Director's Notes

Richard R. John

Deploying Technology to Counter Terrorist Threats

A recent report by the National Research Council, "Making the Nation Safer: The Role of Science and Technology in Countering Terrorism," notes that vulnerability to terrorism results not only from the proliferation of weapons of mass destruction, but also from the highly efficient and integrated systems that we rely on for key services, such as transportation. The report identifies the Volpe Center as an important federal resource for strategic transportation planning, systems-level research, and technology development and deployment. Since the 1970s, the Center has played significant roles in major programs to evaluate transportation systems vulnerabilities and risks, and to facilitate the deployment of innovative security processes and technologies for critical government facilities and for all modes of transportation.

Security experts at the Volpe Center understand the importance of preserving efficiency while increasing security. Although technology-

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Focus

The Volpe Center manages the Entry Point Screening (EPS) Program, whose primary concern is protecting people and facilities against bombs carried by personnel, vehicles, vessels, mail, and cargo. The EPS projects include Operation Safe Commerce (above), for which Volpe performed an assessment of an entire multimodal, global supply chain and demonstrated tracking and sensing technologies. Data were captured by interrogation stations and transmitted to the Volpe Center.

Combating Terrorism with Entry Point Screening (TSWG)

Swift responses to security needs demand the cooperation of many agencies to identify requirements, develop solutions, and execute projects. The Volpe Center is proud to be a member of the Technical Support Working Group (TSWG), an interagency group whose mission is to provide for rapid research, development, and prototyping of new technology for the Combating Terrorism Technology Support Office directed by the Department of Defense (DoD).

Volpe supports TSWG's Entry Point Screening (EPS) Program, whose primary concern is protecting people and facilities against large

vehicle bombs; it focuses on non-intrusive inspection technology to screen personnel, vehicles, vessels, mail, and cargo. TSWG asked the Volpe Center to serve as EPS program manager because of the Center's expertise in technology application and program management. A member of the Volpe Center's Infrastructure Protection and Operations Division manages all EPS projects, some of which are implemented by Volpe Center staff. EPS projects identify, evaluate, and integrate innovative technologies and procedures; evaluations are undertaken at high-risk DoD and civilian agency locations in the United States and overseas.

During November 20 and 21, 2002, Volpe staff participated in the TSWG Annual Program Review in McLean, Virginia, which was attended by representatives from federal agencies involved in counter-terrorism technology initiatives. An overview of the EPS Program activities was presented, highlighting the Vessel Identification and Positioning System (VIPS) and the Advanced Vehicle/Driver Identification System (AVIDS) – both developed by the Volpe Center – and Operation Safe Commerce, conducted by a Volpe team.

Leveraging Existing Technology to Counter New Threats: VIPS

The VIPS program was initiated in response to the terrorist attack on the U.S.S. Cole; its primary objective is developing affordable, secure, and highly functional systems to protect U.S. naval vessels and other ships from waterborne attack. VIPS was derived from vessel-tracking systems developed by Volpe's Center for Navigation for use in the Panama Canal and St. Lawrence Seaway. It provides a secure way to identify vessels authorized to approach a government or other high-value marine asset.

VIPS employs Differential Global Positioning System technology in specially designed transponders to provide U.S. military force-protection units with situation awareness on a geographical display of U.S. military assets and previously examined and approved vessels.

The Center is field testing VIPS with the U.S. Navy and Coast Guard at U.S. ports; the system was deployed recently at Naval Station Norfolk and Boston Harbor. VIPS is scheduled for overseas deployment in summer 2003. (For previous articles on VIPS, see the Volpe *Highlights* issues dated March/April 2002 and November/December 2002.)

U.S. security operations and force protection units can track all VIPS-equipped vessels in real time on a geographic display.

