



National Transportation Systems Center

# HIGHLIGHTS

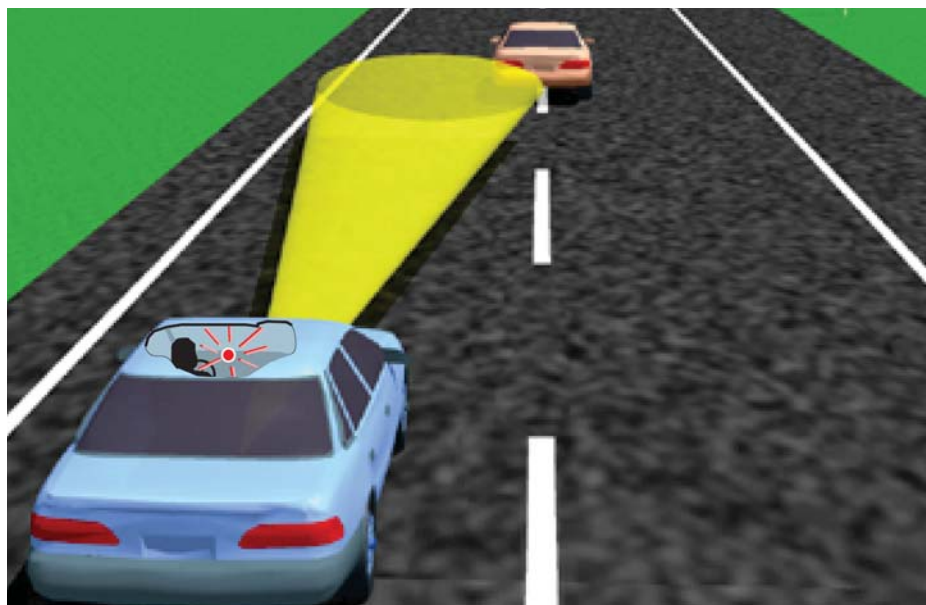
Cambridge, Massachusetts

May/June 2002

## Focus

### **Reducing Motor Vehicle Crashes with the DOT's Intelligent Vehicle Initiative (NHTSA)**

Each year, more than 6 million vehicle crashes occur on our nation's highways. Crashes kill more than 41,000 people, injure approximately 3.4 million others, and cost more than \$150 billion per year. Over the last several decades, public information and education campaigns, standard safety equipment, and improved vehicle crashworthiness and highway design have all contributed to improved safety. Driver error, however, remains the leading cause of highway crashes. Through the Intelligent Vehicle Initiative (IVI), the DOT hopes to reduce crashes by helping drivers avoid hazardous mistakes. The goal of the IVI is to accelerate the development and commercialization of vehicle-based driver assistance products that can assess the driving environment in ways that drivers cannot. Such products will warn drivers of dangerous situations, recommend actions, and even assume partial control of vehicles to avoid collisions, ultimately reducing deaths and injuries.



*The Volpe Center supports the DOT's Intelligent Vehicle Initiative, whose mission is to accelerate the development, introduction, and commercialization of driver-assistance products such as Intelligent Cruise Control shown above. Such products have significant potential benefits.*



*Richard R. John*

## Director's Notes

### **Preventing Collisions, Saving Lives**

The majority of transportation deaths and injuries involve motor vehicles. Saving lives by preventing collisions is a major objective of the DOT and the Volpe Center. This issue's *Focus* article highlights the DOT's Intelligent Vehicle Initiative (IVI), which encourages the development of driver assistance products. Such systems may use remote sensors to detect other vehicles or objects, a computer to evaluate the possibility of a collision, and a "driver interface" to relay that information to the driver.

The IVI operates as a public-private partnership in which federal government and private industry collaborate to promote the development, testing, and deployment of effective and practical safety features. The federal partner, DOT, takes the lead in conducting basic

*Continued on back page*

## Inside

Training airport security screeners

Designing "park-friendly" alternative vehicles for the National Park Service

Improving business practices for the Federal Motor Carrier Safety Administration

Houko Luikens of the Dutch Transport Centre contributes to the Volpe Center Distinguished Lecture Series

### Helping Drivers Avoid Hazardous Mistakes

Some high-end “smart cars” already have add-ons such as crash-avoidance systems that maintain a vehicle's position in the center of the lane; night-vision capabilities to detect people, animals, or objects in the dark; and cruise control that automatically adjusts to maintain a safe distance from other vehicles. These and future advanced safety systems are expected to save lives, to lessen injuries, and to reduce financial losses by reducing the number and severity of vehicle crashes. These safety improvements to vehicles could also show secondary benefits such as increased transportation mobility, productivity, and other operational improvements.

