



# HIGHLIGHTS

Cambridge, Massachusetts

Fall 2005

National Transportation Systems Center



*Curtis J. Tompkins*

## Director's Notes

### Volpe Center Hurricane Relief Efforts

*"There's a lot of work ahead and I pledge that we will continue to be partners every step of the way in making sure that the Gulf region has a transportation system that meets the needs of the local community and of the nation."*

U.S. DOT Secretary Norman Y. Mineta  
October 6, 2005

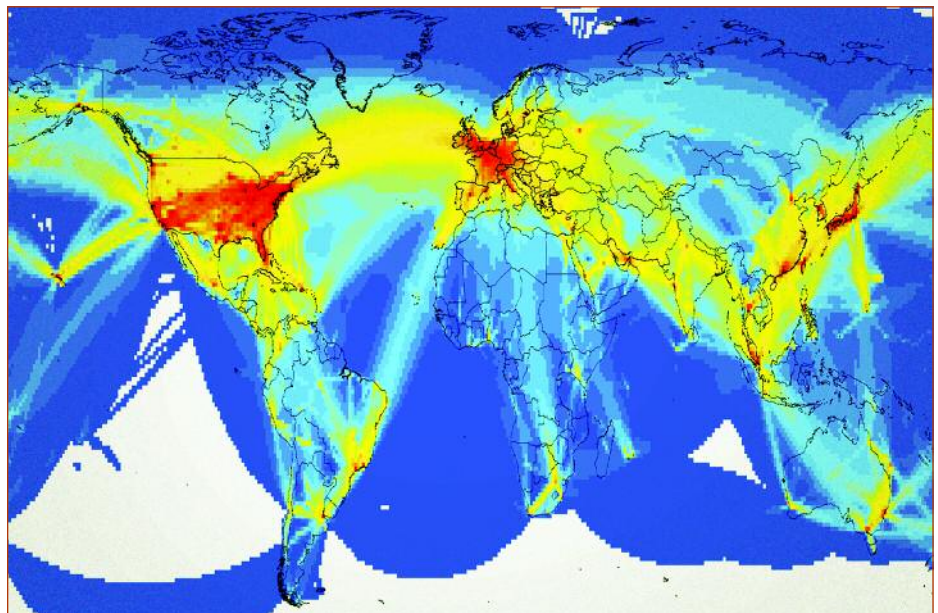
The hurricanes that hit the Gulf Coast this year dramatically demonstrated the importance of robust transportation systems for response to and recovery from disasters. In the short term, transportation links must be repaired to provide service as people rebuild their businesses and their lives. In the longer term, there must be a clear planning effort to ensure that there is adequate infrastructure to meet future needs—both normal and disaster related. As a

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## Inside

- Addressing **Child Safety** Research
- Analyzing a **Motor Carrier** Safety Program
- Developing **Asset Management** Tools
- Excellence in **Project Management**

## Focus



The Volpe Center is home to two internationally recognized facilities for multimodal research and development—the Acoustics Facility and the Air Quality Facility. Major accomplishments of these facilities include designing, developing, and maintaining transportation-related noise models and emissions models used across the nation and the world, and leading the development of a global emissions assessment system, SAGE (illustrated above). As well, the Volpe Center is leading a team that is developing the first system to integrate aviation noise and emissions modeling.

### Mitigating Transportation-Related Noise and Emissions

As public concern for the human and natural environment grows, the potential impacts of transportation—such as noise and air quality—receive particular attention. With its strategic goal of Environmental Stewardship, the U.S. Department of Transportation emphasizes its commitment to improving the transportation system while protecting or enhancing the environment. Environmental analysis has become an integral component of the planning, development, and deployment of transportation systems; and state, federal, and global agencies seek sound technical foundations for policies, regulations, and standards. Over the years, awareness of the complexities of these issues has increased, and the Volpe Center has proven to be a valuable resource, providing interdisciplinary support for regional, national, and international noise and emissions

initiatives. Among the range of environmental capabilities resident at the Center are two internationally recognized facilities for multimodal research and development—the Acoustics Facility and the Air Quality Facility.

In addition to supporting current initiatives, these facilities work to enhance sponsors' capabilities to meet future requirements for mitigating noise and emissions; to anticipate and create awareness of national and international trends and issues; and to serve as a bridge to industry, academia, and other government agencies. Both facilities are within the Volpe Center's Environmental Measurement and Modeling Division; close ties allow leveraging of capabilities and resources.

Major accomplishments of these facilities include designing, developing, and maintaining transportation-related noise models and emissions models used across the nation and the world, and leading the development of a global emissions assessment system. The Volpe Center's technical support has laid the foundation for many transportation-related policy and regulatory decisions. Current research trends are toward integrating the measurement and analysis of noise and emissions. Enabled by the close alignment of its Acoustics and Air Quality Facilities, the Center is at the forefront of this work, leading a team that is developing the first integrated system of this type for aviation.

### Transportation-Related Noise

The Acoustics Facility has been involved in all aspects of transportation-related noise and vibration research and development since the Volpe Center's inception in 1970. In the early years, much of the facility's work was in the areas of community and rail noise. From the late 1970s to the present, most of the work has been in the areas of aircraft and highway noise. The Acoustic Facility supports noise mitigation programs of the Federal Aviation Administration (FAA), Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and various state and local agencies. Staff members of the Acoustics Facility include Ms. Gina Barberio, Mr. Eric Boeker, Ms. Andrea Goldstein, Dr. Aaron Hastings, Mr. Mike Lau, Ms. Cynthia Lee, Ms. Amanda Rapoza, Mr. Dave Read, Mr. Clay Reheman, Dr. Judy Roachat, Mr. Chris Roof, and Mr. Chris Scarpone of the Environmental Measurement and Modeling Division; Dr. Joseph Burstein, Mr. Paul Gerbi, Dr. Andrew Hansen, Mr. Robert Samiljan, and Ms. Sharon Woods of CSC (a Volpe Center on-site contractor); and Mr. Gregg Fleming, Chief of the Division.