Screening Entry to Strategic Military Installations: AVIDS

AVIDS, designed by the Volpe Center's Infrastructure Protection and Operations Division, identifies personnel and vehicles entering U.S. military facilities. It was derived from screening systems the Center developed for the Immigration and Naturalization Service (INS). (See Lessons Learned from Biometric Deployments, page 5.) AVIDS has proven successful at Fort Campbell, Kentucky, where many U.S. troops deploy to the Middle East. The Volpe team that designed, installed, and deployed the prototype system at Fort Campbell will soon do the same at strategic locations in the Middle East Operations Area.

Like other Volpe-developed screening systems, AVIDS improves security and throughput at entry points by providing the posted officer with current information about arriving individuals and their vehicles. At Fort Campbell, Volpe developed a database of vital data for registered individuals. When the screening officer scans an AVIDS photo ID card, the wireless system checks the database for verification and delivers information directly to the officer's handheld scanner. The officer knows immediately whether the cardholder is admissible or non-admissible, and if the person is non-admissible, the system notes what action should be taken. Vehicle screening is a significant component of AVIDS. To detect large vehicle bombs, weigh-in-motion technology screens every vehicle. Currently, the Volpe team is developing technology that can "recognize" particular vehicles by reading the license plate and the configuration of the vehicle, including unique characteristics such as dents and scratches.

A screening officer scans an AVIDS ID card to determine if the holder is authorized. Only registered individuals are allowed entry; visitors must go to the enrollment station to register. (See page 5 for AVIDS application of biometrics.)

Securing the Supply Chain: Operation Safe Commerce

Operation Safe Commerce aims to construct a prototype of a secure international trade corridor by developing dependable procedures for securing, monitoring, and sharing information about cargo from point of origin, through the supply chain, to its final destination entry point. In spring 2002, the Center executed Phase I, in which a single cargo container was tracked, and its security monitored, during shipment from Central Europe to the United States.

The Volpe team achieved its objectives: identification of security concerns and practices within a supply chain for a single container, and demonstration of available technologies for tracking and monitoring the container's integrity and contents. In the future, it is expected that Operation Safe Commerce would serve as a "test bed" to evaluate key issues and proposed improvements in collaboration with related industry and government initiatives.

> ### *Operation Safe Commerce Northeast Committee*
> The Volpe Center conducted Operation Safe Commerce in conjunction with the Law Enforcement Coordinating Committee, Operation Safe Commerce Northeast Subcommittee, whose members include U.S. Coast Guard, U.S. Marshals Service, U.S. Attorney Offices for New Hampshire and Vermont, U.S. Customs Service, and the New Hampshire Governor's Office.
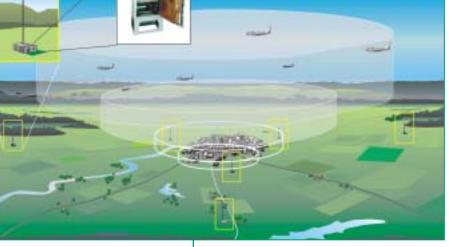
Expanding Airport Surveillance Capabilities (FAA)

The Volpe Center's Airport Surface Division provides extensive technical and management expertise to the Federal Aviation Administration's (FAA) Safe Flight 21 (SF21) program. SF21, a cooperative government and industry effort, seeks to develop and demonstrate a set of aircraft navigation, surveillance, and information-distribution tools derived from evolving technologies. In general, these technologies improve the sharing of real-time information between the pilot and the air traffic controller. Leveraging work accomplished earlier at the Atlanta and Dallas/Ft. Worth airports, the Airport Surface Division plays a major role in requirements definition, system engineering, software development, site engineering, and analysis of surface and terminal surveillance systems for the FAA's SF21 test bed at the Memphis International Airport.

The Volpe team, composed of Messrs. Frank Coyne, Steve Nuzzi, Ray Lambert, and Brent Midwood, all of the Division, recently achieved a significant milestone in airport surveillance that will improve airport safety on the ground and in the air. In December 2002, the team completed testing and evaluation of the Memphis Outer Ring (MOR) Terminal-area Multilateration Surveillance system. Multilateration determines the location of an aircraft by interrogating the aircraft's transponder. The transponder's reply is measured by an array of sensors on the ground that computes aircraft identification and position. This project extends surveillance well beyond the surface to 11,000 square feet of airspace surrounding Memphis. The recent MOR proof-of-concept showed very promising performance; the Volpe Center team recommended that the FAA proceed to the next phase of development.

