Volpe
National
Transportation
Systems
Center

Volpe Center Highlights

Cambridge, Massachusetts March 2001

Director's Notes

Dr. Richard R. John

Supporting the Secretary's Priorities

From President Richard Nixon in 1970 to President George W. Bush in 2001, the Volpe Center has supported seven presidents as well as thirteen secretaries of transportation. Our current DOT Secretary, Norman Y. Mineta, spoke at his confirmation hearing before Congress on January 24th of his belief that transportation is an essential component of the country's vitality and productivity. As the Volpe Center Director, I know that the Center is well positioned to support the Secretary's priorities and to address the challenges that he sees in the transportation arena. In many of the specific areas that the Secretary discussed at his hearing, the Center is already providing significant assistance to the Department and to its modal administrations.

Secretary Mineta emphasized the Department's critical role in ensuring transportation safety. He stated that, as a result of a constant search for safety improvements, the U.S. safety record is one of the best in the world; however, continuing to make safety

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Focus

Supporting the Environmental Protection Agency's Brownfields Initiative (EPA)

This coal house, built in 1899, is part of the Assets Site, an EPA brownfields site in Lowell, Massachusetts, where Volpe staff are performing an environmental site assessment. The EPA Brownfields Initiative helps revitalize urban areas by supporting the cleanup and sustainable redevelopment of contaminated industrial sites.

(Photo courtesy of Mr. Christopher Zevitas)

The nation's landscape is littered with "brownfields," vacant or underused industrial and commercial facilities whose redevelopment is often complicated by real or perceived environmental contamination. Because lenders, investors, and developers fear that involvement with these sites may make them liable for cleaning up contamination they did not create, they are more attracted to developing sites in pristine areas called "greenfields." The neglected brownfields can create safety and health risks for residents, drive up unemployment, and degrade communities.

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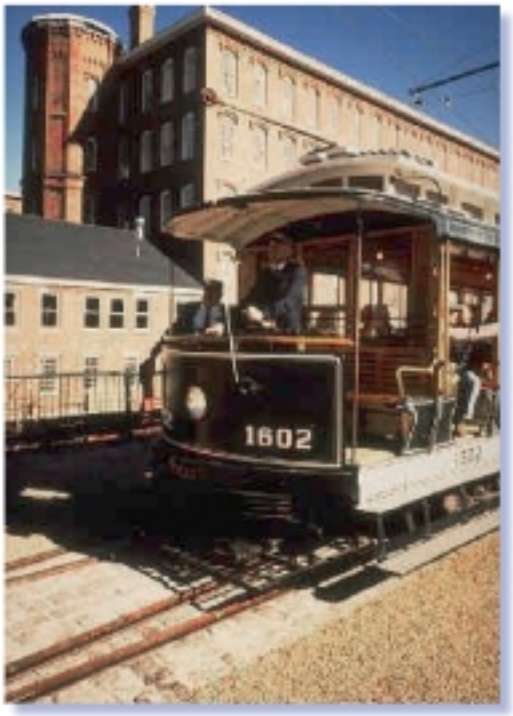
The Environmental Protection Agency's (EPA) Brownfields Initiative promotes the cleanup and sustainable redevelopment of brownfields. The Volpe Center is supporting EPA Region 1 in implementing the Brownfields Initiative by conducting environmental site assessments at two Massachusetts sites: the Assets Site in Lowell, and the Gilbertville Woven Label Site in Hardwick. The assessments will determine the extent of contamination, potential solutions for cleanup, and the costs to prepare the sites for redevelopment.

The Assets Site consists of a powerhouse and boiler-and-coal houses that produced steam and hydroelectric power from 1899 through the early 1990s. The buildings are the last of their kind remaining in Lowell, home to the Lowell National Historical Park. The park, which includes historic cotton textile mills, worker housing, and nearly 6 miles of canals, commemorates the history of the American Industrial Revolution in Lowell. The National Park Service (NPS) is working with the Assets Site owner, Boott Mills, to acquire the site for inclusion in the Park as an exhibit of historic power-generation technology. The NPS is studying the feasibility of reactivating the Assets powerhouse to power certain elements of the Park, such as the historic light rail trolley (circa 1925) that currently transports visitors through the Park.

In a related project for the NPS, Mr. Terry Sheehan of the Service Assessment Division is performing an alternatives analysis of potential alignments for a proposed extension of this trolley line. The goal for the proposed light rail extension is to serve more of the Lowell community and still blend with the historic fabric of the city and park.