### Predicting Highway Noise Levels—TNM

In support of FHWA, the Acoustics Facility provides technical oversight to the development, validation, and updating of the Traffic Noise Model (TNM), which is used in more than 20 countries to predict highway traffic

*The Volpe Center's technical support has laid the foundation for many policy and/or regulatory decisions regarding noise and emissions.*

*The Acoustic Facility supports noise mitigation programs of FAA, FHWA, FRA, and state and local agencies.*

noise levels. Among other uses, the model can be employed to design effective, cost-efficient highway noise barriers. The first version of TNM was developed in 1998; subsequent versions use advances in personal computing to improve the accuracy and ease of modeling highway noise. Version 2.5 (released in April 2004) reflects substantial improvements to the core acoustics and has undergone comprehensive field validation. The Version 2.5 enhancement is expected to lead to more accurate highway noise barrier design; FHWA has conservatively estimated that the use of the improved TNM will result in an annual cost savings of \$20 million per year.

In May 2005, FHWA announced in the *Federal Register* that the TNM is the official model to be used for all federal-aid traffic noise analyses in the United States.

### Studying “Quiet Pavements”

Supporting the California Department of Transportation (Caltrans), the Acoustics Facility is conducting a study to determine the noise reduction benefits of “quiet” asphaltic concrete (AC) pavements. Typically in the United States, noise barriers along highways are used to reduce traffic noise propagating into neighboring communities (since 1970, more than \$2 billion has been spent on highway noise barrier construction). In contrast, however, in Europe, quiet pavements are also used to help reduce tire/pavement interaction noise, the noise source most prevalent at highway speeds. Introducing quiet pavements into highway projects can reduce tire/road noise at the source, benefiting nearby communities. In some cases, for example, when noise barriers are not an option, pavement may be the only feasible noise-mitigation tool.

For the Caltrans Quiet AC Pavement Study, tire/road noise is measured on the side of an open highway. Twice a year for five years, simultaneous measurements are performed in five adjacent sections of the highway, each with a different AC pavement overlay. Among other parameters, the noise-reduction benefit of each of the pavements is investigated in terms of pavement age, pavement composition, and vehicle type. Ultimately, this study will contribute to a choice of pavement to be used throughout the state of California and will help build new federal policy on the use of quiet pavements to reduce highway traffic noise. The Volpe Center is also supporting similar activity for the Arizona DOT.

FHWA has started the Quiet Pavement Pilot Program, designed to evaluate quiet pavements in terms of noise reduction benefits and longevity, while ensuring safety to highway travelers. An important part of the program is



*The Volpe Center developed the Traffic Noise Model (TNM) for the FHWA, which recently mandated the TNM for use for all traffic noise analysis in the United States. Above, noise measurement equipment used for “quiet pavements” research.*

determining the pavement specifications and maintenance requirements necessary to maintain the noise-reduction benefits for nearby communities. This program is also designed to potentially help introduce quiet pavements as a feature in FHWA's TNM. The Volpe Center is supporting FHWA directly in implementing the Quiet Pavement Pilot Program.

### Measuring and Mitigating Railroad Noise

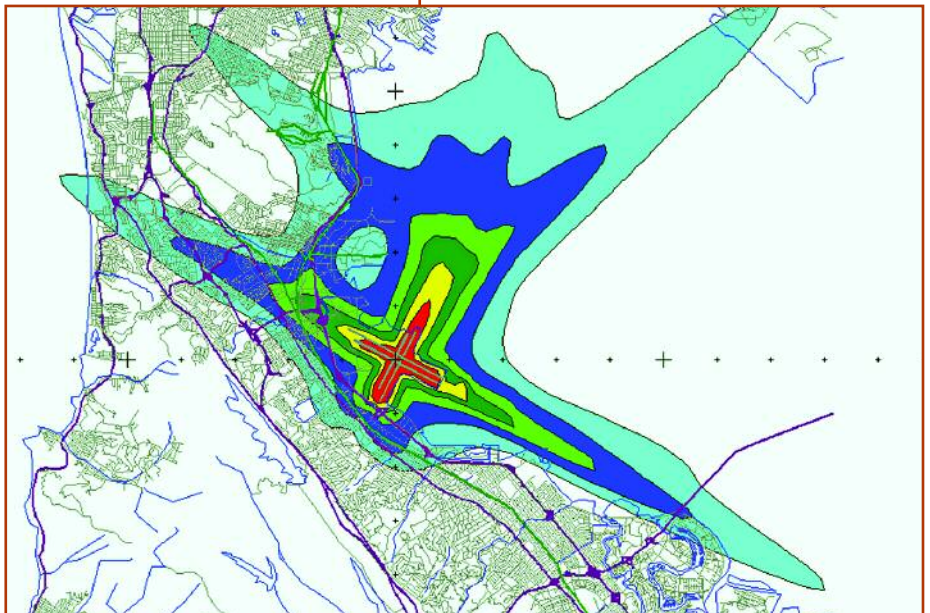
As part of ongoing efforts to improve safety at highway-railroad grade crossings, FRA is conducting research into all aspects of audible warning systems, and the Volpe Center supports this research with experts in engineering, human factors, and acoustics. Volpe Center Acoustics staff performed testing and analysis in several areas, including perceptibility of warning signals inside vehicles, annoyance of residents near grade-crossings due to audible warning signals, and effectiveness of automated horn systems, which are activated automatically by an approaching train.