IVI products and services will encompass in-vehicle systems such as those mentioned above; cooperative vehicle-to-vehicle systems, which enable cars to send and receive information from each other about their relative locations; and cooperative vehicle-to-infrastructure systems such as traffic lights that send information to cars warning them of upcoming red lights. IVI addresses four types of vehicles: light (passenger) vehicles, transit and intercity buses, commercial trucks, and specialty vehicles such as emergency and road utility vehicles. Moreover, the initiative includes the development of industry-wide architecture and standards, integrated system prototyping, and field operational test evaluations. In this way, government and industry can assess benefits, define the performance requirements, and accelerate the deployment of effective driver assistance products and services.

### Providing Technical Support to NHTSA in IVI Implementation

The Volpe Center has been providing technical support to the National Highway Traffic Safety Administration (NHTSA) under the IVI for the light vehicle platform since 1999. The Center's studies include: an analysis of different types of crashes (i.e., crossing-path, off-roadway, lane change, and pedestrian and pedalcyclists); an analysis of rear-end crashes; an assessment of traffic simulation models to evaluate the safety performance of intelligent vehicle systems; an analysis of how drivers respond to an imminent rear-end collision when their cars are equipped with intelligent cruise control systems; a study of countermeasures for intersection-crossing-path and off-roadway crashes; a traffic safety evaluation framework for IVI crash countermeasures; and the development of objective test procedures for crash countermeasure systems. Details of recent analyses of crash types follow.

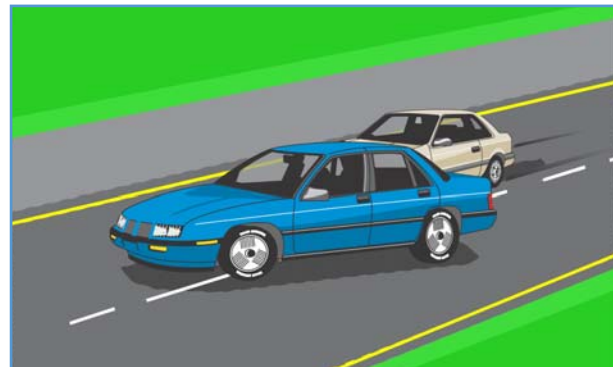
*Driver error is the primary cause of about 90% of reported crashes involving passenger vehicles, trucks, and buses. The Volpe Center supports the IVI program in helping drivers avoid hazardous mistakes.*

### Understanding How Crashes Happen

Recognizing that the development of effective driver assistance products requires a rigorous understanding of the collisions themselves, NHTSA asked Volpe to analyze crash scenarios and identify potentially effective countermeasures.

### **Lane Change Crashes**

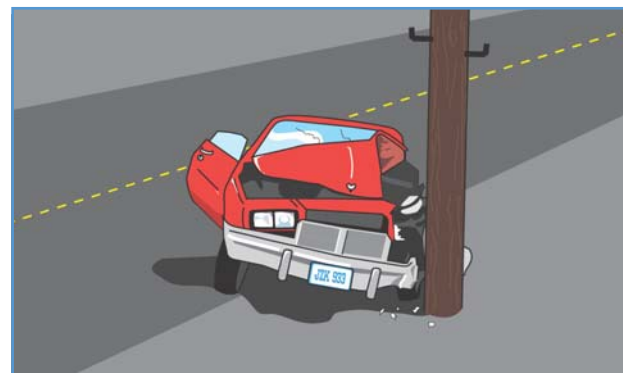
Recently, the Center's Accident Prevention Division completed an analysis of lane change crashes for NHTSA's Office of Vehicle Safety Research. Lane change crashes are defined as two-vehicle crashes that occur when one vehicle encroaches into the path of another vehicle initially on a parallel path with the first vehicle and traveling in the same direction. These crashes include many vehicle maneuvers such as changing lanes, passing, leaving a parking space, drifting, turning, and merging. The Volpe study, which analyzed lane change crashes reported in 1999, focuses on a selected portion of these crashes to enable the development of potential lane change, crash avoidance systems. Dr. Wassim Najm and Mr. John Smith of the Division and Dr. Basav Sen of EG&G Technical Services (a Volpe contractor) conducted this analysis, which was completed in February 2002.