The Gilbertville Woven Label Site includes a machine shop and factory used for textile and other industries from 1947 until the late 1980s. The Town of Hardwick is seeking to redevelop the site for light industrial use.

Redevelopment of both sites is complicated by environmental contamination resulting from leaking storage tanks, previous spills, and the presence of a variety of hazardous materials and waste. Mr. Christopher Zevitas of the Environmental Engineering Division completed the Phase I environmental site assessments for both sites in March 2001. This work included background and historical investigations of each site, which proved to be particularly interesting, especially with regard to the Assets Site, whose ownership history is documented back to 1828. Using the libraries and museums of the NPS and the University of Massachusetts Lowell – Center for Lowell History, Mr. Zevitas researched historical documents, including detailed engineering drawings dating back to the 1800s. Reviewing the site's environmental history gave him a unique glimpse into the story of the City of Lowell, once one of the largest industrial centers in the United States, and now in the midst of revitalization after years of decline. The city's renaissance – which stems from the rediscovery of its rich industrial and ethnic heritage – has been spurred by the vision and will of its citizens, the late U.S. Senator Paul Tsongas, assistance from the NPS, and, more recently, the EPA. The Volpe Center is proud to be a participant in this worthy endeavor.



This 1925 trolley serves the Lowell National Historical Park. Volpe staff are performing an alternatives analysis for a proposed extension of this light rail line.

(National Park Service Photo)

The Phase II Site Assessments for both sites, scheduled to begin in May 2001, will involve sampling activities to identify the types and concentrations of contaminants and the areas of contamination to be cleaned. At the conclusion of this work, the Center will determine remediation and cleanup options and develop cost estimates appropriate for the redevelopment plans and future uses. Supporting Mr. Zevitas on the project are Ms. Michelle Morris, Mr. William Halloran, and Ms. Julie Borgesi of the Environmental Engineering Division, and Mr. Robert Hallet of the Service Assessment Division.

Promote public health and safety by working toward the elimination of transportation-related deaths, injuries, and property damage.

Volpe Team Commended by Federal Aviation Administration (FAA)

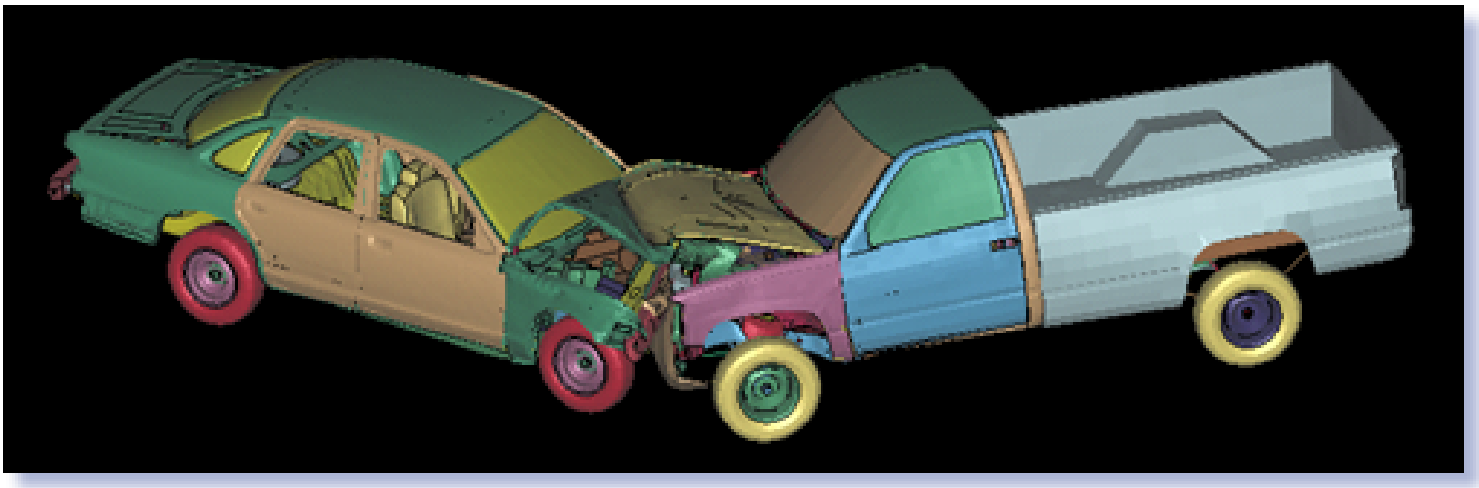
The Volpe Center provides technical and management support to the Federal Aviation Administration's (FAA) Integrated Products Team for Surveillance. As part of this effort, the Center has participated in the development of the Airport Surface Detection Equipment Model X (ASDE-X), an integrated system comprised of: an X-band radar that scans an airport surface, digitally locating aircraft and ground vehicles; a multi-lateration/automatic dependent surveillance-broadcast subsystem that tracks transponder-equipped aircraft on the surface and approach routes; and a data-fusion system that blends information from the sensor subsystems and provides a unified surveillance "picture" of the airport situation. The ASDE-X is a key element of the Volpe Center's support to the FAA in meeting one of its top priorities: preventing airport runway incursions.