Also for FRA, the Volpe Center Acoustics Facility updated the *Handbook for the Measurement, Analysis, and Abatement of Railroad Noise*. Designed in a straightforward, user-friendly format, this document reflects numerous improvements and changes to railroad noise measurement, analysis, and abatement techniques developed since the original 1982 publication.

### Setting the Standard for Airport Noise Modeling—INM

Between 1982 and 1999, \$4.3 billion was spent on noise-mitigation at U.S. airports; FAA's Integrated Noise Model (INM) is the primary tool used by decision makers charged with these expenditures. In fact, the INM is the standard for airport noise modeling and impact assessment in the vicinity of airports in 33 countries. The Acoustics Facility and FAA first developed the INM in 1978; Version 6.2 is expected to be released in November 2005. Version 6.2 reflects the initial results of a multi-year, Volpe-led effort to develop and incorporate in INM a new international standard for the lateral attenuation of aircraft sound, recently adopted by the Society of Automotive Engineers.

Another focus for Version 6.2 was to enable more complete modeling of air tour noise in National Parks for the program discussed in the following section.



The FAA's Integrated Noise Model (INM) provides a decision-making tool for airport noise mitigation. The Volpe Center's Acoustics Facility has worked with the FAA to develop and update INM.

### Preserving the Peace in National Parks

Congress passed the National Parks Air Tour Management Act of 2000 (the Act) to regulate commercial air tour operations over units of the National Park System. A Volpe Center team comprised of staff from the Acoustics and Air Quality Facilities and the Environmental Engineering Division are supporting the FAA, Western Pacific Region, and working cooperatively with the National Park Service, in the development of Air Tour Management Plans (ATMPs) for all National Parks with commercial air tours. The objective of the ATMPs is to develop acceptable and effective measures to mitigate or prevent significant adverse impacts from the air tours on the natural and cultural resources, visitor experiences, and tribal lands within the parks. Approximately 100 park units will need ATMPs. For more on the ATMP program, visit [www.atmp.faa.gov](http://www.atmp.faa.gov).

Environmental Engineering staff members are led by Mr. Phil Mattson, Division Chief, and Dr. Paul Valihura, Program Manager; their team includes Ms. Nicole Grewell, Dr. Amishi Joshi, Ms. Catherine Mulvey, and Ms. Jennifer Papazian, who, joined by Mr. Bob Hallett of the Service and Operations Assessment Division and Mr. Adam Klauber of the Planning and Policy Analysis Division, are responsible for developing the environmental assessments and impact statements supporting the ATMPs.

A major component of establishing noise impacts is the determination of representative baseline sound levels, or ambient levels for each park. The Volpe Center studies utilize specially designed low-level measurement systems deployed at multiple park sites and collect continuous sound-level data over a period of several months. The most recent upgrade on the FAA's Integrated Noise Model (see subsection above) was designed to better support modeling of air tour noise. In addition to noise analyses in support of ATMPs, the Center is designing and conducting the air quality analyses.

### Transportation-Related Emissions and Air Quality

The Volpe Center Air Quality Facility has been involved with all aspects of air pollution including emissions and dispersion measurement as well as computer modeling. The group was started in 1999 with funding from the FAA Office of Environment and Energy (AEE) to support ongoing efforts to study and improve the analysis and modeling of air quality at airports. Work has since expanded to include global air quality issues related to aviation, as well as air quality issues beyond the aviation sector. Staff members of the Air Quality Facility include Mr. Ben Berry, Ms. Andrea Goldstein, Dr. Brian Kim, Dr. Andrew Malwitz, Mr. Anjoli Martin, Mr. George Noel, Mr. Joe Ruggiero, and Dr. Roger Wayson of the Environmental Measurement and Modeling Division; Mr. Sathya Balasubramanian and



*Noise measurement equipment gathers data for use by Volpe Center teams in developing acceptable and effective measures to mitigate or prevent significant adverse impacts from commercial air tours in Haleakala National Parks.*

*The Air Quality Facility performs emissions and dispersion measurement as well as computer modeling.*

Dr. John McDonald of CSC (a Volpe Center on-site contractor); and Mr. Gregg Fleming, Chief of the Environmental Measurement and Modeling Division.

### Assessing Air Quality Impacts of Airports – EDMS

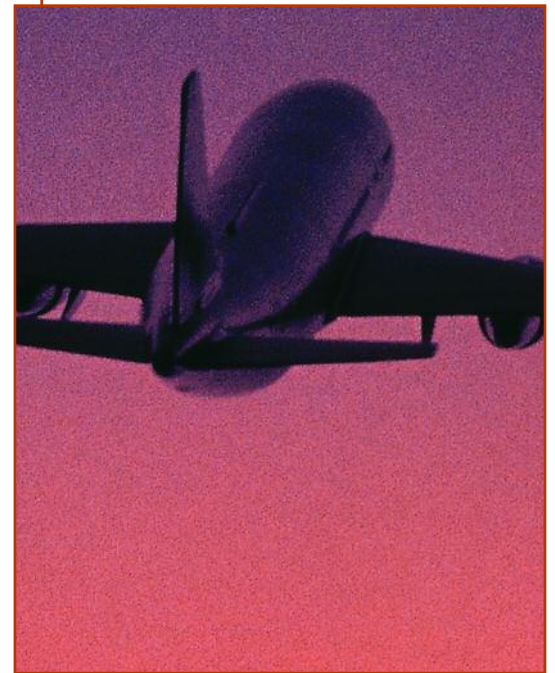
The FAA's Emissions and Dispersion Modeling System (EDMS) is designed to assess the air quality impacts of airport emissions sources. The FAA requires the use of EDMS in the performance of any air quality analyses for aviation sources. The model is designed to meet both scientific and policy-related needs, and the FAA continues to enhance it to more effectively determine emission levels and concentrations generated by typical airport emission sources. The Volpe Center's Air Quality Facility is engaged in a number of activities that support the continued enhancement of EDMS, including assessing existing aircraft performance methodologies for inclusion, and developing and implementing a detailed, multiyear measurement plan as part of a comprehensive validation effort.