*Collisions during lane changes and merges account for 1 in 25 of all crashes. Volpe's analysis of lane change crashes could enable the development of effective crash-avoidance systems.*

### **Off-Roadway Crashes**

Off-roadway crashes occur when a moving vehicle departs the travel roadway and then experiences a harmful event. Mr. Jonathan Koopmann and Dr. Wassim Najm of the Accident Prevention Division analyzed off-roadway crash countermeasure systems in support of IVI. They defined off-roadway crashes and described their pre-crash scenarios and crash-contributing factors, then used this information to define countermeasure concepts and functional requirements for technology to warn drivers of an imminent road edge crossing or a vehicle control loss on straight or curved roadways. The team performed a technology survey to assess the status of applicable state-of-the-art technologies, and then forecast the progression of future countermeasure systems. On March 5, 2002, Mr. Koopmann presented this work in a paper titled "Analysis of Off-Roadway Crash Countermeasures for Intelligent Vehicle Applications," at the Society of Automotive Engineers World Congress in Detroit, Michigan. Dr. Najm co-authored the paper.



*Single-vehicle roadway departures account for 1 in 5 of reported crashes. A Volpe team is analyzing countermeasure systems to help prevent off-roadway crashes, which usually involve a single vehicle.*

### **Crashes Involving Pedestrians and Pedalcyclists**

The Accident Prevention Division is also investigating the cause of, and potential solutions to, motor vehicle crashes involving pedestrians and pedalcyclists (i.e., bicyclists). The goal of this work is to enable the development of concepts, functional requirements, performance guidelines, and test procedures, as well as the safety assessment of potential pedestrian and pedalcyclist crash avoidance systems. Recently, Mr. Marco daSilva of the Division presented a technical paper at the Institute of Transportation Engineers' 2002 Spring Conference and Exhibit held March 24 to 27, 2002 in Palm Harbor, Florida. The paper, titled "Pre-Crash Scenario Development for Pedestrian and Pedalcyclist Crash Problems," presents a summary of the most prevalent findings obtained from Volpe's analysis of pedestrian and pedalcyclist crash problems. The results are intended to support development of effective

countermeasure concepts and provide data for the design of effectiveness assessments. These findings help researchers quantify the different conditions present in pedestrian and pedalcyclist crashes by identifying vehicle maneuver and pedestrian/pedalcyclist action combinations most prevalent in such crashes. Dr. David Yang of the Division also attended the conference, participating in a special discussion session on traffic signal timing, and attending several technical sessions related to intersection safety and red light running.

The Volpe Center is committed to helping NHTSA and DOT support the development of safe, effective, and cost-efficient technology that can become standard equipment on the vehicles of the future.



*Volpe's work will lead to the safety assessment of potential pedestrian and pedalcyclist crash avoidance systems.*



### ***Volpe Center Staff Member Joins Airport Screening Training Team (TSA)***

At the request of the Research and Special Programs Administration's Administrator, Miss Ellen G. Engleman, the Volpe Center is supporting the new Transportation Security Administration (TSA). Last year, the TSA was chartered by Congress to take over transportation security nationwide, beginning with aviation security. TSA quickly developed a plan that would provide for premium-quality, intense, and measurable training for security screeners employed by the TSA at the 429 U.S. airports with commercial service. The training has a dual objective of protecting the system and serving the traveling public. Key elements include screening of persons, baggage, and cargo. The screener training included x-ray interpretation, operation and maintenance of walk-through metal detectors, explosive trace detectors, hand-held metal detectors, stress management, conflict resolution, and professional interaction with passengers.

As part of Volpe's support to TSA, Ms. Justyne Johnson of the Center's Telecommunications Division participated in the Airport Screener Training Program at the Federal Law Enforcement Training Center in Glynco, Georgia, where she was fully certified as a Screener Training Facilitator. After receiving instruction, she traveled to the Aeronautical Center in Oklahoma City to train airport security screeners and supervisors; this intensive training session was conducted over four consecutive weeks in April. Ms. Johnson remains on call for the TSA and expects to be training airport security screeners again in the near future.