At a ceremony held on February 27, 2001, the FAA recognized the efforts of the ASDE-X Project Team. Volpe team members recognized were Mr. Frank Coyne of the Airport Surface Division and Dr. Tom Seliga and Dr. Mike Geyer both of the Surveillance and Sensors Division. The Volpe team was also commended for its "outstanding level of engineering expertise" in a letter to the Deputy Director of the Center.

Vehicle Crashworthiness Research Support (NHTSA)

During the week of February 12, 2001, Mr. George Neat, Chief of the Vehicle Crashworthiness Division, and sponsor Dr. Thomas Hollowell, Chief of the National Highway Traffic Safety Administration's (NHTSA) Crashworthiness Research Division, participated in meetings held in Wolfsburg, Germany, on vehicle aggressivity and fleet compatibility. Several groups are working on a common safety problem resulting from the disparate types of motor vehicles operating on the highways. Vehicle designs intended to protect the occupants of motor vehicles have resulted in "aggressive" vehicles that cause excessive injuries and fatalities to the occupants of the other vehicle in various crash scenarios.

Dr. Hollowell and Mr. Neat attended a workshop sponsored by the European automobile manufacturers on February 13 and 14, 2001, that addressed research being conducted in this area by governments, academia, and industry around the world. Much of the discussion focused on the development of new crash tests to address the vehicle compatibility issue; there was notable progress toward finding candidate solutions. Material presented at the workshop by Dr. Hollowell included results of research conducted at the Volpe Center.



In the United States, the emergence of large sport utility vehicles and the increase in sales of vans and pickup trucks have exacerbated the problem of "aggressive" vehicles. Volpe research for NHTSA will help determine the best combination of vehicle characteristics to reduce fatalities and injuries in motor vehicle crashes between dissimilar types of vehicles.

(Model courtesy of Mr. George Neat)

In addition to the manufacturers' workshop, Dr. Hollowell and Mr. Neat participated in a Compatibility Working Group meeting of the International Harmonization of Research Activities. Mr. Neat also attended a meeting of the European Enhanced Safety of Vehicles Committee Working Group 15 on Vehicle Compatibility.

The meetings were directly related to fleet compatibility research performed at the Volpe Center for NHTSA. The Vehicle Crashworthiness Division has developed a prototype fleet systems model to evaluate the impact of vehicle design changes and the introduction of new safety systems on the U.S. automobile fleet. Ultimately, the model will incorporate projections of the U.S. fleet into future years and will enable determination of the best combination of vehicle characteristics to reduce fatalities and serious injuries in motor vehicle crashes.

Aviation Safety Program Support (NASA)

To assist NASA Langley Research Center in evaluating the safety benefits of the NASA Ames R&D program, Dr. Sherry Borener of the Accident Prevention Division and Mr. Walter Gazda of the Economic Analysis Division conducted a workshop at the Volpe Center on January 25 and 26, 2001. Because the NASA sponsors were interested in learning how safety benefit estimation had been done in non-aviation programs, an array of Volpe staff from various disciplines provided project-level descriptions of their methodology, and participated in a round-table discussion on how those techniques could be applied to estimate safety benefits for NASA's aviation safety programs.

Approximately 15 Volpe Center participants discussed their projects in the context of: topic area (e.g., economics, human factors, materials research, systems analysis and integration); method (e.g., experiment, forecasting and mathematical analysis, decision analysis); data requirements (e.g., institutional, operational, organizational input); analysis; and results. During the second half of the workshop, Volpe aviation safety experts provided background on data availability at the Center, ongoing aviation safety analyses, and possible overlap with NASA programs.