### Assessing Global Aviation Emissions – SAGE

A groundbreaking computer model, the FAA's System for assessing Aviation's Global Emissions (SAGE), is used to predict fuel burn and emissions for all commercial aircraft in the world—more than 30 million flights annually. In support of the FAA's AEE, the Volpe Center, with the Massachusetts Institute of Technology and the Logistics Management Institute, designed and developed SAGE.

SAGE enables the analysis of aircraft emissions on technological, operational, and geographic scales; the model is capable of analyses at single-aircraft, airport, regional, and global levels. FAA's objective is for SAGE to be an internationally accepted model used for evaluating operational-, policy-, and technology-related scenarios to estimate global aircraft emissions. As the only nonproprietary model of its type, SAGE is being considered for formal adoption by the United Nations International Civil Aviation Organization Committee on Aviation and Environmental Protection. The Volpe Center provides technical support for the FAA's activities on the committee. SAGE will also provide the foundation for continued U.S. research in global warming.

SAGE employs parallel-processing technology to evaluate both simulated flights from the Official Airlines Guide and recorded radar flight data from the Enhanced Traffic Management System (ETMS), developed and operated by the Volpe Center's Automated Applications Division. (FAA uses ETMS to track, anticipate, and manage the flow of air traffic.) The Volpe Center team is conducting a comprehensive validation effort to quantify the uncertainty of the model, which may lead to further model enhancements.



*FAA's System for assessing Aviation's Global Emissions (SAGE) is capable of analyses on a range of scales, including aircraft, airport, regional, and global. The Volpe Center's Air Quality Facility leads the development of this state-of-the-art technology.*

### **Integrating the Analysis of Noise and Emissions**

As research tools and approaches have become more sophisticated the interdependencies of noise and emissions have been acknowledged, but are not yet fully understood. Adding to the complexity are the interrelationships of different emissions. Accordingly, the FAA's AEE asked the Transportation Research Board to assist in the design and development of a new Aircraft Environmental Design Tool (AEDT), which will integrate all of AEE's noise, emissions, and dispersion tools. The Volpe Center is leading the effort to develop this multifaceted and comprehensive new tool, supported by ATAC Corp., CSSI Inc., Wyle Laboratories, the Massachusetts Institute of Technology, and the Georgia Institute of Technology.

AEDT is expected to greatly increase the understanding of noise and emission relationships, and open new pathways for systems-level research. Ultimately, it will enable integrated noise and emission modeling on a range of scales, from local to global. Local models will support local and regional regulatory and planning efforts, while global models will support national and international policy development; all models will use the same data sources to help ensure accuracy, transparency, and efficiency.

### **The Future of Transportation and Environmental Stewardship**

Thirty-five years ago, the Volpe Center was established as a new research and development facility with the unique mission of applying innovative technologies and a systems approach to problems across all transportation modes—including the emerging issue of transportation-related environmental impacts. Today, this issue is a strategic goal of the DOT, and the Volpe Center's systems approach is more important than ever to tackling the intricacies of environmental challenges. As part of the Research and Innovative Technology Administration, the Volpe Center will continue its support of the Environmental Stewardship goal by helping its DOT sponsors to anticipate trends, create tools, and develop policies that help ensure that the future holds a safer, more efficient transportation system in a cleaner, healthier environment.



### ***Child Safety and Vehicle Technology Research (NHTSA)***

Extensive research, development, testing, crash investigation, and data collection and analysis activities form the scientific strength needed to meet the safety goals of the National Highway Traffic Safety Administration (NHTSA). The Volpe Center supports NHTSA in a variety of these activities. Some of this work was presented at the 19th International Technical

*AEDT is expected to greatly increase the understanding of noise and emission relationships, and open new pathways for systems-level research.*

Conference on the Enhanced Safety of Vehicles in Washington, D.C., June 6–9, 2005. Held every two years for international vehicle safety experts from government and industry, the conference seeks to reduce motor vehicle fatalities and injuries by addressing safety issues and international cooperation. The U.S. DOT and NHTSA hosted this year's conference. U.S. Secretary of Transportation Norman Y. Mineta welcomed participants and stressed the importance of this opportunity for the international community to come together to reduce traffic fatality rates and referred to “the enormous costs of traffic crashes in terms of human lives and pain and suffering as well as economic productivity and lost opportunities worldwide.”

Volpe Center staff co-authored three conference papers with NHTSA colleagues. Two of the papers address child safety research and the third discusses new technologies for pre-crash sensing countermeasures.

“Child Safety Research in School Buses” provides an overview of past, present, and near-term school bus research efforts and summarizes safety data for injuries and deaths associated with school bus accidents. It provides reassuring information on the safety records of school buses and describes school bus transportation as one of the safest forms of transportation in the United States. American students are nearly eight times safer riding in a school bus than with their own parents and guardians in cars. The paper also describes NHTSA's role in developing and enforcing safety standards and the continuing vigilance by NHTSA, the National Transportation Safety Board, and the U.S. Congress to ensure that safety measures remain adequate and to investigate potential approaches that could further enhance safety. The paper was written by Ms. Linda B. McCray of NHTSA and Dr. John Brewer of the Volpe Center's Vehicle Crashworthiness Division.

