

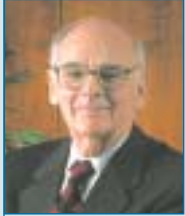


# HIGHLIGHTS

Cambridge, Massachusetts

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National Transportation Systems Center



*Richard R. John*

## Director's Notes

*"With a new national commitment, our scientists and engineers will overcome obstacles ... so that the first car driven by a child born today could be powered by hydrogen, and pollution-free."*

President George W. Bush, State of the Union Address, January 2003

### The Future of Transportation

In the State of the Union address, President George W. Bush introduced a hydrogen fuel initiative that would reduce America's dependence on imported oil by developing the technology for commercially viable hydrogen-powered fuel cells to power cars, trucks, homes, and businesses with no pollution or greenhouse gases. The Department of Transportation and its administrations support this initiative, and the Research and Special Programs Administration's Volpe Center makes a significant contribution. The Focus article in this issue of *Highlights* presents an overview of the Center's work in this area.

The safe, efficient integration of hydrogen fuel into the transportation system will

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### Inside

- Evaluating a **Drowsy Driver** Warning System
- Deploying 511: **National Travel Information**
- Determining Delays** that Affect ITS Projects
- Deploying **Antiterrorism Technology**

## Focus



The safe and efficient transport and delivery of hydrogen will lay the foundation for advancing the President's Hydrogen Initiative. RSPA is bringing the DOT perspective to interagency and industry collaborations that support this initiative.

### *Supporting the Hydrogen Fuel Initiative*

The President's Hydrogen Initiative presents the challenge and the opportunity to develop technology for commercially viable hydrogen fuel cells to power vehicles, homes, and businesses. Hydrogen holds great promise as the United States seeks to reduce its dependence on oil and limit impacts to the environment. However, before hydrogen can be a significant energy resource for the nation, many technical, operational, and economic barriers must be overcome.

### *RSPA Helps Determine the DOT's Critical Role*

Hydrogen, like other transportation fuels, is a hazardous material, so its safe, reliable, and efficient production, storage, transport, and delivery is critical. The Research and Special Programs Administration (RSPA), the Volpe Center's parent agency, has been assigned to lead the coordination of the Department of Transportation's (DOT's) contribution to the President's Hydrogen Initiative. With its expertise in both hazardous materials delivery and transportation systems, RSPA is uniquely qualified

for the job. RSPA's Deputy Administrator, Sam Bonasso, heads up the DOT's Hydrogen Working Group, which includes senior staff from the DOT modal administrations. The Volpe Center is engaged in interagency efforts and public-private partnerships that are determining how hydrogen could be integrated into energy and transportation delivery. Successful solutions will help build a foundation for the nation's potential conversion to a hydrogen economy.

In support of the RSPA Administrator's office, Mr. William P. Chernicoff of the Service and Operations Assessment Division serves as a key DOT representative in several Hydrogen Fuel Initiative panels and working groups. He participates in the Office of Science and Technology Policy – Executive Office of the President's interagency hydrogen working group. An interagency taxonomy is being developed, and Mr. Chernicoff is coordinating this effort within DOT. Mr. Chernicoff chairs the hydrogen safety codes and standards working team of the DOT's Hydrogen Working Group. This activity leverages several years of active involvement in numerous codes and standards consensus activities.

Deputy Administrator Bonasso is the DOT representative to the California Fuel Cell Partnership (CaFCP). CaFCP advances research on the nationwide implementation of fuel-cell powered vehicles through demonstrations of fuel cell electric buses and cars under real-world operating conditions. Its committees work to coordinate and ensure safe vehicle deployment and infrastructure, and to support standards-development bodies by providing operational data. Mr. Chernicoff is supporting the Administrator's office as the technical representative on the CaFCP safety and codes and standards working groups. Additionally, he served as a merit reviewer and a participant on the technical advisory team of the 2003 Hydrogen and Fuel Cell Review for the Department of Energy (DOE), and provides DOT perspectives and expertise to DOE's materials compatibility and hydrogen release modeling activities.