Memphis Outer Ring Terminal-area Multilateration Surveillance system. Multilateration determines the location of an aircraft by interrogating the aircraft's transponder. The transponder's reply is measured by an array of sensors on the ground that computes aircraft identification and position.

Homeland Security

Lessons Learned from Biometric Deployments

Biometrics are measurable physical characteristics or traits unique to each individual, such as fingerprints, hand geometry, retinal characteristics, or facial characteristics. The Infrastructure Protection and Operations Division has developed several security systems that incorporate biometrics, a key element of most cutting-edge access control systems. During November 10–13, 2002, Mr. William Baron of the Division participated in a Biometrics Conference sponsored by the University of Hawaii and held in Honolulu. He presented the paper "Lessons Learned from Biometric Deployments," which discusses the effectiveness of different biometric technologies for infrequent users. Several Volpe-developed screening systems were discussed, including three for the Immigration and Naturalization Service: INSPASS, SENTRI, and PORTPASS; and AVIDS, developed for the DoD Technical Support Working Group, described in this issue's *Focus* article.

INSPASS is an airport security system developed to speed the processing of frequent travelers (people who travel internationally at least three times a year). INSPASS kiosks integrate card-reader and hand-geometry technologies to identify registered travelers. The process takes about a minute.

SENTRI screens vehicles and people entering the United States from Mexico. Pre-cleared travelers who pass extensive background checks can use a dedicated traffic lane. SENTRI has reduced some two-hour waits to three minutes. Facial recognition technology was tested for SENTRI, but proved ineffective at certain times of day due to shadows and glare.

PORTPASS, deployed at remote locations along the U.S.–Canadian border, recognizes voices of enrolled local residents speaking into a handset. This system enables enrollees to cross the border when the port is unstaffed.

AVIDS uses facial recognition during the enrollment process to guard against double enrollment, and to evaluate enrollees against a select group of persons wanted by law enforcement. AVIDS will incorporate fingerprint verification for pedestrian traffic later in 2003.

INSPASS kiosks use hand geometry to screen frequent travelers in U.S and Canadian airports.

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Lessons learned from Volpe deployments can be considered when choosing biometric systems.

- Most biometric systems use optics; however, when used outdoors glare and shadows can cause unpredictable effects.

- Disabled persons may not be able to use certain systems such as retinal scanners or hand-geometry readers.

- Template size has no relationship to uniqueness. Individual biometric data is stored in templates; the amount of data used to create a biometric template varies among systems. For example, a hand-geometry template has 9 digits, whereas a fingerprint template has 2000 digits. Since most people's templates will cluster in the middle range, the larger template is not necessarily more effective, particularly in large populations.

- Ease of use varies among systems. Surprisingly, fingerprint readers are more difficult to use than hand-geometry readers. Retinal scanning is difficult for most users, and is not easily accepted in many populations.

- Finally, some biometric systems work well for people who use them every day, but poorly for people who use them infrequently; this is known as the "Blue Moon Effect." Learning curves for biometrics technologies vary. Most users get up to speed fairly quickly with daily use, but infrequent users (from once a week to a few times a year) may not, which can result in high rates of errors and false rejections. Since it is difficult to test a biometric system for ease of habituation among infrequent users in a laboratory environment, it is necessary to rely on the experience of others in the biometrics community to determine which systems are best suited for certain tasks.