This workshop is an excellent example of the Center's value as a multimodal research center. The integration of multiple disciplines provides a comprehensive perspective that benefits from lessons learned across many transportation modes.

Ensure that the transportation system is accessible, integrated and efficient, and offers flexibility of choices.

Fast Ferry Transport Analysis (FHWA)

The Volpe Center is providing engineering and operations research analysis support to help the Federal Highway Administration meet its intermodal program goals as specified in the Transportation Equity Act for the 21st Century (TEA-21). This effort has focused on the assessment of fast ferry transport opportunities, data development and analysis, and public communication of the results.

Volpe staff recently completed the development of a comprehensive inventory and database of existing ferry routes and operators - including vessel and terminal characteristics and operating route elements - covering the United States and the territories of Puerto Rico, the U.S. Virgin Islands, and Guam. The database is used by industry and government agencies for a variety of purposes, including market research and public ferry transport policy analysis; it has been distributed on CD to nearly 1500 interested users. Public communication venues include trade magazines and conferences. The next phase of work involves developing a Web site and maintaining the database.

On February 13 and 14, 2001, Mr. Michael Dyer of the Technology Applications and Deployment Division and Mr. Robert Armstrong, formerly of the Center, participated in the Annual Meeting of the Passenger Vessels Association in Savannah, Georgia. They presented the database in detail, and conducted a session to solicit input regarding additional data elements and improving the usefulness of the database.

Performing ITS Program Reviews (FHWA)

As part of its support to the Federal Highway Administration (FHWA), the Volpe Center recently completed two program reviews for Dr. Christine Johnson, Program Manager for the Operations Core Business Unit (CBU). The work involved appraising the effectiveness of two programs related to Intelligent Transportation Systems (ITS), and proposing recommendations for improvement. The first review investigated how the Interim Guidance for conforming to the National ITS Architecture was applied by federal field offices and state Departments of Transportation. The architecture is a framework for developing and deploying ITS; it identifies relationships among ITS products and services and the requirements for sharing and disseminating information. The second review examined the quality of information disseminated by the ITS Joint Program Office that describes the benefits of ITS, and how this information is used by transportation officials at all levels of government.

The reviews were conducted by the team of Mr. Allan DeBlasio, Mr. David Jackson, Ms. Dana Larkin, Mr. Armand Ciccarelli, and Ms. Maureen Luna-Long of the Economic Analysis Division; Ms. Jane Lappin, Ms. Jessica Paddock, and Ms. Katherine Blythe of EG&G Technical Services, Inc.; and Mr. John Mermin of Cambridge Systematics, Inc. The team visited 15 sites and interviewed more than 110 transportation professionals from federal, state, county, municipal, and transit agencies, and metropolitan planning organizations. During the review period, Mr. DeBlasio and Ms. Lappin facilitated two breakout sessions at an ITS America workshop that addressed the ITS community's knowledge of benefits information and future information requirements.

The team concluded with two presentations to Dr. Johnson; her management team; representatives from other FHWA groups, the Federal Transit Administration, and the Maritime Administration; and consultants. At a later date, the team will present more detailed recommendations for producing and distributing information on ITS benefits to the FHWA's Operations CBU outreach team.

Advance America's economic growth and competitiveness domestically and internationally through efficient and flexible transportation.

Volpe Completes Telecommunications Network Upgrade (FAA)

In support of the Federal Aviation Administration's (FAA) Spring 2001 Air Traffic Management initiative, the Automation Applications Division recently implemented a telecommunications upgrade for the Enhanced Traffic Management System (ETMS). ETMS is the real-time, operational computer system developed and supported by the Volpe Center that the FAA uses to detect, predict, and handle airspace congestion problems.

Mr. Neil Stone and Mr. Ray Goulet of the Telecommunications Division and Mr. Bruce Ressler of the Automation Applications Division led the Volpe team. The upgrade was performed one site at a time over a period of six weeks; the work required close coordination between telecommunications specialists at the Volpe Center ETMS hub site and technicians at the field sites during the evening and early morning hours. On February 15, 2001, the field site conversion was complete at all 75 FAA operational sites, successfully concluding four months of planning and implementation.