### ***Volpe Supports DoD Demonstration Program***

The National Automotive Center (NAC) is the U.S. DoD/Army focal point for collaborative dual-use ground vehicle research and development. It links industry, academia, and government agencies in the development and exchange of automotive technologies. An interdisciplinary Volpe team is working on a NAC-sponsored program, run by Vehicle Projects LLC, to develop the world's first fuel-cell powered, road-switcher locomotive. The full-size locomotive will be fabricated from a U.S. Army surplus GP-10 locomotive chassis. The target date for the operational

For several years, the Volpe Center has been active in research and technical exchange regarding hydrogen, fuel cell, alternative fuel, and advanced propulsion technologies.



*A U.S. Army surplus locomotive will be converted to the world's first fuel-cell powered, road-switcher locomotive.*

locomotive is 2005. The three-phase project will include 1) feasibility and design; 2) construction of the locomotive; and 3) operations and testing. Various options are being evaluated in Phase 1 for fuel selection and the actual fuel cell to be used, and Volpe is providing critical assessments of the economics, marketability, and safety issues. The Volpe team includes Mr. Chernicoff and Mr. Scott Lian of the Service and Operations Assessment Division; Dr. Alan Rao of the Railroad Systems Division and Mr. Ross Gill, Acting Chief of that division; and Dr. Don Pickrell of the Office of System and Economic Assessment.

***Volpe Supports Public Transit Applications***

The use of alternative fuels to power transit buses is steadily increasing. Volpe has supported the Federal Transit Administration’s Clean Air Program for several years, preparing a series of reports on the safe use of alternative fuels for bus operations. Individual reports focus on compressed natural gas, liquefied petroleum gas, liquefied natural gas, methanol/ ethanol, electric power, and hybrid electric power, as well as hydrogen. The reports provide overviews of alternative-fuel bus technologies and recommended practices for safe, reliable vehicles and infrastructure. Training for operations, maintenance, and emergency response personnel is emphasized. Currently, Mr. Chernicoff is leading an effort to develop a fuel cell vehicle and infrastructure maintenance training manual and program.

***The Fuel of the Future***

Realizing the vision of a clean, sustainable transportation system will depend on the cooperation of many organizations. As RSPA takes the lead in defining DOT’s critical role in this national effort, the Volpe Center will continue to support the development of safe, secure, hydrogen-powered technology.



*Transit buses present a highly suitable arena to address the many challenges associated with a shift to a hydrogen economy.*



***Evaluating a Drowsy Driver Warning System (NHTSA and FMCSA)***

Every year, thousands of people are injured or killed in vehicle crashes associated with drowsiness. The National Highway Traffic Safety Administration (NHTSA) and the Federal Motor Carrier Safety Administration (FMCSA) are two of the federal agencies that are pursuing ways to reduce drowsy driving. The Volpe Center will evaluate the effectiveness of a commercially available drowsy driver warning system (DDWS)

for NHTSA and FMCSA under the DOT's Intelligent Vehicle Initiative Program, which promotes the deployment of advanced technology systems that are proven to be effective in reducing highway vehicle crashes. The DDWS is designed to alert a vehicle operator when it detects signs of drowsiness.

Data to evaluate the DDWS will be collected in a field operational test involving 102 commercial truck drivers from both long-haul and overnight operations. Additional information will be gathered through questionnaires and focus groups. The Volpe team has established five evaluation goals for the project, which will assess:

1. Safety benefits of the device
2. Driver acceptance
3. Performance and capability of the device
4. Deployment prospects
5. Fleet management acceptance.

As the independent evaluator, the Volpe team has been working with the sponsors, the developer of the DDWS, and the systems integrator, the Virginia Tech Transportation Institute, which will outfit the trucks with the DDWS and collect data. A full-day project meeting at the Transportation Institute in October 2003 included a demonstration of the DDWS, a review of driving data that will be collected during the test, and data-sharing issues. Volpe team members presented their progress in preparing for the evaluation, in particular their work in estimating safety benefits and in developing the experimental design, or research protocol.

The Volpe team includes Dr. Bruce Wilson (principal investigator), Mr. Frank Foderaro, Mr. Greg Ayres, and Mr. Jon LeBlanc, all of the Accident Prevention Division, and Dr. Stephen Popkin and Dr. Heidi Howarth of the Operator Performance and Safety Analysis Division.