*Volpe staff support the new Transportation Security Administration in its implementation of premium-quality training of airport security screeners.*

### ***Joining Forces to Address Wire System Aging (FRA)***

Aging wire systems impact many elements of our nation's infrastructure, including aircraft, spacecraft, railroads, and nuclear power plants, as well as residential housing. A study by the White House National Science and Technology Council concluded that wire system safety is an important public health and safety issue that transcends government agencies. The Nuclear Regulatory Commission hosted the International Conference on Wire System Aging in Rockville, Maryland, from April 23 to 25, 2002. The conference reviewed current practices and programs for understanding and managing wire system aging; enabled information exchange on the status of related research; and identified technical issues and programs of interest for collaborative research. The conference sessions - Reliability Physics Modeling, Fire Risk Assessment, Risk Significance, and Diagnostics and Prognostics - featured papers by diverse organizations in government, academia, the aerospace industry, and the nuclear power industry.

Dr. John Brewer of the Vehicle Crashworthiness Division participated in the conference. Dr. Brewer was a panelist in a summary discussion that reviewed the proceedings and discussed the future direction for research and collaboration. He also invited attendees to propose contributions to the National Strategy Document of the Wire System Safety Interagency Working Group (WSSIWG), a group chartered by the White House Office of Science and Technology Policy. Dr. Brewer chairs the WSSIWG subgroup that is drafting the document.

*Experts from many fields are collaborating to address the pervasive problem of wire system aging.*



### ***Improving Public Transportation on Cape Cod (CCTTF)***

Over the last several decades, Cape Cod, Massachusetts, has each year attracted larger numbers of people. The growing population of summer visitors and year-round residents has resulted in increased traffic congestion, as well as increased demand for public transportation.

The Cape Cod Transit Task Force (CCTTF) was established in 2000 to develop a short-term plan to improve public transportation in the Cape region. At CCTTF's request, the Volpe Center has supported this, under the direction of Mr. Terry Sheehan of the Service and Operations Assessment Division, and has recently produced the final draft of the *Five-Year Cape Cod Public Transportation Plan*. The recent Transit Summit III, hosted by the CCTTF on February 27, 2002, in Hyannis, Massachusetts, marked the end of the formal public comment period on the final draft Plan.

Transit Summit III was held in two parts. The Summit co-chairs and Mr. Sheehan first discussed the elements of the plan, the results of the public comment period, and implementation. The need for a long-range, 10-to-20-year Public Transportation Plan to complement the work already completed was also addressed. This discussion was followed by four workshops focusing on next steps: 1) future rail improvements (moderated by Mr. Sheehan); 2) human service coordination and youth transportation; 3) financing the plan; and 4) the role for a community-based, public-private coordinating council. After the workshops, all input was gathered by the workshop moderators and presented to the full assembly in the main ballroom. A question-and-answer period followed. The Summit was attended by nearly 150 guests, and featured a speech by newly appointed Massachusetts Secretary of Transportation James Scanlan.

The Volpe team, in conjunction with the CCTTF, is expected to deliver the final *Five-Year Cape Cod Public Transportation Plan* in May 2002.

**Enhancing Configuration Management with CMplus (U.S. Coast Guard)**

As part of the U.S. Coast Guard's Configuration Management Project, the Volpe Center's Information Integration Division supports the Configuration Management Plus (CMplus) system. CMplus helps the Coast Guard manage maintenance and supply information for its fleet of cutters. The Division provides support in the areas of business analysis, requirement definition, system design, development and integration, implementation, and maintenance.

CMplus is the central repository for activities associated with maintaining Coast Guard assets at the unit level. It provides an automated information storage and retrieval source for inventory, maintenance, requisitioning, and equipment history; enables updating and maintaining baseline equipment configuration data and associated references; and provides logistics support in configuration, maintenance, and supply management. CMplus is deployed to more than 300 Coast Guard cutters and shoreside support organizations; implementation is expected at more than 600 units by 2003.