The network upgrade significantly changed the underlying telecommunications infrastructure of ETMS, quadrupling bandwidth capacity from 56 - 64kb to 256kb for each site. As a result, ETMS will support aircraft-position updates every minute; previous updates were at intervals of only one to four minutes. More frequent updates help provide more accurate traffic-position information to air traffic managers, enhancing safety and efficiency. A high priority for the FAA, this accomplishment will enhance the FAA's ability to manage air traffic during the upcoming severe weather season, the spring and summer months of thunderstorm activity.

PAPERS AND PRESENTATIONS

- Ms. Melissa Laube of the Service Assessment Division and Mr. Robert Stout of the Federal Transit Administration co-authored a paper titled "Grand Canyon National Park: Assessment of Transportation Alternatives." The paper explores the environmental benefits of transit services for park visitors, and was published by the Transportation Research Board, in *Transportation Research Record,* No. 1735, pp. 59-69.
- On December 13 and 14, 2000, Mr. William Lyons of the Service Assessment Division joined sponsor Mr. Edward Weiner of the Office of the Secretary of Transportation in Madrid, Spain, as a participant in an international conference, "Overcoming Institutional Barriers to Implementing Sustainable Urban Travel Policies." The conference was organized by the Working Group on Urban Travel and Sustainability, a joint effort of the Organization of Economic Cooperation and Development, and the European Conference of Ministers of Transport. Mr. Lyons delivered a paper on the institutional frameworks for transportation and environmental decision making. He also joined Dr. Pieter Boot, Policy Director of the Dutch Ministry of Transport and Waterworks, in a discussion of the different approaches used in the United States and the Netherlands, based on collaborative work conducted by the Volpe Center and the Dutch Ministry. Mr. Lyons' paper was titled "The U.S. Transportation Equity Act for the 21st Century and Clean Air Act Amendments: An Innovative Framework for Environmental Policy."
- On January 9, 2001, Dr. Paul Valihura of the Environmental Engineering Division, supported by staff from the Safety and Environmental Technology Division and the Transportation Strategic Planning and Program Development Division, submitted a two-volume Final Programmatic Environmental Impact Statement (PEIS) in support of the Federal Railroad Administration's (FRA) Maglev Deployment Program. This PEIS is part of the environmental review process required under the National Environmental Policy Act before Maglev system construction can begin. After a 30-day review period, the FRA will release a Record of Decision, indicating the future of the Maglev Deployment Program.
- Dr. Thomas Seliga of the Surveillance and Sensors Division co-authored two papers that were presented at the Annual Meeting of the American Meteorological Society held on January 10 to 13, 2001, in Albuquerque, New Mexico. These papers result from work done by the Volpe Center in support of the Federal Aviation Administration's (FAA) programs related to weather systems and the relationship of weather to air traffic operations. Specifically, the Center has worked on the development and implementation of the new-generation Runway Visual Range (RVR) System, which monitors visibility at critical locations on runways. The first paper is titled "Visibility Variability at Seattle, Washington, and Portland, Oregon: Insights into the Impacts of Runway Visual Range (RVR) Measurements on Aviation Operations." The second paper is titled "Severe Winter Weather Performance of Runway Visual Range (RVR) Systems at Five Alaskan Airports."
- On January 23, 2001, Ms. Stephanie Markos of the High Speed Ground Transportation Division co-presented "Development of a Hazard Assessment-Based Method for Evaluating the Fire Safety of Passenger Trains" at the 7th International Conference on Fire and Materials held in San Francisco, California, January 22 to 24, 2001. This paper provides an overview of the results to date of work being done by the Volpe Center and the National Institute of Standards and Technology to study the fire performance characteristics of current rail car materials in support of the rail car fire research program sponsored by the FRA.
- Mr. Christopher Roof of the Safety and Environmental Technology Division presented the paper "A Differential GPS for Determining Time-Space-Position Information in Support of Aircraft Noise Certification" at the 2001 National Technical Meeting of the Institute of Navigation (ION) held in Long Beach, California, January 22 to 24, 2001. The paper discusses a method of precision tracking of aircraft during noise certification testing, co-developed by Mr. Roof, in support of the FAA's Office of Environment and Energy.
- At the same 2001 ION National Technical Meeting, Ms. Karen Van Dyke of the Center for Navigation presented a paper titled "Use of Standalone GPS for Approach with Vertical Guidance." Presentations at this meeting were closely related to work that the Center for Navigation performs on aviation and maritime applications of the Global Positioning System (GPS).
- Ms. Alexandra Kuchar of the Vehicle Crashworthiness Division presented a paper at the Society of Automotive Engineers 2001 World Congress in Detroit, Michigan, held March 7 and 8, 2001. The paper, titled "A Systems Modeling Methodology for Evaluation of Vehicle Aggressivity in the Automotive Accident Environment," describes a computational approach for evaluating changes in the vehicle fleet, such as increasing sport-utility sales, and their effects on passenger safety.
- Dr. Judith Rochat of the Safety and Environmental Technology Division gave a presentation titled "Field Evaluation of the Traffic Noise Model" at a workshop of the Institute of Transportation Engineers in Phoenix, Arizona, on March 15, 2001. The presentation covered the selection of highway sites, noise measurement procedures and instrumentation, and preliminary results. Dr. Rochat's work supports the Federal Highway Administration's (FHWA) Office of Natural Environment in the development and maintenance of the FHWA Traffic Noise Model.