Addressing Transportation Issues in Bioterrorism (OET)

In support of RSPA's Office of Emergency Transportation (OET), Volpe Center personnel designed, developed, and facilitated a two-day workshop titled "Transportation Issues in Bioterrorism: Considerations for Evacuation and Quarantine." The workshop was hosted by the RSPA OET Deputy Director Janet Benini and held in Washington, D.C., on November 19 and 20, 2002. Forty officials from various transportation, emergency response, and public health organizations across the country attended. Federal agencies represented include the Office of Homeland Security, Department of Agriculture, Department of State, Department of Health and Human Services, Centers for Disease Control and Prevention, Transportation Security Administration, Federal Aviation Administration, Federal Emergency Management Association, Federal Highway Administration (FHWA), Federal Railroad Administration (FRA),

RSPA Administrator Ellen G. Engleman delivers the welcome speech at OET's Bioterrorism Workshop. The workshop addressed a spectrum of national concerns regarding bioterrorism in transportation.

and National Highway Traffic Safety Administration (NHTSA). National organizations represented included the National Emergency Managers Association, Association of American Railroads, National Defense Transportation Association, International Association of Fire Chiefs, National Association of Counties, and the Association of State and Territorial Health Officials.

The workshop began with a DOT welcome panel consisting of Miss Ellen G. Engleman, RSPA Administrator; Mr. Allan Rutter, FRA Administrator; Dr. Jeffrey W. Runge, NHTSA Administrator; and Mr. J. Richard Capka, FHWA Deputy Administrator. The remainder of the workshop focused on developing coordination and communication among key groups at the local, state, regional, and national levels. Several hypothetical scenarios stimulated broad-ranging discussion among the attendees regarding transportation both as a potential means for bio-agent transmission and as an effective tool for emergency response.

The Volpe team managed all aspects of workshop development, including working with several academic and government experts to develop the scenarios. Ms. Dawn Lopez Johnson (Volpe project manager), Ms. Ruth Hunter, and Ms. DiAnn White of the Intermodal Logistics Systems Planning and Integration Division organized the workshop. Ms. Johnson and Mr. Walter Gazda, of the Economic and Industry Analysis Division, helped facilitate discussions. The team is preparing a short summary of consensus items generated in the workshop and ideas for future forums.

Special emphasis was placed on understanding potential consequences to transportation, human health, and the nation's economy.

Integrating Land Use and Transportation Policies (FHWA)

Designing transportation systems that enhance mobility, economic opportunity, and community livability is a major challenge for many communities across the country. Increasingly, political leaders, planning professionals, and private citizens are becoming aware of the connections between transportation planning and land-use policies. Transportation infrastructure and land-use guidelines create the framework in which communities grow, influencing urban and rural development, economic prosperity, environmental quality, and social equity. In many states, however, transportation and land-use policies are often considered separately, a disassociation that can lead to inefficient resource use and excessive environmental impact.

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The Volpe Center recently supported an effort sponsored by the Federal Highway Administration (FHWA) to learn from projects in Colorado, Utah, and Wyoming aimed at successfully integrating land-use and transportation planning. Most of the projects have received funds from the Transportation and Community and System Preservation Pilot (TCSP) Program, a grant program established by TEA-21 to assist communities with the planning and implementation of policies intended to address the relationship between transportation, land use, public infrastructure, and private-sector initiatives.

The project visits (known as a "Scan Tour") enabled the team members to collect, synthesize, and distribute information on best practices in transportation and land-use planning. All four projects are in high-growth areas and aim to reduce detrimental growth patterns and preserve existing infrastructure as well as environmental and community assets.

Ms. Cassandra C. Allwell and Ms. Katherine Fichter, both of the Planning and Policy Analysis Division, represent the Volpe Center on this project. Joining them on the Scan Tour team were three FHWA staff members; the Director of the Charlottesville Metropolitan Planning Organization; and the Assistant Director of the Planning and Development Department of Houston. The team members visited the following projects:

- Denver Union Station Work and Entertainment Connection, Colorado

- Stapleton Airfield Redevelopment, Colorado (not a TCSP project)

- Envision Utah, Salt Lake City, Utah

- Mapping for a Millennium, Teton County, Wyoming.