“Child Safety in Light Vehicles” provides a status on recent analyses and proposed child safety research efforts. In the last 30 years, the nation has achieved significant gains in child passenger safety. Child restraint systems (child safety seats and booster seats) have saved thousands of children. The paper provides statistics that demonstrate that child safety seats are an effective safety innovation. Even though child restraint systems have proven to be an excellent concept for injury mitigation, Congress directed the Secretary of Transportation to initiate a rulemaking for the purpose of improving the safety of children. NHTSA conducted extensive research and developed several programs to provide better consumer information on child safety restraints and their use. Federal Motor Vehicle Safety Standards are currently being upgraded to continue improvements in child



*The school bus is one of the safest forms of transportation in the United States.*



safety. This paper was written by Ms. Linda B. McCray of NHTSA and Dr. John Brewer of the Volpe Center's Vehicle Crashworthiness Division.

"Pre-Crash Sensing Countermeasures and Benefits" introduces NHTSA's research plan for developing objective test procedures and estimating safety benefits of pre-crash sensing countermeasures. Vehicle safety could be enhanced and severity of crash injury reduced if occupant protection components such as airbags were deployed more rapidly. Currently, decisions for activation of restraints come from signals from accelerometer sensors. Pre-crash sensing technologies have the potential for providing quicker crash-sensing times and more robust information. This paper also provides preliminary results from a preparatory analysis to review state-of-the-art pre-crash sensing technology and applications, proposes a methodology to estimate their safety benefits, and defines relevant crash problems. This paper was written by Mr. Ron Pack of NHTSA, Mr. Jonathan Koopmann and Dr. Wassim G. Najm of the Volpe Center's Advanced Safety Technology Division, and Dr. Hailing Yu of CASE, LLC (an on-site Volpe Center contractor).

*Pre-crash sensing technologies could help occupant-protection components, such as airbags, deploy more quickly.*

### ***Measuring Effectiveness of a Key Motor Carrier Safety Program (FMCSA)***

An important element of the Federal Motor Carrier Safety Administration's (FMCSA) safety programs is the Compliance Review, an on-site examination of a motor carrier's records and operations to determine whether the carrier meets the safety fitness standard of the Administration. The FMCSA expects that through education, heightened safety regulation awareness, and the enforcement effects of Compliance Reviews, motor carriers will improve the safety of their commercial vehicle operations and, ultimately, reduce the number and severity of crashes in which they are involved. Thousands of these reviews are conducted each year, accounting for perhaps the single greatest resource-consuming activity of the FMCSA.

To measure the effectiveness of Compliance Reviews, FMCSA asked the Volpe Center to develop an analytic model. Previously, there was no way to determine the benefits and effectiveness of these programs. Using the Compliance Review Effectiveness Model, the benefits of the reviews can now be calculated in terms of crashes avoided, lives saved, and injuries avoided. Results for 2002 show that for the 9,172 motor carriers that received Compliance Reviews and were still active 12 months later, there were 1,426 crashes and 1,087 injuries avoided, and 62 lives saved in the immediate 12 months following the reviews.

This model provides FMCSA and state safety program managers with a quantitative basis for optimizing the allocation of field safety resources. It also provides FMCSA management with the information it needs to address the requirements of the Government Performance and Results Act of 1993,

which obligates federal agencies to measure the effectiveness of their programs as part of the budget cycle process.

A recent study documents the methodology used to develop the Compliance Review Effectiveness Model and presents the results of the implementation of the model for carriers receiving Compliance Reviews in 2002. Ms. Julie Nixon of the Motor Carrier Safety Assessment Division is the project manager. Mr. John Ohman of the Division authored the study report, "FMCSA Safety Program Effectiveness Measurement: Compliance Review Effectiveness Model, Results for Carriers with Compliance Reviews in 2002, May 2005." The full report and a summary of the findings are posted on the FMCSA A&I website at [www.ai.fmcsa.dot.gov/ProgramMeasures/PM/PM.asp](http://www.ai.fmcsa.dot.gov/ProgramMeasures/PM/PM.asp).

**Compliance Review Effectiveness Model**

**Model Implementation for Motor Carrier Compliance Reviews in 2002**

Compliance reviews conducted	12,139
Motor carriers that received compliance reviews and were still active 12 months later	9,172
Estimated percentage reduction in average crash rate due to compliance reviews	12.6

**Model Results (i.e., Benefits) Estimated for 2002 – 2003**

Crashes avoided	1,426
Fatal crashes avoided	53
Injury crashes avoided	677
Towaway crashes avoided	696
Lives saved	62
Injuries avoided	1,087



**New TIMS Tool Replaces Obsolete System (FAA)**

Telecommunications is the lifeline of the critical systems overseen by the Federal Aviation Administration (FAA). To manage its telecommunications services, the Administration's Telecommunications Services Management (TSM) program requires well-integrated systems that can be upgraded as needs change and technology advances. A Volpe Center-developed system provides TSM with a single, central, national data repository of FAA telecommunications information along with automated tools to plan, provision, and support FAA telecommunication services. TSM employs the Telecommunications Information Management System (TIMS) in the areas of ordering, funding, and tracking FAA telecommunications circuits and equipment.

The Volpe Center's Telecommunications Division is responsible for TIMS software development, operation, and training. A Volpe Center team led by Mr. Kip Brown worked with TSM personnel to determine development requirements and the phased deployment of new software releases. Team members include Ms. Kate McGann, Mr. Jeff Garlitz, and

*The FMCSA performs Compliance Reviews (CRs) to determine whether motor carriers meet safety fitness standards. The Volpe Center developed an analytic model to measure the effectiveness of CRs.*

Mr. Kevin O'Neill, all of the Division, and Mr. Vince Milley of CSC (an on-site Volpe Center contractor).