### ***Determining Delays that Affect ITS Projects***

Since its inception more than a decade ago, the DOT's Intelligent Transportation Systems (ITS) Program has supported the integration of advanced technologies that improve the safety and efficiency of the nation's transportation system. However, the implementation of ITS products and services continues to be affected by scheduling problems. To address this issue, the ITS Joint Program Office and the Federal



*The drowsy driver warning system uses low-level infrared signals (which are not visible) to monitor eye closure.*

Highway Administration (FHWA) Office of Operations asked the Volpe Center to identify major causes of project delay.

The Volpe Center recently conducted ten site visits and a case study to investigate the causes of delay in four phases of ITS projects: conception and planning, requirements analysis and design, construction and installation, and testing. The team first conducted a pilot review, in which team members tested their interview protocol. Then at each study site, team members interviewed staff from the FHWA and state department of transportation (DOT). The Volpe team examined projects developed through the transportation planning process and projects earmarked by Congress. The review included non-ITS projects to identify any meaningful differences and similarities in managing ITS projects versus non-ITS projects. The final report, "Delays Affecting ITS Projects – Summary of Findings," was submitted on October 30, 2003. The Volpe team includes Mr. Allan DeBlasio, Mr. David Jackson, and Ms. Dana Larkin of the Planning and Policy Analysis Division; Ms. Margaret Zirker of Cambridge Systematics (an on-site Volpe contractor); and Mr. Terrance Regan of Planners Collaborative (an on-site Volpe contractor).

The study findings revealed that ITS projects that involve software development, systems integration, or both accounted for a high percentage of the delays. Lack of experience by state DOT staff, consultants, contractors, and vendors also contribute to delays. The Volpe Center team noted, however, that state DOT staff members have learned to better foresee the challenges associated with ITS projects, have more knowledge as to how to overcome them, and have developed several positive approaches to address these issues. Now in some instances, the potential for delay is recognized early and projects are scheduled appropriately. The most significant of the positive approaches include devoting more resources to the development of system requirements, pre-qualifying contractors and vendors, having the systems integrator available during the design phase, and using innovative procurement methods.

For example, as part of a recent procurement process, the Connecticut DOT (ConnDOT) required bidders to submit designs and equipment specifications as well as references with their proposals. A ConnDOT procurement team reviewed the designs and specifications and requested clarifications and corrections to ensure that both met system requirements. As part of their implementation process, ConnDOT staff required the selected contractor to develop a prototype early in the project and to demonstrate the system by assembling at the contractor's location all of the equipment that would be installed in the field. Both the prototype testing and system demonstration identified several problems that were corrected before the equipment was installed along the highways.

The Volpe study noted several positive approaches that state DOTs use to address the challenges associated with deploying ITS projects.



*The Connecticut Department of Transportation developed an innovative procurement process for the implementation of a large-scale freeway management system that will enable the sharing of video and traffic data among traffic operations centers.*

***Deploying 511: the National Travel Information Phone Number***

Travel information phone numbers provide real-time traffic and transit information so users can plan trips based on weather, construction, schedule, or traffic conditions. In July 2000, when the Federal Communications Commission (FCC) designated 511 as the nationwide, three-digit telephone number for traveler information, an estimated 300 or more regional numbers were in existence. The FCC ruling provided the opportunity to consolidate the various travel information services into a nationwide service, but left the details of implementation up to states, localities, and private telecommunications providers. Given the absence of centralized control, a national coordinating body was formed. Supported by the U.S. DOT, the 511 Deployment Coalition includes the American Association of State Highway and Transportation Officials, the American Public Transportation Association, and the Intelligent Transportation Society of America. Its stated goal is to ensure “timely establishment of a national 511 traveler information service available to a majority of Americans by 2005 that is sustainable and provides value to users.” The Volpe Center is actively involved with the Coalition and other 511 initiatives that are working through a complex set of technical and public communication issues to help ensure that 511 services meet customers’ needs.



