparative Analysis**, published May 2004. (DOT-VNTSC-FHWA-04-03)
http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE//14024.html

- **Effects of Catastrophic Events on Transportation System Management and Operations: Executive Summary of the August 2003 Northeast Blackout Great Lakes and New York City**, published May 2004. (DOT-VNTSC-FHWA-04-05)
http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE//14022.html

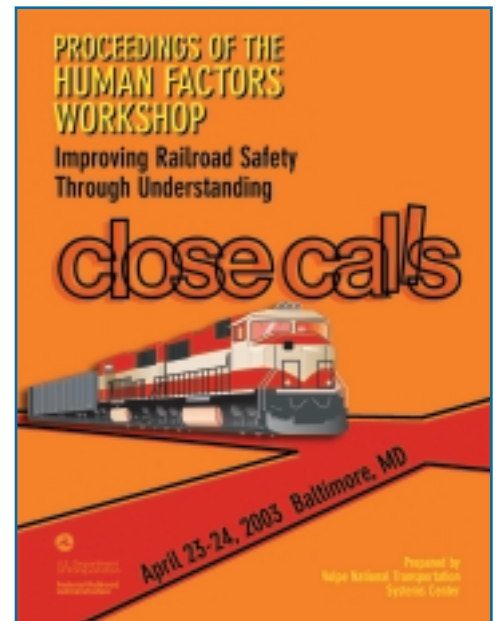


August 2003 Northeast Blackout. A Volpe team developed case studies documenting the actions taken by transportation agencies in the Great Lakes region and the New York City area in response to the blackout. This work is part of a larger effort to examine the impacts of catastrophic events on transportation system facilities and services and the role that intelligent transportation systems play in emergencies. Shown above: Region of the United States affected by the electrical power loss from the August 14, 2003 blackout.

- Mr. Michael Dinning of the Office of Environmental Preservation and Systems Modernization presented the lecture “**Challenges in Implementing Transportation Security and Logistics Management Technologies**” to students in the Electrical Engineering and Computer Science Department at the University of Massachusetts at Lowell on March 2, 2004.
- Mr. Gregg Fleming, Chief of the Environmental Measurement and Modeling Division, presented “**The Future of Aircraft Noise Research**” at the National Conference on Noise Control Engineering, held in Baltimore, Maryland, July 12-14, 2004.
- Mr. Arthur Flores of the Environmental Measurement and Modeling Division presented “**Mutual Acceptance of OIML Recommendation 126 Testing**” at the 17th International Conference on Alcohol, Drugs, and Traffic Safety, held in Glasgow, Scotland, August 8-13, 2004. On April 25, 2004, he presented “**Alcohol Concentration Extrapolation**” at the Annual Meeting of the International Association for Chemical Testing.
- Mr. Kevin Green of the Transportation Strategic Plans and Programs Development Division presented “**Technology to Increase CAFE**” at the 12th Annual National Energy Modeling System/Annual Energy Outlook Conference in Washington, D.C. on March 23, 2004.
- Dr. James Hallock, Chief of the Aviation Safety Division, and Dr. Frank Wang of the Surveillance and Assessment Division co-authored *Summary Results from Long-Term Wake Turbulence Measurements at San Francisco International Airport*, published July 2004. (DOT-VNTSC-FA27-PM-04-13)
- Mr. Robert Hoaglund of the Infrastructure Protection and Operations Division presented “**The Future of Security**” at the National Cargo Security Council Seminar, at Baltimore, Maryland, July 17-20, 2004, and “**Security in the Terminal and Beyond,**” at the 2004 IEEE Conference on Technologies for Homeland Security, Cambridge, Massachusetts, April 21-22, 2004.
- Mr. Robert Hoaglund of the Infrastructure Protection and Operations Division presented a lecture titled “**Cargo Security Best Practices in the Port Environment**” to students in the Cargo Security Management Course at the Global Maritime and Transportation School of the U.S. Merchant Marine Academy in Kings Point, New York, March 16, 2004.
- Ms. Karina Jacobsen, Mr. David Tyrell, and Dr. Benjamin Perlman of the Structures and Dynamics Division co-authored “**Impact Test of a Crash-Energy Management Passenger Rail Car,**” presented at the 2004 ASME/IEEE Joint Rail Conference, Baltimore, Maryland, April 6-8, 2004. (RTD2004-66045)