In May 2005, the Volpe Center released TIMS Tool Suite 3.3, which supports the processing of communications service requests by FAA Headquarters engineering personnel. Previously, such requests were handled by an obsolete headquarters system, which can now be decommissioned.



### **Road Inventory System Proves Successful, Enhancements Continue (BIADOT)**

With the availability of increasingly powerful data systems, the practice of transportation asset management has become more feasible, and its benefits more evident. For the Bureau of Indian Affairs Division of Transportation (BIADOT), the Volpe Center developed and continues to enhance a road inventory system that is becoming the cornerstone of the Bureau's integrated transportation information and management system. A Volpe Center team recently introduced a new release of the Road Inventory Field Data System (RIFDS).

RIFDS provides web-based software to manage more than 59,000 miles of roads on Indian lands. It was designed to reduce data maintenance, facilitate data entry, and ease integration with other BIADOT asset management systems, including a bridge management system previously developed by the Volpe Center. Since its adoption last year, RIFDS has significantly reduced the paperwork backlog at the Branch Engineering Office while improving data acceptance tenfold. Recent RIFDS improvements include better navigation features and data-management tools requested by users.

The team, led by Mr. Walter Gazda of the Economic and Industry Analysis Division, is also working with BIA senior staff to identify, prioritize, and develop further upgrades and enhancements to RIFDS.

This work provides another opportunity for the Volpe Center to contribute to the nation's transportation system by leveraging expertise developed on U.S. DOT projects to meet the transportation needs of other federal agencies.

### **Excellence In Management**

The Volpe Center has continued its project management initiatives by encouraging its staff to obtain project management credentials recognized by the Project Management Institute—the world's leading association for the project management profession. Recently, 15 Volpe Center employees

*Asset management of transportation infrastructure provides a decision-making framework that draws from economics as well as engineering.*

received their Project Management Professional certifications. To obtain this certification, staff members must have the requisite project management experience and have passed a rigorous examination that demonstrates project management knowledge in six domains: initiating the project, planning the project, executing the project, monitoring and controlling the project, closing the project, and demonstrating professional and social responsibility. This professional development effort is part of a broader effort designed to strengthen the Volpe Center's organization, respond to the President's Management Agenda, and manage for results.

## Awards

**Exceptional Service Award.** Dr. James Hallock, Chief of the Volpe Center's Aviation Safety Division, recently received an Exceptional Service Award from the National Aeronautics and Space Administration (NASA) for his service on the Columbia Accident Investigation Board (CAIB) following the Columbia Space Shuttle accident of February 1, 2003. CAIB released a six-volume final report in October 2003. In addition to playing a major role in determining the physical causes of the accident, Dr. Hallock provided numerous background briefings to the press on the science involved with the accident and participated in many of the press conferences dealing with the investigation. He was also one of the final technical editors of the report. He briefed the families of the Columbia astronauts as well as the entire astronaut corps before the report was released to the public. He testified with Admiral Gehman, CAIB chairman, before Congress. In addition, he has given presentations on the accident investigation and lessons learned to the Secretary of Energy and his senior staff; the Commander of the Electronics Systems Command at Hanscom Air Force Base and his senior staff; and a number of other government, academic, and professional organizations. Mr. Eric Peterson, Deputy Administrator of the Research and Innovative Technology Administration (the Volpe Center's parent agency), presented the award to Dr. Hallock on behalf of NASA.



*Mr. Eric Peterson, Deputy Administrator of RITA, presents the Exceptional Service Award to Dr. James Hallock, Chief of the Volpe Center's Aviation Safety Division.*

## Published and Presented

- **National Environmental Policy Act.** Two Volpe Center staff members wrote papers that were published in the proceedings of the National Association of Environmental Professionals 30th Annual Conference held in Alexandria, Virginia, April 16–19, 2005. The papers highlight different aspects of the role of the National Environmental Policy Act (NEPA).