*Accurate traffic information can help travelers plan their trips to avoid congested areas. The Volpe Center supports several initiatives to provide a nationwide phone number for traveler information: 511.*

To accelerate the development of useful 511 service, FHWA awarded a Model Deployment Initiative to the Arizona Department of Transportation (ADOT) for enhancements to its 511 service. As National Evaluation Program Manager for the 511 Model Deployment Initiative, Ms. Jane Lappin of Volpe’s Economic and Industry Analysis Division directs the evaluation of this and other ITS evaluation projects on behalf of the ITS Joint Program Office. The national evaluation of ADOT’s 511 service is assessing impacts, determining benefits, and defining issues that will provide insight to other 511 deployers and to policy makers. Because customer acceptance and satisfaction are critical to the success of any 511 service, deployers need a high-quality monitoring and evaluation process. One product of the Arizona model will be a standard survey with which to measure customer satisfaction. Ms. Lappin is leading a task force of Coalition members that is guiding the development of this important survey, which other regional services will be able to customize to suit their needs. Mr. Sean Peirce and Ms. Margaret Petrella, also of the Economic and Industry Analysis Division, support Ms. Lappin in this activity.

The Volpe Center also supports other 511 initiatives. For example, the Federal Transit Administration (FTA) has expressed interest in increasing its support of transit agencies deploying 511, and has asked Volpe to provide background information to the FTA Office of Research, Demonstration and Innovation. In October, Mr. Peirce submitted a report, "Transit Agency Deployment of 511: Assessment of Current Issues," which examines the institutional and technical issues that transit agencies around the country face in providing information to their regional or statewide 511 system. It also summarizes the views of transit-authority members of the 511 Deployment Coalition, the coordinating body for 511, and presents recommendations to FTA regarding outreach activities.



### ***Developing and Deploying Antiterrorism Technology (CTTSO/TSWG)***

Volpe's Infrastructure Protection and Operations Division supports the Combating Terrorism Technology Support Office/Technical Support Working Group (CTTSO/TSWG), an interagency organization whose mission is to provide rapid research, development, and deployment of new technology for combating terrorism. Mr. John Wojtowicz of the Division, a core TSWG team member, participates in the CTTSO's program to develop antiterrorism technology for physical security with several international partners. This program determines which member governments have mutual requirements and identifies programs in which governments can share in technology development and funding. Over the last several months, Mr. Wojtowicz and representatives from U.S. antiterrorism force protection groups have met with government officials from the United Kingdom and Canada. Similar meetings in Singapore and Australia are expected in spring 2004.



### ***Performance-Based Government – A Different Way of Doing Business***

The Volpe Center has traditionally performed much of its work by creating and managing teams that best meet project needs. Teams are composed of federal staff augmented with external and on-site contractors. Federal staff always retains responsibility for and guides the work.

In response to several ongoing assessments, as well the President's emphasis on performance-based government, the Volpe Center is focusing on improving its business practices by moving the contractual purchasing method of the Center from a cost-plus-fixed fee to a performance-based contracting vehicle. Performance-based contracting is based on results rather than level of effort, and is part of a larger initiative to shift the government's role from one of managing a contract's processes to measuring performance outcomes. This kind of contracting is being used more frequently by all federal government agencies, and reflects a momentum to make contractors more accountable for their work. An integral part of this process is choosing appropriate performance measurements. This is usually done in collaboration with the contractor.

The Volpe Center has demonstrated its commitment to performance-based contracts with a dramatic increase in these awards from FY2003 to FY2004. The FY2003 total performance-based obligations for 2003 were \$9.4 million. By the end of the first quarter of FY2004, the performance-based contract awards had already exceeded the total for FY2003 and were at \$29.2 million, or 68 percent of eligible service. The Volpe Center's FY04 goal is to have performance-based contract awards at 50 percent – and the FY05 goal is to increase this to 80 percent. This sets a higher standard than the federal government has set for itself. To help ensure that contracting-related processes run smoothly, the Center has already initiated Center-wide training.

The Volpe Center is pleased to be part of this evolutionary change that establishes a new government-wide paradigm and will result in a more efficient way of doing business.