*The Cape Cod Transit Task Force was established in 2000 to develop a short-term plan to improve public transportation in the Cape region. In support of this effort, the Volpe Center is developing the Five-Year Cape Cod Public Transportation Plan.*



*CMplus is deployed to hundreds of Coast Guard cutters and shoreside support organizations.*

In January 2002, Ms. Carrie Darling-Brown, Mr. Gary Fredericks, and Mr. Calvin Pires of the Division received the Coast Guard Meritorious Team Commendation for their service on the Configuration Management Project Software Installation and Training Team. The team conducted 122 CMplus software builds, installations, and 3-day training sessions from April through December 2001, completing a 2-year task in 9 months.

Recently, the Division worked with the Coast Guard Office of Logistics to develop related software called the New Acquisition Tool. Contractors building new Coast Guard vessels can use this tool to collect and maintain configuration-related data during vessel construction; this data will be exported into CMplus and the Coast Guard's automated Fleet Logistics System. The final version of the New Acquisition Tool was delivered to the Coast Guard on March 1, 2002.

### ***Volpe Center Lecture Series Features Houko Luikens, Director of Dutch Transport Research Centre***

The Volpe Center's Distinguished Lecture Series focuses on maintaining a climate for transportation innovation and on defining the roles of government, industry, and academia in the 21st Century transportation system. This activity continues the Center's long tradition of serving as a hub for the diverse transportation community and a forum for highly respected national and international experts and leaders to exchange information and perspectives.

On April 30, 2002, Mr. Houko Luikens presented "Institutional Frameworks for Transportation Infrastructure – Management, Organization and Financing: Dutch and European Experiences." Mr. Luikens is Managing Director of the Transport Research Centre (TRC) for the Dutch Ministry of Transport, Public Works and Water Management. The TRC applies expertise in the development and execution of the government's policy for personal and freight transport.

Mr. Luikens addressed the need for a common European Transport Policy. Because the issues and approach of the Netherlands and the European Union are quite similar, he used his country as an example of how the European policy could work. The European Transport Policy, established by the European Commission, is based on an awareness and analysis of the growing transport-related problems in Europe: congestion, poor service quality, environmental problems, and safety. To address these problems, the policy would enable trans-European network investments, open up the transport market, shift the balance among modes, and establish a pricing policy that would allow fair competition.

*The Center's ongoing work supports the continued, effective, and growing use of CMplus throughout the Coast Guard.*



*Mr. Houko Luikens (left) and Dr. Richard R. John renewed the collaborative agreement between the Volpe Center and the Dutch Transport Research Centre during Mr. Luikens' recent visit to the Volpe Center. The two centers collaborate on a broad range of topics, including operator fatigue and alertness; professional capacity building for transportation planning; and public-private roles in funding and operating passenger railroads.*

The Dutch Traffic and Transport Plan that is currently under review is aimed at improving accessibility, quality of life, safety, and sustainability. The main Transport policy strategies are essentially in line with the European Union policy, and include:

- Better utilization of road and rail infrastructure;
- “Smart” mobility pricing;
- Limited road infrastructure expansion;
- Extensive public transport infrastructure expansion (e.g., high-speed rail, maglev);
- Institutional changes in public transport;
- Institutional changes in road investments, maintenance, and operation; and
- Transfer of responsibilities to local and regional levels.

The Netherlands’ high population density and car ownership present a unique challenge. Despite growing traffic congestion, public transportation has a negative public image because of lack of quality, speed, comfort, and accessibility. Passenger and freight rail usage has also declined. In response, the Dutch plan emphasizes facilitating a high-quality network where consumers can decide which mode they want to use. However, Mr. Luikens emphasized, there must be a direct link between using a service and paying for it. The plan also balances the need for mobility with other concerns, such as environmental impacts.

Of particular interest to the audience was Mr. Luikens’ description of the institutional changes made regarding passenger rail service in the Netherlands. To improve efficiency, responsibility for operation was separated from infrastructure. The national government owns and maintains the rail infrastructure and handles traffic management, while a private firm operates the rail service according to government standards. The issue of public-private roles in funding and operating passenger railroads is one area in which the TRC and the Volpe Center collaborate.

Mr. Luikens’ main message was the importance of shared responsibility for solving transportation problems – that only through the participation of the public, business community, and local and regional governments will major transportation problems be solved.