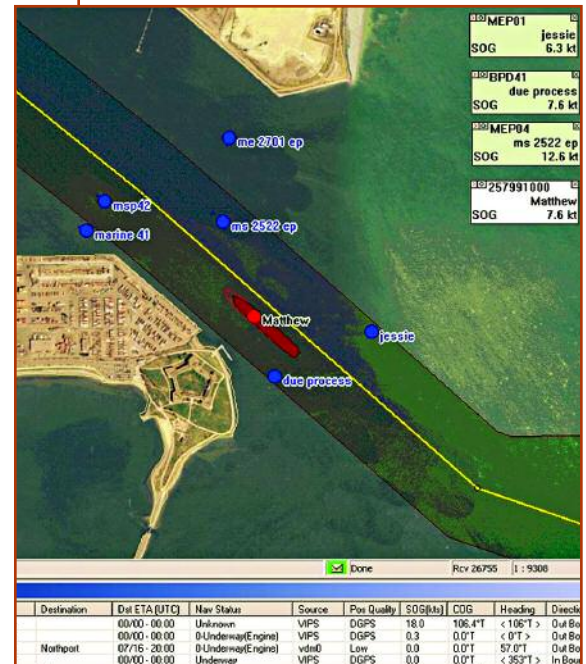
- Ms. Jennifer Papazian “The Role of NEPA in National Transportation Projects: The National Parks Service Air Tour Management Plan Program as a Case Study.”
- Dr. Amishi Joshi wrote “The Role of NEPA in Agency Decision-Making: The U.S. Maglev Deployment Program as a Case Study.”
- **Technologies for Homeland Security.** The Volpe Center co-sponsored and participated in the Institute of Electrical and Electronics Engineers Conference on Technologies for Homeland Security held in Boston, Massachusetts, April 26, 2005. The conference theme was “Advanced Sensors for Personnel, Baggage, and Cargo Security.” Volpe Center presenters included the following.
  - Dr. Aviva Brecher of the Office of Environmental Preservation and Systems Modernization and Mr. Michael Rossetti of the Surveillance and Assessment Division presented “Defining Transportation Security Data Needs and Standards for Networked Sensors.”
  - Mr. Robert Hoaglund, CPP, of the Infrastructure Protection and Operations Division presented “The Challenges of Technical Security Screening at Seaport Terminals.”
- **Acoustical Analysis of Wake Vortices.** Volpe Center staff from the Surveillance and Assessment Division presented papers discussing a wake acoustics test designed and carried out jointly by the Volpe Center and NASA in 2003 at Denver International Airport to study the feasibility of using passive acoustic sensors as a means to detect and track wake vortices. It resulted in one of the richest data sets ever collected on the sound generated by wake vortices.
  - Mr. Hadi Wassaf presented “Acoustical Spectral Analysis of a Wake Vortex Cross-Section Using Microphone-Arrays” at the 149th meeting of the Acoustical Society of America held in Vancouver, Canada, May 15–20, 2005. Mr. Wassaf co-authored the paper with colleagues from the University of Massachusetts Lowell, OptiNav Inc., and the NASA Jet Propulsion Laboratory.
  - Dr. Frank Y. Wang, Mr. Hadi Wassaf, and Mr. Andrew Gulsrud presented “Acoustic Imaging of Aircraft Wake Vortex Dynamics” at the 23rd American Institute of Aeronautics and Astronautics Applied Aerodynamics Conference held in Toronto, Canada, June 6–9, 2005. Colleagues from North West Research Associates and Aviation Turbulence Research co-authored the paper. (AIAA 2005-4849).
- **Transit Planning and ITS.** Dr. Scott Smith of the Service and Operations Assessment Division presented “Transit Planning and Intelligent Transportation Systems” at the Transportation Research Board's 10th Transportation Planning Applications Conference held in Portland,

*A joint study by the Volpe Center and NASA produced a rich data set on the sound generated by wake vortices.*

Oregon, April 24–28, 2005. The paper introduced a handbook that the Volpe Center developed to outline opportunities for incorporating the impacts of transit Intelligent Transportation Systems (ITS) improvements into current planning models and techniques. The project is sponsored by the Federal Transit Administration's Office of Planning with support from the ITS Joint Program Office.

- **Electronic Flight Bag Industry Review.** In April 2005, the Volpe Center published *Electronic Flight Bag (EFB): 2005 Industry Review* (DOT-VNTSC-FAA-05-06). The report, a review of the EFB industry, provides information about EFB systems, software/content, and hardware that are currently on the market or in active development. It was prepared by Dr. Michelle Yeh and Dr. Divya Chandra of the Operator Performance and Safety Analysis Division. This work is part of the Division's ongoing human factors support to the Federal Aviation Administration. The report is available at [www.volpe.dot.gov/library/pp05/html](http://www.volpe.dot.gov/library/pp05/html).
- **Vehicle Collision Avoidance Technologies.** On May 4, 2005, Dr. David Yang of the Advanced Safety Technology Division presented "Lessons Learned from Vehicle Crash Statistics and their Implications to U.S. DOT's Research Activities" at the Intelligent Transportation Society of America's annual meeting held in Phoenix, Arizona. In his presentation, Dr. Yang showed various bus and passenger vehicle crash statistics generated from the Federal Transit Administration's National Transit Database and the National Highway Traffic Safety Administration's General Estimates System. He also discussed five current U.S. DOT projects that are studying and developing vehicle collision avoidance technologies. Work related to this presentation is part of Volpe Center's ongoing support to the U.S. DOT's Intelligent Transportation System Program.
- **Decision Sciences Institute.** Dr. Seamus McGovern of the Airport Surface Division presented "Stochastic and Deterministic Combinational Optimization Solutions for an Electronic Product Disassembly Flow Shop" at the 2005 Northeast Decision Sciences Institute Conference held in Philadelphia, Pennsylvania, March 30 to April 1, 2005.
- **Alternative Transportation Evaluation.** Ms. Frances Switkes of the Service and Operations Assessment Division and Dr. Jeffrey Bryan of the Planning and Policy Analysis Division co-authored *Minute Man National Historical Park Alternative Transportation Evaluation Final Report*, for the National Park Service, April 2005 (DOT-VNTSC-NPS-05-06). The report is available at [www.volpe.dot.gov/nps/docs/minuteman-2.pdf](http://www.volpe.dot.gov/nps/docs/minuteman-2.pdf).
- **Motor Carrier Safety.** Ms. Sarah Dammen of the Economic and Industry Analysis Division published "The Effects of Safety Practices, Technology Adoption, and Firm Characteristics on Motor Carrier Safety" in *Journal of the Transportation Research Forum*, v. 44, n. 1, Spring 2005, pp. 103–120.