## Awards

- The Federal Aviation Administration conferred to the Volpe Center Wide Area Augmentation System (WAAS) Notice to Airmen (NOTAM) Team an Outstanding Performance Recognition on October 16, 2003. WAAS provides the Global Positioning System with increased accuracy, availability, and integrity. The software developed by the Volpe team predicts the availability of WAAS and disseminates this information to pilots via the NOTAM system. This effort supported the July 10, 2003, commissioning of WAAS for all phases of flight. Volpe team members include Ms. Karen Van Dyke, Ms. Jayne Rossetti and Mr. Chris Dufresne of the Center for Navigation, and Mr. Jon Parmet of the Surveillance and Assessment Division.

*"Performance-based contracting means structuring all aspects of an acquisition around the purpose of the work to be performed with the contract requirements set forth in clear, specific, and objective terms with measurable outcomes as opposed to either the manner by which the work is to be performed or broad and imprecise statements of work."*

Federal Acquisition Circular (FAC) 97-25,  
66 Fed. Reg. 22082 (May 2, 2001).

*"What matters most is completion. Performance. Results. Not just making promises, but making good on promises."*

President George W. Bush  
The President's Management Agenda, 2002



## Published & Presented

- Dr. Judith Bürki-Cohen, Operator Performance and Safety Analysis Division, and Dr. Tiau Go, Massachusetts Institute of Technology, delivered a paper, “The Effects of Enhanced Hexapod Motion on Airline Pilot Recurrent Training and Evaluation,” at the American Institute of Aeronautics and Astronautics Modeling and Simulation Technologies Conference in Austin, Texas, on August 13, 2003. The paper was authored by Dr. Bürki-Cohen, Dr. Go, Dr. Jeffery A. Schroeder of the National Aeronautics and Space Administration (NASA), Dr. Thomas Longridge of the Federal Aviation Administration (FAA), Mr. Sean Jacobs of the Operator Performance and Safety Analysis Division, Mr. William W. Chung of SAIC, and Mr. Ghislain Saillant of Northrop Grumman. The paper describes how Volpe and NASA reengineered the FAA/NASA Boeing 747-400 simulator to improve on the motion cues typically provided by training simulators to test the effect of enhanced motion on recurrent training and evaluation of airline pilots. In contrast to an earlier study using “as-is” motion, enhanced platform motion was found to make a difference in recurrent evaluation, but was still not found to benefit recurrent training. Results of this study and the previous hexapod motion research should assist the FAA in determining future research directions in its effort to develop motion requirements for today’s airline evaluation and training needs.
- In September 2003, the Volpe Center published a final report for the Center for Climate Change and Environmental Forecasting (CCCEF) entitled “Greenhouse Gas Reduction Through State and Local Transportation Planning.” The CCCEF, formed in May 1999 by the U.S. Department of Transportation (DOT), addresses issues associated with climate change and variability. The report, written by Mr. William Lyons of the Planning and Policy Analysis Division, with co-authors Ms. Kimberly Noerager, formerly of the Economic and Industry Analysis Division, and Mr. Scott Peterson, formerly of on-site contractor EG&G Technical Services, evaluates how states and local areas might contribute to greenhouse gas (GHG) emission reduction through transportation planning. The report uses seven case studies, focusing research on the broad transportation planning process, strategies and other actions selected, and GHG emissions reductions accomplished or projected. The report can be found at <http://climate.volpe.dot.gov/papers.html>.