*The TRC’s role in the Netherlands is similar to the Volpe Center’s role in the United States: research, development, and analysis focusing on effective use of technology to improve quality of life.*

**One Europe?**

Implementing one common transportation policy in Europe is a daunting task. On the most basic level, the 15 countries that now make up the European Union have differing transportation and power systems. However, Mr. Luikens was optimistic about movement toward a unified approach.





## Designing “Park-Friendly” Alternative Vehicles (NPS)

The National Park Service (NPS) maintains a comprehensive program aimed at developing and implementing alternative transportation systems (ATS) in the National Parks. ATS can help reduce traffic congestion, alleviate environmental impacts, and provide a more enjoyable visitor experience.

The Volpe Center provides wide-ranging support to the ATS program. Recently, members of the Advanced Vehicle Technologies Division facilitated an NPS-sponsored Alternate Vehicle Design Workshop held in Estes Park, Colorado. The workshop focused on the planning and design of alternative transportation vehicles that:

- Protect park resources and adhere to sustainable design principles;
- Enhance visitor understanding and enjoyment of parks through interpretation and education;
- Address visitor safety and comfort, including requirements of the Americans with Disabilities Act; and
- Contribute to the NPS’ role as a leader in a national conservation ethic.

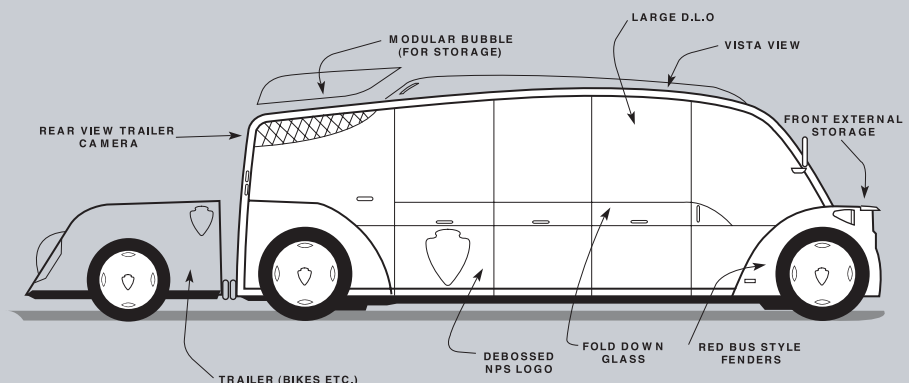
March 25 through 28, 2002, Messrs. Paul Bushueff, William Chernicoff, and Barry Mickela of the Division moderated and led an interactive forum that brought together leaders from the NPS, the transportation industry, and other organizations to exchange ideas and information, and to develop readily implementable design concepts of the NPS vehicles of the future.

The 86 attendees included NPS planners, coordinators, and superintendents from all seven park regions; representatives from transportation manufacturing companies and transportation-related supply companies.

As part of this effort, the Center is also developing a Web-based, vehicle-selection tool for the NPS that will assist individual parks during vehicle procurement and acquisitions.

*The goal of the workshop was to develop NPS requirements and tangible vehicle design concepts for “park-friendly” vehicles.*

*Several design concepts for park-friendly vehicles were developed collaboratively at the Volpe-facilitated workshop. In developing the concept shown here for a small bus that would carry 20-29 people, participants considered many issues, including road and route factors such as load, terrain, grades, and turning radii; environmental factors; passenger requirements such as access, egress, safety, interior comfort, and luggage; driver/tour guide requirements; visual and audio requirements; maintenance, reliability, and serviceability; style and appearance; and integration of intelligent transportation systems.*





## Organizational Excellence

### ***Improving Business Processes with Electronic Document Management (FMCSA)***

The primary mission of the Federal Motor Carrier Safety Administration (FMCSA) is to prevent commercial motor vehicle-related fatalities and injuries. Formerly a part of the Federal Highway Administration, FMCSA was established within DOT in 2000. As a relatively new administration, FMCSA is searching for innovative ways to conduct its business and serve the public. For example, the administration is working toward automating its internal business processes to improve efficiency and customer service.