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improvements remains a top priority. The Volpe Center has played an important role in the Department's ongoing mission to improve the safety of the nation's transportation system. For more than 30 years, we have supported all DOT's modes in improving their safety performance through research, analysis, and engineering.

Secretary Mineta referred to the recently established Federal Motor Carrier Safety Administration (FMCSA), whose functions had previously been part of the Federal Highway Administration. He noted that the FMCSA was created to ensure that the proper focus would be given to improving the safety performance of motor carriers and their compliance with regulations. SafeStat, FMCSA's safety profiling system for evaluating interstate commercial vehicle operators, was developed here at the Volpe Center and is a heavily used and valuable tool.

Secretary Mineta stressed the need to improve infrastructure to meet the demand for transportation. In particular, the Secretary expressed serious concern about the ability of the nation's airways to keep up with increased demand. To illustrate this point, he noted that between 1991 and 2000 the number of air passengers had increased by 215 million, or 50 percent, which has caused dramatic overcrowding in the aviation system especially in the summer months. The resulting delays are exacerbated by adverse weather conditions. He believes that airlines, airports, and air traffic control must all contribute to solving this problem, and that since the federal government is responsible for air traffic control, its priority must be to find ways to meet this challenge. For three decades, the Volpe Center has supported the Federal Aviation Administration (FAA) in its efforts to modernize and to increase capacity, and has been involved in laying the groundwork for the modernization efforts to which the Secretary gives priority.

In addition, Secretary Mineta reminded the Senators that when promising technologies are introduced, current technologies should be maintained until the new technologies are universally available where needed. To illustrate this point, he described the new aircraft landing systems that involve Global Positioning System (GPS) Local Area Augmentation and emphasized the importance of continuing to provide the infrastructure required for the current Instrument Landing System (ILS) until the GPS system is ready. The Volpe Center, which is at the forefront in both technologies, recently issued a report on the vulnerabilities of the GPS system, and the need to maintain the ILS system as a backup.

The Secretary sees upgrading computer technology as key to modernizing air traffic control. The Volpe Center's work in developing and implementing the FAA's Enhanced Traffic Management System, which aids air traffic controllers as they manage the flow of air traffic, has helped increase the efficiency of air transport. In addition, the Center is playing a significant role in the implementation of Free Flight, which will allow pilots to choose their own routes within appropriate safety parameters.

Problems in other modes of transportation include severe highway congestion, which has the potential to adversely affect the nation's economy. The Secretary believes that steps in the right direction have been taken, first with the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) - which recognized that solving problems required local, state, and metropolitan involvement - and more recently with the Transportation Equity Act for the 21st Century (TEA-21), which has continued this approach and provided capital investment. He also believes that modernization and the implementation of Intelligent Transportation Systems (ITS) are key to addressing this problem.

The Volpe Center has been supporting the ITS Joint Program Office in many activities related to the design, management, and implementation of that program, and has also supported ITS modernization at the local level. For example, the Center helped the State of Maryland to address its highway congestion problems by developing a comprehensive ITS strategy to increase the efficiency of the existing road network capacities, and has also worked with other state and local governments on capacity-improving initiatives.

We look forward to supporting Secretary Mineta in initiatives that will improve our transportation system, as we continue to work with the other modal areas of the DOT and our many other clients at the federal, state, local, and international levels.

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