- A Volpe team consisting of Mr. Michael Dyer and Mr. Mario Caputo of the Technology Applications and Deployment Division, Dr. Alan Rao of the Railroad Systems Division, and Mr. Paul Zebe of the Environmental Engineering Division have been supporting the U.S. Army Corps of Engineers (USACE) in its efforts to better manage its resources on the inland navigable rivers. The team recently completed the final draft report “Upper Mississippi River and Illinois Waterway: Non-Structural Measures Cost-Benefit Study,” which complements the USACE’s efforts to investigate and enhance the efficiency of the waterways by assessing proposed scheduling and fee collection regimes as alternatives to capital construction projects. On September 10, 2003, Mr. Dyer presented the study’s results in Washington, D.C., at a meeting of the Federal Principals Group, comprised of representatives of the USACE and several partner agencies, including the Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the Maritime Administration. On September 12, Mr. Dyer delivered the report to the USACE for presentation to the National Research Council and public review as a component of the USACE Feasibility Study for Navigational Improvements in the Waterway.
- A Volpe team presented a paper and a poster session at the 6th World Congress on Railway Research in Edinburgh, Scotland, on September 29 and 30, 2003. The World Congress promotes international sharing and cooperation in the fields of railway innovation and research covering operational, environmental, and safety management, as well as more traditional engineering issues. This year’s conference, which brought together more than 800 delegates from 33 countries, emphasized the need to revitalize busy existing conventional railways, as well as build new ones, to improve railway systems of the future.
- Mr. James Lamond, Railroad Systems Division, presented “The Aerodynamic Effects of High-Speed Trains on Surroundings, Train Operations, and People,” co-written by Mr. Harvey Lee, Structures and Dynamics Division, and Mr. Tom Tsai, Federal Railroad Administration. The paper assessed the potential safety issues associated with the aerodynamic forces created by high-speed trains as they pass people standing on platforms and lightweight empty container cars operating on adjacent tracks.
- Ms. Anya A. Carroll, Railroad Systems Division, presented a poster session, “Railroad Infrastructure Security Systems,” which presented work performed by Ms. Carroll, Mr. Marco daSilva of the Accident Prevention Division, and Mr. William Baron of the Infrastructure Protection and Operations Division that assessed the potential implementation issues associated with an automated prototype trespass monitoring and deterrent system currently being tested on a rail bridge in Pittsford, New York.



*Trespassers on a rail bridge in Pittsford, New York. Volpe is developing and testing a video-based trespass monitoring and detection system.*

- In October, the final report on the District of Columbia Tour Bus Management Initiative was delivered to the District of Columbia Department of Transportation, the National Capital Planning Commission, and partner agencies. The Volpe study addressed tour bus problems such as congestion, parking shortages, accidents, air pollution, and neighborhood intrusion. Potential solutions were identified and analyzed, leading to the recommendation of actions and an implementation strategy that can form the basis of a tour bus management plan. Ms. Melissa Laube of the Service and Operations Assessment Division led the study team, which consisted of Mr. David Spiller and Ms. Sara Secunda, also of the Division, and Ms. Esther Lee of the Planning and Policy Analysis Division.
- In support of the Volpe Center's various marine security projects, Mr. Robert Hoaglund of the Infrastructure Protection and Operations Division authored "Practice Makes Perfect?" an article featured in the October inaugural issue of *Cargo Security International Magazine*. The article highlights the upcoming publication of *International Cargo Industry Best Security Practices*, an analysis of foreign port security survey data collected by Mr. Hoaglund and Mr. Charles McCarthy, also of the Division, between 2001 and 2003. In developing this report, Volpe staff traveled to more than a dozen megaports worldwide in support of the U.S. Merchant Marine Academy, learning about procedures and techniques that can be applied to reduce the threat of cargo theft and terrorism. This report follows the Division's *Intermodal Cargo Transportation: Industry Best Security Practices*, published by the Center in 1999. It also complements the U.S. Coast Guard's Port Security Assessment Program, which is supported by staff members from Volpe's Technology Applications and Deployment Division and Infrastructure Protection and Operations Division.
- October 14 and 15, 2003, Mr. Chris Daskalakis of the Surveillance and Assessment Division participated in the Digital Avionics System Conference in Indianapolis, Indiana. Mr. Daskalakis chaired the session "Future CNS Applications and Architecture" which addressed communication, navigation, and surveillance in the National Airspace System. He also presented the paper "A Technical Evaluation of Multilateration and ADS-B in the Gulf of Mexico." The paper assessed technologies for offshore helicopter and high-altitude commercial aircraft applications and presented results from flight tests performed in the Gulf of Mexico over the past 13 months in support of NASA and the FAA.

## Director's Notes

*Continued from page 1*

require technical knowledge, leadership in bringing stakeholders together, an understanding of the need for collaboration between government agencies, and consensus building between government and the private sector. For several years, the Center has been engaged in collaborative work on codes, standards, and recommended practices for alternative fuel vehicles and related infrastructure, which will help provide the foundation for effective implementation.