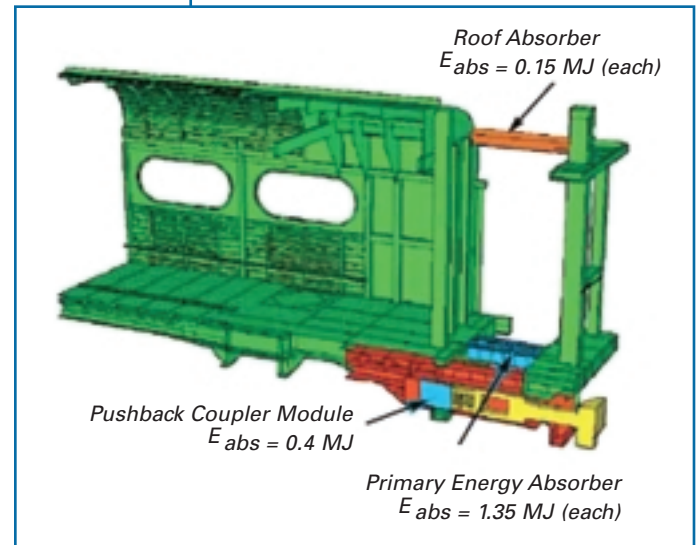
http://www.volpe.dot.gov/sdd/docs/2004/rail_cw_2004_1.pdf

- Dr. Douglass Lee of the Economic and Industry Analysis Division, Mr. Kevin Gay of the Service and Operations Assessment Division, and Ms. Anya Carroll, Mr. Adrian Hellman, and Ms. Suzanne Sposato, all of the Railroad Systems Division, co-authored *Benefit-Cost Evaluation of a Highway-Railroad Intermodal Control System* (ICS), published June 2004. (FHWA-JPO-04-055)
http://www.itsdocs.fhwa.dot.gov/JPODOCS/REPTS_TE//14017.html
- Dr. Douglass Lee of the Economic and Industry Analysis Division wrote “**Making the Case for ITS Investment,**” published in *Assessing the Benefits and Costs of ITS*, David Gillen and David Levinson, eds., Boston: Kluwer Academic Publishers, 2004.
- Ms. Esther Lee of the Planning and Policy Analysis Division, and Ms. Robin Smith and Ms. Felicia Young, both of the Federal Highway Administration Office of Planning, co-authored Domestic Scan Tour II Report, *The Integration of Land Use and Transportation Planning: Lessons Learned from the Second Domestic Scan Tour*, published May 2004. (DOT-VNTSC-FHWA-04-01)
<http://www.planning.dot.gov/Documents/DomesticScan/domscan2.htm>
- Ms. Esther Lee of the Planning and Policy Analysis Division presented “**Land Use and Transportation Coordination: Lessons Learned from Domestic Scan Tour I and II**” at the 29th Annual Conference of the National Association of Environmental Professionals April 25-28, 2004, in Portland, Oregon.
- Mr. Seamus McGovern of the Airport Surface Division presented:
 - “**Demanufacturing Strategy Based Upon Metaheuristics,**” at the 2004 Industrial Engineering Research Conference, Houston, Texas, May 15-19, 2004.
 - “**Multi-Objective Optimization in Disassembly Sequencing Problems,**” at the 2nd World Conference on Production & Operations Management and the 15th Annual Production & Operations Management Conference, Cancun, Mexico, April 30-May 3, 2004.
 - “**Metaheuristic Technique for the Disassembly Line Balancing Problem,**” at the Northeast Decision Sciences Institute 33rd Annual Meeting, Atlantic City, New Jersey, March 24-26, 2004.
- Dr. Jordan Multer of the Operator Performance and Safety Analysis Division, and Ms. Jane Saks and Ms. Katherine Blythe both of EG&G Technical Services (a Volpe on-site contractor), produced *Proceedings of the Human Factors Workshop: Improving Railroad Safety through Understanding Close Calls*, published May 2004. (DOT-VNTSC-FRA-04-01, DOT/FRA/ORD-04/03)
<http://www.fra.dot.gov/downloads/Research/ord0403.pdf>
- Dr. Eric Nadler of the Operator Performance and Safety Analysis Division, with Ms. Rosa Oseguera-Lohr of the NASA-Langley Research Center, co-wrote *Effects of an Approach Spacing Flight Deck Tool on Pilot Eyescan*, published as a NASA technical memorandum. (NASA/TM-2004-212987)
<http://techreports.larc.nasa.gov/ltrs/PDF/2004/tm/NASA-2004-tm212987.pdf>



Improving Railroad Safety Through Understanding Close Calls. For the FRA, a Volpe team designed and led a human factors workshop, "Improving Railroad Safety Through Understanding Close Calls," to educate the railroad industry on the benefits of understanding close call events and the challenges to the implementation and success of a close call reporting system. Input from workshop participants, representing a cross-section of industry stakeholders, led to the initiation of the Confidential Close Call Reporting System Demonstration Program, now underway at the Volpe Center. Workshop proceedings were published in May 2004.