Early in 2001, FMCSA approached Volpe's Computer Center for assistance in identifying requirements for, and then implementing, an Electronic Document Management System (EDMS – see sidebar). Several FMCSA organizations had expressed a need for document management, and FMCSA wanted to ensure that any document management efforts were well integrated, with a plan that covered each organization's needs. Careful planning and development is especially important since FMCSA is rapidly expanding, with more than 1,000 employees based in four Service Centers, 52 Division offices, recently installed Mexican border offices, and at Headquarters.

The Volpe Center recommended the use of a methodology that could quickly scope requirements and set an overall direction for all future efforts. Volpe support has included conducting workshops, interviews, and security and network architecture analyses, and planning for the upcoming pilot. Volpe team members include Ms. Rosemarie Kelly and Mr. Bob Berk of the Computer Center, and Mr. Michael Beyer and Mr. Bob Mallion of WT Chen (a Volpe contractor).

In November 2001, Volpe conducted an initial requirements-gathering workshop with what is now known as the EDMS Core Team. Comprised of FMCSA staff from both Headquarters and the field, the Core Team is responsible for validating user and functional requirements of the EDMS and for choosing an EDMS software package for implementation throughout FMCSA.

From February through April 2002, the Volpe team conducted a series of five information-gathering workshops. Each workshop was attended by up to a dozen employees from FMCSA Service Center regions and Headquarters. Workshop topics included process modeling and data definition for several internal FMCSA processes. The two- and three-day workshops were held close to FMCSA Service Centers in Chicago, San Francisco, Atlanta, and Baltimore. The team also conducted security and network architecture analyses at each Service Center.

#### ***EDMS: Working Toward a Paperless Work Environment***

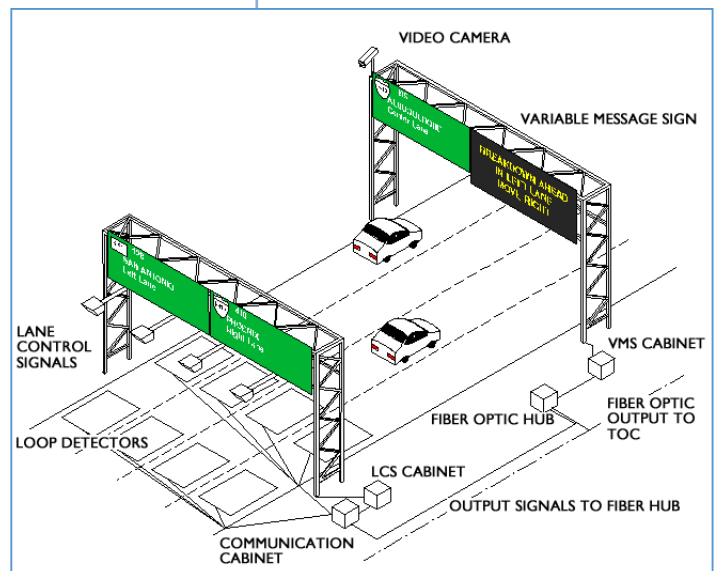
- Electronic document management systems (EDMS) can facilitate efficiency and collaboration in a work process by enabling electronic management of the document lifecycle.
- An EDMS allows for the creation, editing, routing, tracking, approval, storage, and retrieval of documents, including word processing, spread sheet, and presentation documents, in a paperless environment.
- Files in other formats, such as photographs and sound clips, can also be easily stored and retrieved with an EDMS.

After analyzing FMCSA requirements, Volpe developed a Request for Information that was distributed to EDMS vendors nationwide. Three vendors were chosen to demonstrate their products to the Core Team at a workshop hosted by the Volpe Center during the week of May 13, 2002. The selected vendor will participate in a 12-week pilot in selected geographic and functional FMCSA areas, beginning at the end of June. Following the pilot, Volpe will deliver documentation to FMCSA that will enable it to incorporate lessons learned into the implementation plan for the EDMS solution at all FMCSA locations.