Interest in hydrogen fuel-cell technologies goes beyond national borders. In support of the RSPA Administrator's Office, Volpe staff recently attended and supported the International Partnership for the Hydrogen Economy Ministerial meeting, which brought together energy ministers from 15 countries and the European Commission to discuss common areas of interest in, and obstacles to, the hydrogen economy.

Our engineering staff is also involved in the development of new vehicles, such as the world's first fuel-cell powered, road-switcher locomotive, and our analysts contribute to efforts to ensure the safety of using alternative fuels for transit.

*Continued on page 12*



*Dr. Rao discussed the Volpe-developed model RISK2, which answers questions such as "How safe is safe?" and "How many trains can safely run through this territory?" (See page 12)*

- Dr. Alan Rao of the Railroad Systems Division attended the Institute for Operations Research and Management Science Conference October 20 to 22, 2003, in Atlanta, Georgia. In addition to chairing a Transportation Session, he presented “Safety Standards for Computer/Processor-based Signal and Train Control Systems,” discussing the Volpe Center’s recent work on Base Case Risk Assessment (a performance-based model named RISK2) for the Federal Railroad Administration (FRA). The presentation, co-authored by Mr. Frank Roskind of the FRA, detailed RISK2 and how it applies both linear and non-linear methods to analyze failure rates and accident consequences in different railroad territories. The model studies the per-train-mile risk for future railroad development.
- On October 29 and 30, 2003, Mr. Seamus McGovern of the Airport Surface Division participated in the 2003 International Society for Optical Engineering (SPIE) International Symposium on Photonics Technologies for Robotics, Automation, and Manufacturing held in Providence, Rhode Island. This event attracts experts from industry, academia, and government to exchange information on emerging technologies and address the increasing synergy between traditional component technology areas of robotics sensors, controls, computing, and platform mechanization design. Mr. McGovern served as Chair for the Green Manufacturing Session, which addressed innovative practices in environmental management and manufacturing technology. He also presented two peer-reviewed technical papers for publication in the Symposium Proceedings: “2-Opt Heuristic for the Disassembly Line Balancing Problem” and “Use of Data Envelopment Analysis for Product Recovery.”
- Dr. Michelle Yeh of the Operator Performance and Safety Analysis Division co-authored the paper “Head-Up vs. Head-Down: The Costs of Imprecision, Unreliability, and Visual Clutter on Cue Effectiveness for Display Signaling,” published in the fall issue of *Human Factors, the Journal of the Human Factors and Ergonomics Society* (Volume 45, Number 3). The paper describes research conducted while Dr. Yeh was at the University of Illinois at Urbana-Champaign that bears on a number of new and ongoing Volpe projects related to cockpit displays and driver collision warning systems. The other contributors were Major James L. Merlo, U.S. Army; Dr. Christopher D. Wickens, University of Illinois at Urbana-Champaign; and Mr. David Brandenburg, University of Illinois at Urbana-Champaign.

## Director’s Notes

*Continued from page 11*

Other Volpe safety work is also featured in this issue. Our approach to safety is constantly evolving in response to changing requirements. As the “easy fixes” – such as the introduction of safety belts and air bags – are achieved and more complex safety technologies are developed, our researchers continue to ask questions and identify areas of concern. The Center’s role in evaluating technology that warns drivers when they are becoming drowsy is a salient example.

The Volpe Center continues to support the DOT’s strategic goal of mobility – advancing accessible, efficient, intermodal transportation for the movement of people and goods. Volpe’s investigation of the causes of delays in the deployment of Intelligent Transportation Systems is part of a sustained effort to introduce new technologies that will advance the mobility goal. Delays not only add to project costs, but also postpone mobility improvements that will result from implementation.

In these examples, as in all our work at the Volpe Center, we focus not only on our technical excellence as a research institution, but also on improving and formalizing our management practices in corporate management, project and program management, financial and acquisition management, and customer satisfaction. As reported in the previous issue of *Highlights*, a recent RSPA Management Assessment provides useful guidance to measure our progress.

As described in this issue, the Volpe Center is also participating in a larger government-wide initiative to make the government in general more accountable by being performance based and mission oriented. Our success in moving toward performance-based acquisitions is an important step in this direction.

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