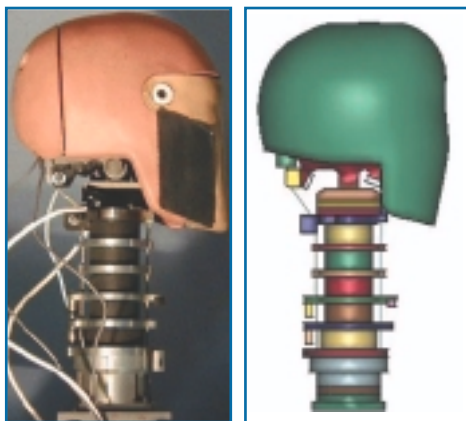
- On March 8, 2004, Dr. Wassim Najm of the Volpe Center's Accident Prevention Division presented a technical paper titled **"Modeling Driver Response to Lead Vehicle Decelerating"** at the Society of Automotive Engineers 2004 World Congress in Detroit, Michigan. Dr. Najm co-authored the paper with Dr. David L. Smith of the National Highway Traffic Safety Administration's Advanced Vehicle Safety Research Division.
- Mr. Daniel Parent, Mr. David Tyrell, and Dr. Benjamin Perlman of the Structures and Dynamics Division co-authored **"Crashworthiness Analysis of the Placentia, CA Rail Collision,"** presented at the ICrash 2004, International Crashworthiness Conference, San Francisco, California, July 14-16, 2004.
http://www.volpe.dot.gov/sdd/docs/2004/rail_cw_2004_4.pdf
- Mr. Sean Peirce and Ms. Jane Lappin of the Economic and Industry Analysis Division co-wrote **"Why Don't More People Use Advanced Traveler Information? Evidence from Seattle, Washington,"** Proceedings of the ERTICO Intelligent Transport System & Services Congress & Exhibition, Budapest, Hungary, May 24-26, 2004.
- Mr. Sean Peirce, Mr. Sodany Sor, and Ms. Sari Radin of the Economic and Industry Analysis Division co-wrote **"Hazardous Materials Incident Costs: Estimating the Costs of the March 25, 2004, Tanker Truck Crash in Bridgeport, Connecticut,"** for the Office of Hazardous Materials Safety, Research and Special Programs Administration, August 2004.
- Mr. Stephen Popkin of the Operator Performance and Safety Analysis Division presented:
 - **"The Operator Fatigue Management Program: A Multimodal Initiative for the Transportation Enterprise"** at the Maritime Institute of Technology and Graduate School's: Human Factors Conference, Linthicum Heights, Maryland, April 27, 2004.
 - **"Railroad Dispatcher Workload, Stress and Fatigue,"** Railroad Dispatching Operations: A Tool for Traffic Planners and Dispatchers, Scottsdale, Arizona, September 30, 2004.
- Dr. Alan Rao of the Railroad Systems Division presented **"Applying Geospatial Technology in Homeland Security: A Review of the Latest Developments"** at the 2004 IEEE Conference on Technologies for Homeland Security, Cambridge, Massachusetts, April 21-22, 2004.
- Dr. Judith Rochat of the Environmental Measurement and Modeling Division presented:
 - **"Evaluating Tire/Road Noise for Multiple Pavements – Route 138 Study Update"** and **"FHWA's Traffic Noise Model (TNM) Version 2.5 Validation Results"** at the National Conference on Noise Control Engineering, Baltimore, Maryland, July 12-14, 2004. She co-wrote **"Quiet Pavement Technologies—An FHWA/AASHTO European Scan,"** also presented at the conference.



Crashworthiness Analysis Report. The specific crash energy management design selected for the rail car test is a series of trigger mechanisms and crushable components that, when activated, cause the end of the car to crush in a controlled manner. There are three primary crushable elements: the pushback coupler module, the primary energy absorbers, and the roof absorbers.