Each of these projects established innovative planning mechanisms for the coordination of transportation and land-use policies. The following lessons can be drawn from their challenges and opportunities.

- Planning solutions should be developed and supported locally.

- Planning efforts that fail to include sufficient public outreach and participation are unlikely to succeed.

- Creative planning efforts should find ways to present ideas, particularly contentious ideas, in locally acceptable language and context.

- Well-considered physical design is as important as good planning.

- Funding should be regularly calculated and reviewed to most effectively leverage all available resources.

- The local development climate will strongly influence efforts to coordinate transportation and land-use planning.

Rehabilitation of Union Station in Denver, Colorado, will increase transportation options and create an urban transportation hub.

• Innovative planning ideas can eclipse established processes and regulations, requiring old policies to be revised and updated.

The team's draft report was approved in late December. It details the findings of the Scan Tour, including lessons learned and ideas for use in other sustainable growth projects around the country. The final report is scheduled for submittal in late winter 2003.

Organizational Excellence

Community planning will address the impact of increased recreational visitors and part-time residents on Teton County, Wyoming.

Volpe's First Staff Exchange with Dutch Ministry

On November 4, 2002, Mr. Gerben Bootsma of the Transport Research Centre of the Dutch Ministry of Transport began an assignment on-site at the Volpe Center. Mr. Bootsma's assignment is the first under the collaboration agreement between the two national transportation research centers, which collaborate on a broad range of topics, including operator fatigue and alertness, public-private roles in funding and operating passenger railroads, and professional capacity building for transportation planning. The Volpe coordinator of the agreement, Mr. William Lyons of the Planning and Policy Analysis Division, is organizing this first exchange. Mr. Bootsma is assigned to the Planning and Policy Analysis Division, where he will focus on statewide and metropolitan planning and capacity building as well as user and societal acceptance of new technology.

Supporting Asset Supply Chain Management (FAA)

The Federal Aviation Administration (FAA) is improving its ability to effectively manage and account for all of its assets, valued in excess of $17 billion. The FAA has initiated a national program, Asset Supply Chain Management (ASCM), to replace existing asset management systems. To the maximum extent possible, the ASCM capability will be developed using a commercial, off-the-shelf solution. Under the leadership of Mr. Joe McGann of the Technology and Knowledge Engineering Division, the Volpe Center is engaged in developing technical specifications and a strategy for acquiring an integration contractor and product solution for the ASCM Program.

The FAA's ASCM Program Manager has requested that Mr. Steve Czapczynski, also of the Division, serve as a key technical consultant to the ASCM investment analysis team. FAA investment analysis, a cornerstone of the FAA's acquisition process, ensures that early decisions that shape and launch new programs are good, implementable corporate decisions. Each analysis identifies alternatives; analyzes their potential

The goal of the FAA's national ASCM program is an integrated solution for agency-wide asset management requirements. ASCM will provide an efficient, effective, national system to headquarters, regional, and remote field users regardless of their organization or business line.

by studying such factors as performance, lifecycle costs, benefits, risk, schedule, affordability, and compatibility with the overall system architecture; and identifies reasonable, cost-effective solutions for the core set of critical requirements. In late November, Volpe began working with the FAA on the analysis, which in spring 2003 will culminate in the presentation of the Investment Analysis Report and recommendations to the FAA's Joint Resources Council for an investment decision. Also in November, an acquisition milestone was met with the announcement of a short list of offerors who participated in an initial screening. Volpe's acquisition team lead, Mr. Russ Furtado of the Division, supported this early step in the critical process of identifying appropriate integration contractors to participate in the request-for-offer process later this year.

In support of the ASCM acquisition effort, the Volpe technical team, led by Mr. Czapczynski, has completed a detailed Technical Specification that identifies the more than 1,100 requirements necessary for ASCM implementation. Associated with this effort, Mr. Brian Willim, also of the Division, created a Requirements Traceability Tool that maps the detailed requirements to top-level requirement categories. The FAA/Volpe team will use this tool to develop phased implementation strategies and budgets, manage stakeholder expectations, and reduce "requirement-creep" risks inherent in large-scale system implementation efforts.