- **Highway-Railroad Grade Crossings.** Dr. Monica Gil of the Operator Performance and Safety Analysis Division presented “Driver Compliance and Noncompliance at Actively Protected Highway-Railroad Grade Crossings” at the Western Regional Grade-Crossing Safety Training Conference held in Costa Mesa, California, May 17–20, 2005.
- **Transit Security Design.** Mr. Matthew Rabkin of the Planning and Policy Analysis Division presented an overview of the Federal Transit Administration (FTA) Security Design Considerations at the American Public Transportation Association 2005 Rail Conference held June 6–8, 2005 in Pittsburgh, Pennsylvania. Mr. Rabkin also presented the overview at the FTA’s Annual Engineers Meeting in Pittsburgh.
- **Deicing Decision Support Tool.** Dr. Jonathan Lee presented “Detroit Deicing Decision Support Tool” at the 5th Integrated Communications Navigation and Surveillance Conference & Workshop held in Fairfax, Virginia, May 2–5, 2005. A Volpe Center team developed the Deicing Decision Support Tool, which will enable airport and Northwest Airlines personnel to more efficiently manage aircraft moving through the deicing stations.
- **Automotive Collision Avoidance System.** Dr. Wassim Najm of the Advanced Safety Technology Division presented “Overview and Evaluation of the Automotive Collision Avoidance System Field Operational Test (ACAS FOT),” at the SAE 2005 Government/Industry Meeting held in Washington, D.C., May 10, 2005.
- **Communication, Navigation, and Surveillance.** Several Volpe Center staff members participated in the 61st Annual Meeting of the Institute of Navigation held in Cambridge, Massachusetts, June 27–29, 2005.
  - Mr. William Baron of the Infrastructure Protection and Operations Division presented “Development of the Guardian Vehicle Tracking and Emergency Communications System.”
  - Dr. James Carroll of the Surveillance and Assessment Division was a co-chair of a Communication, Navigation, and Surveillance (CNS) session titled “CNS Applications Enabled by Radionavigation,” and presented a paper in that session on field test results on performance of a GPS/Loran-C/Dead Reckoning tracking system developed by the Volpe Center.
  - Mr. David Phinney of the Technology Applications and Deployment Division presented “Data Presentation Considerations for Land and Water Surveillance and Navigation Systems.”
  - Mr. Henry Wychorski of the Technology Applications and Deployment Division presented “The Vessel Identification and Positioning System—Key Element to Harbor Security.”



*The Vessel Identification and Positioning System uses differential GPS-based transponders and shore-side base stations to help ensure port security.*

## Director's Notes

*Continued from page 1*

transportation systems center, the Volpe Center understands the interrelated nature of the components needed to ensure the health of the region and to help protect it from future catastrophes. As part of the recovery effort, there is an opportunity to apply a multimodal systems approach to rebuilding the transportation infrastructure.

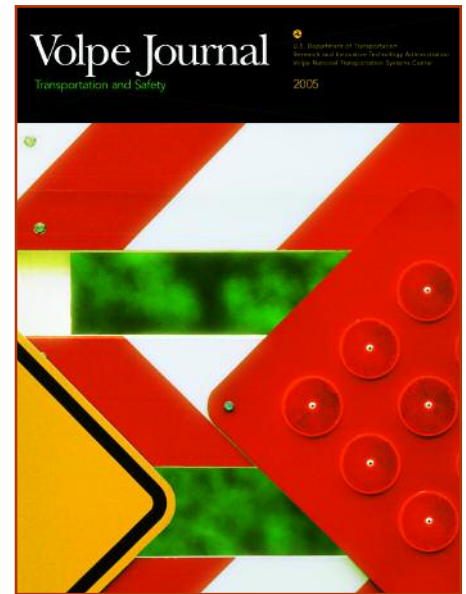
The Volpe Center is proud to have been part of the Hurricane Katrina response effort. Several Center staff members responded to the DOT Chief of Staff's call for volunteers to assist the Department and the Federal Emergency Management Agency. Their efforts were directed toward immediate emergency relief—matching hurricane victims to housing and other social services, and providing technical assistance in setting up computer networks and databases. One Center staff member, in his role as Regional Emergency Transportation Representative, worked at the Barksdale Air Force Base near Shreveport, Louisiana, supporting the coordination and movement of emergency supplies and personnel.

In Katrina's wake, the Volpe Center provided immediate response to the Federal Motor Carrier Safety Administration (FMCSA), which needed to ensure that motor carriers could participate in the transport of goods for the relief effort. However, many of these carriers were licensed for intrastate transport only. To address this problem, FMCSA called on the Center to modify the agency's Licensing and Insurance system to temporarily accommodate the interstate operation of these carriers.

Hurricane Katrina also underscored the importance of well-coordinated emergency response. The Volpe Center has played an important role in formulating emergency preparedness guidelines for all modes of transportation, and has designed and facilitated workshops that bring together emergency response agencies and transportation agencies. These workshops help key responders to create networks and work together to prepare and protect their communities.

The importance of New Orleans as a port became starkly apparent following the hurricanes. The Center's experience in improving the efficiency of commercial ports and terminals is clearly applicable to the Katrina recovery effort. Through the Agile Ports and Terminals Project, for example, the Center is currently supporting the Office of Naval Research in evaluating state-of-the-art technologies for material and cargo handling, high-speed ground transportation, cargo tagging and tracking, and information management to improve the efficiency of commercial ports and terminals. The Center's role includes coordinating activities of federal, state, local, and contractor organizations.

We thank our volunteers for putting aside their own daily lives to help the hurricane victims. A great deal remains to be done, and the Center is well positioned to provide assistance on the federal, state, or local level.



### **Volpe Journal 2005 Transportation and Safety**

Great strides have been made in transportation safety over the last 50 years, but statistics show that in some areas progress has leveled off in some areas since the mid-1990s. Realizing that many of the obvious safety advances have been made, researchers are thinking in new and innovative ways to develop strategies for sustaining safety improvements. This issue of the *Volpe Journal* provides a framework for transportation safety research and presents examples of the Volpe Center's work within this framework. More importantly, the *Journal* proposes future directions for transportation safety and asks questions that will help determine the best approaches to increasingly complicated transportation problems. Find the *Journal* at [www.volpe.dot.gov/infosrc/journal](http://www.volpe.dot.gov/infosrc/journal).

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