- **“Using Quiet Pavements to Help Reduce Highway Traffic Noise: Wayside Noise Measurement Studies in California and Arizona and FHWA’s Quiet Pavement Pilot Program”** at the 29th Annual Conference of the National Association of Environmental Professionals, Portland, Oregon, April 26-27, 2004.
- Dr. Judith Rochat and Mr. Gregg Fleming of the Environmental Measurement and Modeling Division wrote *TNM Version 2.5 Addendum to Validation of FHWA’s Traffic Noise Model (TNM): Phase 1*, published July 2004. (DOT-VNTSC-FHWA-02-01 Addendum)
http://www.volpe.dot.gov/acoustics/docs/2000/dts-34-04_1.pdf
- Ms. Nicole Rossbach of the Environmental Engineering Division presented **“NEPA Compliance Process for the National Parks Air Tour Management Plan Program”** at the 29th Annual Conference of the National Association of Environmental Professionals, April 25-28, 2004, Portland, Oregon. Ms. Amishi Joshi and Ms. Jen Papazian, also of the Division, co-authored the paper.
- Dr. Thomas Sheridan presented **“Rating the Severity of Close-Call Events,”** co-authored by Dr. Kim Cardosi and Dr. Daniel Hannon also of the Division, on March 21, 2004, at the Human Performance, Situation Awareness, and Automation Technology Conference, Daytona Beach, Florida.
- Dr. Ted Sussmann of the Structures and Dynamics Division presented **“Trackbed Deflection Under Combined Freight and High Speed Passenger Service,”** at the American Society of Civil Engineers Geo-Trans 2004 Conference, Los Angeles, California, July 30, 2004.
- Mr. Anthony Swierzbin and Mr. Timothy Hall of the Aviation Safety Division presented **“Data Card Authentication Process,”** at the 2004 IEEE Conference on Technologies for Homeland Security, Cambridge, Massachusetts, April 21-22, 2004.
- Dr. Frank Wang of the Surveillance and Assessment Division co-wrote **“Aircraft Wake Vortex Measurements at Denver International Airport,”** 10th AIAA/CEAS Aeroacoustics Conference, Manchester, England, May 10-12, 2004. AIAA 2004-2880.
<http://techreports.larc.nasa.gov/ltrs/PDF/2004/aiaa/NASA-aiaa-2004-2880.pdf>
- Dr. Frank Wang, Mr. Kevin Clark, Mr. Hadi Wassaf, and Mr. Andrew Gulsrud of the Surveillance and Assessment Division co-wrote **“Passive Wake Acoustics Measurements at Denver International Airport,”** 4th NASA Integrated CNS Conference and Workshop, Fairfax, Virginia, April 26-30, 2004.
- Dr. Frank Wang and Mr. Hadi Wassaf of the Surveillance and Assessment Division co-wrote **“Sound Generation by Aircraft Wake Vortices Interacting with the Ground Plane,”** 10th AIAA/CEAS Aeroacoustics Conference, Manchester, England, May 10-12, 2004. AIAA 2004-2881.

- Dr. Michelle Yeh of the Operator Performance and Safety Analysis Division delivered the final report *Human Factors Considerations in the Design and Evaluation of Moving Map Displays of Ownship on the Airport Surface*, September 2004. DOT-VNTSC-FAA-04-11, DOT/FAA/AR-04/39 <http://www.volpe.dot.gov/opsad/docs/smm.pdf>
- Dr. Michael Zuschlag of the Operator Performance and Safety Analysis Division co-authored “**Effects of Head-Up Display Airspeed Indicator and Altimeter Formats on Pilot Scanning and Attention Switching**,” presented at the Human Performance, Situation Awareness, and Automation II Conference, Daytona Beach, Florida, March 20-25, 2004 and “**Hidden Markov Models as a Tool to Measure Pilot Attention Switching During Simulated ILS Approaches**,” presented at the 12th International Symposium on Aviation Psychology, Dayton, Ohio, April 14-17, 2004, pp. 502-507.
- Dr. Michael Zuschlag of the Operator Performance and Safety Analysis Division presented “**Quantification of Visual Clutter Using a Computational Model of Human Perception: an Application for Head-Up Displays**” on March 21, 2004, at the Human Performance, Situation Awareness, and Automation Technology Conference, Daytona Beach, Florida.
- Volpe Center staff wrote “**Head-Neck Finite Element Model of the Crash Test Dummy THOR**,” which appeared in the March 2004 issue of the *International Journal of Crashworthiness*. Dr. Hailing Yu of EG&G Technical Services (under contract to the Volpe Center) was lead author. Co-authors included Dr. Marisol Medri also of EG&G, Mr. Frank DiMasi of the Vehicle Crashworthiness Division, Dr. Qing Zhou, formerly with EG&G, and Dr. Faris Bandak, formerly with the Volpe Center. Last year, the Division completed the development of a finite element model of the THOR crash test dummy for the National Highway Traffic Safety Administration’s National Transportation Biomechanics Research Center.



At left: the THOR physical dummy. At right: the Volpe-developed THOR finite element model.

Focus

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controlled, reported on, and closed out. Standard Practices are currently being implemented for all projects. The second is an integrated management tool called the Project Management System, which will provide project managers with the information they need to efficiently accomplish projects. This enterprise management tool will also provide a portfolio management information database, containing management-actionable data, to facilitate informed business management decisions and support long-range business planning. Additionally, the Center has established a Web-based Project Management Resource Center on the Volpe Intranet, where project managers can access valuable tools and reference materials.

Dr. Tompkins will work with Volpe Center leadership to formulate plans and continue activities that will enable the Center to transform itself into a higher performing organization. He will support the Volpe Center’s mission to develop and improve the transportation system, consistent with the mission and goals of RSPA and the DOT, and the wise investment of federal dollars.

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