Other Volpe team members have included: Mr. Steven Walkinshaw and Mr. John Smith, Technology and Knowledge Engineering Division; Mr. Ken McGillvary and Ms. Olive Lesueur, Intermodal Logistics Systems Planning and Integration Division; Mr. Harvey Brand, Information Integration Division; Ms. Sheila MacLean, Office of Information and Logistics Management; and Mr. Robert Robinson, Resource Planning and Management Analysis Division.

Volpe supported the FAA in its successful completion of the first acquisition phase for its Asset Supply Chain Management Program. The second phase is under development.

Awards

DOT Secretary Norman Y. Mineta hosted the Department's 35th Annual Awards Ceremony on November 14, 2002, in Washington, D.C. Six Volpe Center staff members were recognized for their valuable contributions.

• Mr. Claude Williams, Administrative Services Branch, received the Secretary's Award for Excellence.

• The following staff members received the Secretary's Partnering for Excellence Award: Dr. Aviva Brecher, Office of Environmental Preservation and Systems Modernization, for her contribution to the Statistical Data Quality Team; Mr. Michael Dyer, Technology Applications and Deployment Division, and Mr. Robert Hoaglund, Infrastructure Protection and Operations Division, for their contribution to the Port Security Grants Team; Ms. Justyne Johnson and Ms. Sharon Jenkins, Telecommunications Division, for their contributions to the Passenger Screening Training Curriculum Development Team.

Papers & Presentations

- On September 27, 2002, Ms. Stephanie Markos of the Railroad Systems Division presented a paper titled "DOT Rail Vehicle Fire Safety Requirements" at Composites 2002, the annual convention of the Composites Fabricators Association held in Atlanta, Georgia. This paper describes the Volpe-supported development and revision of the Federal Railroad Administration and Federal Transit Administration fire safety performance requirements for materials used in constructing rail vehicles.

- On October 10, 2002, Dr. Piyali Talukdar and Ms. Bess Rabin of the Economic and Industry Analysis Division delivered a draft study review to RSPA's Office of Pipeline Safety (OPS). OPS had requested technical support from the Volpe Center in its evaluation of a study, "The U.S. Oil Pipeline Industry's Safety Performance," conducted by the Association of Oil Pipelines and the American Petroleum Institute. The study focuses on the oil pipeline industry's spill and safety records. The Volpe review should help OPS to identify and prioritize inspections on their regulated pipeline systems.

- On October 19, 2002, Mr. Adrian Hellman of the Railroad Systems Division presented a paper titled "Preliminary Evaluation of the School Street Four-Quadrant Gate Highway-Railroad Grade Crossing" at the 9th Intelligent Transportation Systems World Congress in Chicago, Illinois. This research was funded by the Federal Railroad Administration's Office of Research and Development.

- On October 21, 2002, Dr. Don Pickrell of the Office of System and Economic Assessment delivered a presentation titled "Induced Demand, Latent Demand: What Really Happens When We Expand Transportation Capacity?" to the UCLA Public Policy Symposium "Tackling Traffic Congestion" held in Lake Arrowhead, California. Dr. Pickrell's presentation is an outgrowth of Volpe Center research on the subject of induced travel demand conducted in support of the Highway Needs and Investment Team of the Federal Highway Administration's Office of Legislation and Strategic Planning. Dr. Pickrell's paper "Induced Demand: Its Definition, Measurement, and Significance" was also published in October 2002, as part of the Eno Transportation Foundation's Working Together to Address Induced Demand: Proceedings of a Forum" (Washington, D.C., Eno Transportation Foundation, 2002).