*Typical of Volpe's approach, the Computer Center involved users and stakeholders early in the EDMS development process.*

## Papers & Presentations

- Dr. Arthur Flores of the Environmental Measurement and Modeling Division participated in the 15th Annual Meeting of the International Association for Chemical Testing, held in Austin, Texas, from April 14 to 18, 2002. He presented the paper "The Relationship between Breath Alcohol and Breath Temperature." The Volpe Center supports the National Highway Traffic Safety Administration, Office of Research and Traffic Records by conducting studies of techniques for measuring alcohol on the breath and in blood. The studies include evaluation of breath alcohol testing procedures and practices of state law-enforcement agencies.
- Mr. David Read of the Environmental Measurement and Modeling Division participated in a meeting of a Working Group of the International Civil Aviation Organization held in Bordeaux, France, from February 25 to 26, 2002. Participants included international representatives from the aircraft industry and from regulatory agencies. Mr. Read presented the paper, "Discussion of Selected Elements of the Proposed Background Noise Correction Procedure," pertaining to aircraft noise certification, and participated in related technical discussions. The Volpe Center supports the Federal Aviation Administration's Office of Environment and Energy in the development and evaluation of novel technologies related to mitigation of aircraft noise.



*Dr. Lee discussed the difficulties of evaluating benefits from such ITS technologies as freeway surveillance.*

- Dr. Douglass Lee of the Service and Operations Assessment Division presented a paper titled "Making the Case for ITS Investment" at a one-day conference on "Measuring the Contribution of ITS to Transportation Services," held in Sacramento, California, on February 5, 2002. The conference was sponsored by the California Department of Transportation and presented by the Institute of Transportation Studies at the University of California Davis and at Berkeley.
- Volpe Center staff presented papers at the American Meteorological Society's 10th Conference on Aviation, Range, and Aerospace Meteorology, held May 13 to 16, 2002, in Portland, Oregon.
  - Dr. Leonard Kurzweil, Automations Application Division, Mr. David Reiser of Computer Sciences Corporation (a Volpe contractor), and MIT Lincoln Laboratory staff co-authored the paper titled "A Web-Based Display and Access Point to the Federal Aviation Administration's (FAA) Integrated Terminal Weather System (ITWS)." ITWS integrates weather data from FAA and National Weather Service sensors and systems, as well as aircraft in flight, to produce weather products for use within Terminal Radar Approach Control (TRACON) areas.
  - Mr. Dale Rhoda, Automation Applications Division, and two co-authors from MIT Lincoln Laboratory presented a paper titled "Aircraft Encounters with Thunderstorms in Enroute vs. Terminal Airspace Above Memphis, Tennessee." The study described in the paper used two-dimensional and three-dimensional weather radar data to compare the storm avoidance and penetration behavior of pilots in enroute airspace with that of pilots who encountered the very same storms at lower altitudes, in terminal airspace near the Memphis airport.



### Promoting Public Health and Safety

*As the nation's leading transportation systems center, the Volpe Center is regularly called on to provide solutions for a wide variety of critical transportation safety problems. Working with federal, state, local, and international agencies, we apply our expertise to help ensure the safety of all modes of transportation, including air, rail, marine, transit, and highway.*

*A new brochure highlights the Volpe Center's safety initiatives, including Vehicle Crashworthiness, High-Speed Rail, Human Factors, Rail Structural Integrity, Accident Prevention, Drug and Alcohol Testing, Defect Investigation, and Air and Motor Carrier Safety Performance Systems.*

## Director's Notes

*Continued from page 1*

research, defining performance standards, and developing objective evaluation methodologies. DOT also evaluates promising IVI systems via field operational tests and assesses their safety benefits. Private industry develops the technology, integrates it into the vehicle, conducts field tests, and puts it into production. The Volpe Center supports the Federal Highway Administration as well as the National Highway Traffic Safety Administration (NHTSA) in helping DOT fulfill its Federal partner role. The *Focus* article in this issue describes recent work performed for NHTSA.

Preventive technology is an unprecedented approach to vehicle safety. Driver assistance systems do not passively prevent collisions through recalls, or mitigate the effects of collisions through safety features such as air bags – they actively assess the driving environment in ways that the driver cannot and alert the driver, who can act before a collision is inevitable.

Today, relatively few drivers, those owning the more expensive car models, have access to such sophisticated systems. The vehicles of the near future may have intelligent cruise control or night vision as standard features, and in the long-term, vehicles may be voice-activated. Nonetheless, alert and courteous drivers will always be critical to maintaining safety, regardless of the automated aids available. And the most important contribution anyone – whether walking, driving, or pedaling – can make to highway safety is to know and obey the rules of the road.

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