- Mr. Patrick Martone, Surveillance and Sensors Division, presented a paper titled "Helicopter In-flight Tracking System (HITS) for the Gulf of Mexico" at the Institute of Electrical and Electronics Engineers 21st Digital Avionics Systems Conference held in Irvine, California, October 27–31, 2002. HITS, a NASA Ames-funded research project conducted by the Volpe Center, has direct application to Federal Aviation Administration (FAA) initiatives related to improved airspace management.

- October 28 through 31, 2002, the National Information Systems Security Conference and Exposition was held in San Antonio, Texas. Mr. David Sawin of the Infrastructure Protection and Operations Division delivered two presentations, "World Wide Web Security" and "Information Security 101 – Best Practices." Mr. Sawin also assisted the FAA's Office of Information Systems Security in organizing the conference.

A full-scale, seat-fire test conducted on an Amtrak rail coach car, part of Volpe's support of DOT rail vehicle fire safety requirements.

- On November 6, 2002, Mr. Kevin Harnett of the Infrastructure Protection and Operations Division participated in the Annual Air Traffic Control Association Conference in Washington, D.C. In support of FAA's National Airspace System (NAS) Program, the Volpe Center is directing several major Information System Security (ISS) projects. Mr. Harnett participated in an ISS panel and gave a presentation on ISS issues, challenges, and opportunities for the NAS in an open architecture environment.

- On November 6, 2002, Dr. James Carroll of the Center for Navigation presented the keynote speech at the "NAV02" conference and exhibition, hosted by the Royal Institute of Navigation in London, United Kingdom. The theme of this conference was Global Navigation Satellite System vulnerability. In his speech, "Vulnerability Assessment of the Civilian U.S. Transportation Infrastructure Relying on GPS," Dr. Carroll presented the major results of the recent Volpe Center report on GPS vulnerability.

- Mr. Phil Mattson, Chief of the Environmental Engineering Division, presented a transportation overview and moderated a panel discussion at the conference "BioSecurity 2002" held in Las Vegas, Nevada, during November 18-21, 2002. The conference agenda was developed by Harvard Medical School, Harvard Medical International, and Harvard School of Public Health to promote understanding of the current state of preparedness and the tools to develop practical solutions to challenges facing the global community.

Mr. Mattson's presentation addressed the characteristics of the U.S. transportation system, biothreats and the role of transportation, and current transportation security measures.

- On November 26, 2002, Mr. Michael Dinning, Chief of the Volpe Center's Infrastructure Protection and Operations Division, gave a lecture on Transportation Security Technologies at the Department of Electrical Engineering and Computer Science of the University of Massachusetts Lowell. Mr. Dinning is a member of the university's Industry Advisory Board.

- In support of the FRA's Office of Research and Development, the Volpe Center conducted an analysis of the relation between the temperature of the work environment and the performance of mental, or "cognitive," tasks. This research was published in a recent issue of *Ergonomics* [Volume 45, No. 10, 2002], the official journal of the Ergonomics Society and the International Ergonomics Association. Authors Dr. June Pilcher of Clemson University (a Volpe Center contractor), Dr. Eric Nadler of Volpe's Operator Performance and Safety Analysis Division, and Dr. Caroline Busch of the U.S. Army Soldier Center (a Volpe Center contractor) found systematic relationships between temperature and particular categories of cognitive performance.

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based solutions are crucial to addressing these issues, successful deployment requires a skilled, comprehensive approach. We are keenly aware that, as the rapid rate of technological evolution continually expands the range of security tools, it also enables new or more dangerous attack strategies. Solutions must keep pace with emerging threats.

This issue of *Highlights* features some of the Center's technology-based security solutions that help screen out dangerous people and cargo from the majority, who pose no risk. The *Focus* article discusses our work for the DoD's Combating Terrorism Technology Support Office. On page 5, lessons learned from biometrics deployments are presented.

In an address to the nation last year, President Bush stated, "In the war against terrorism, America's vast science and technology base provides us with a key advantage." At the Volpe Center, we are committed to strengthening that advantage and supporting the President's Homeland Security mission.

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