Meet Volpe

The National Transportation Systems Center

2012

Advancing transportation innovation for the public good

U.S. Department of Transportation
Research and Innovative Technology Administration

John A. Volpe National Transportation Systems Center

Letter from the Director

Since becoming Volpe director in 2009, I have learned about the breadth and diversity of accomplishments, talents, and capabilities of our 40-year organization dedicated to transportation innovation.

From my many new relationships with U.S. DOT and other Federal government leaders, I have learned how critical Volpe is in supporting their goals and how instrumental our Federal partnerships are in improving the nation's transportation system. Whether you've already worked with one of Volpe's many teams of experts or are brand new to us, I invite you to learn more about our organization; *I invite you to meet Volpe.*

Volpe is an internationally recognized resource for developing and facilitating innovations in transportation. We pioneered the use of alcohol breath analysis as a transportation safety feature and are among the originators of the Intelligent Vehicles/Highway Systems program, which evolved into today's Intelligent Transportation Systems program. Our decades of work in highway-rail grade crossing safety have resulted in improvements that have saved a significant number of lives. We also developed the Enhanced Traffic Management System (ETMS), helping improve the safety and efficiency of air travel.

Our multimodal team of cross-disciplinary experts and our status as a Federal agency enable these achievements. As dedicated public servants, we leverage our unique blend of expertise, experience, and Federal know-how to build agile teams that help sponsors navigate the toughest transportation challenges.

Volpe is 100 percent funded by sponsor projects, so we have to be knowledgeable, entrepreneurial, and customer-oriented in order to meet our sponsors' needs and sustain our organization, and we have a solid track record of doing just that: this past year alone, our staff of over 550 Federal employees and over 400 on-site contractors attracted $249 million in transportation innovation projects and programs.

In the past 12 months, we have engaged all of our employees in a strategic planning process that initially focused on the clear definition of the Volpe purpose and values. The results are straightforward. The Volpe purpose is **to advance transportation innovation for the public good.** Our four core values are **Public Service, Innovative Solutions, Professional Excellence, and Collaboration and Partnering.** With this as our foundation, we have developed goals and action plans to better position Volpe for our sponsors and for the future.

The following pages describe some of our current efforts to improve the transportation system. They are an exciting blend of diverse projects that help address the U.S. DOT strategic goals and help advance transportation systems for all our sponsors. Through these pages—and through interactions with our staff—I invite you to meet Volpe and learn more about who we are and what we do. ■

Robert C. Johns
Director and Associate Administrator
Volpe, The National Transportation Systems Center

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Volpe developed and maintains the Maritime Safety and Security Information System (shown above), a vessel-tracking system that enables more than 70 countries to collaborate and share their data, increasing the security and safety of the world's ports, harbors, and waterways.

Public Service. Innovative Solutions.
Professional Excellence. Collaboration and Partnering.

Cover images: Volpe (except highway [©iStockPhoto] and ship [U.S. DOT])

Powered by transportation thought leaders, driven by tough challenges, dedicated to making a better transportation system, and committed to the public good.

As an in-house resource with an outside perspective, Volpe is able to leverage a unique blend of experts, experience, and Federal know-how to build agile teams that help sponsors navigate the toughest transportation challenges by delivering innovative, out-of-the-box, actionable solutions.

Meet Volpe

Volpe has been helping the transportation community navigate the most challenging problems for more than 40 years. As the National Transportation Systems Center, our mission is to improve transportation by anticipating and addressing emerging issues and advancing technical, operational, and institutional innovations across all modes.

Part of the U.S. Department of Transportation's Research and Innovative Technology Administration, Volpe is a unique Federal agency that is 100 percent funded by sponsor projects. We partner with public and private organizations to assess the needs of the transportation community, evaluate research and development endeavors, assist in the deployment of state-of-the-art transportation technologies, and inform decision- and policy-making through our comprehensive analyses.

Home to renowned multidisciplinary expertise in all modes of transportation, Volpe serves its sponsor agencies with advanced technologies, research, and programs to ensure a fast, safe, efficient, accessible, and convenient transportation system that meets vital national and international interests and enhances the quality of life for the traveling public, today and into the future. ■

Multimodal, Cross-Disciplinary Expertise

The Volpe Center's research, technical, and program professionals help sponsors thrive by applying best practices culled from more than 40 years of solving problems for multiple modes. We also undertake new research to address emerging issues and advance innovation in transportation.

When Volpe sits at our sponsors' planning tables, our technical, policy, and research experts talk to them about their needs and the most effective ways to meet them. We match those needs with a multidisciplinary team that internalizes our sponsors' missions.

Our multimodal experience enables us to consider unique approaches and champion ideas that make our sponsors' processes more efficient, their work more effective, and their solutions more fully realized. ■

Volpe's multimodal work in safety management systems helps thousands of safety inspectors in the field do their jobs more effectively, ensuring that our transportation system is among the world's safest.

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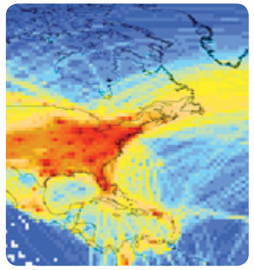

TAKING A SYSTEMS VIEW OF AVIATION IMPACTS

In 2012, the Federal Aviation Administration is slated to release a public version of the Aviation Environmental Design Tool (AEDT), a software system that models aviation-related noise, emissions, and fuel burn at the flight, airport, regional, national, and global levels. Volpe serves as the lead developer and systems integrator for this program. AEDT will become the next generation aviation environmental consequence tool and will replace existing systems used by the public. This tool has the potential to be extended to other transportation modes and serve as the basis for environmental assessment across the transportation enterprise.

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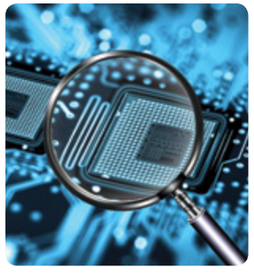
SAFETY MANAGEMENT: MANY MODES, SAME PROBLEM

A large cadre of professionals works to conduct safety inspections and assessments of equipment and industry practices to help the U.S. DOT achieve one of its primary goals: ensuring transportation safety. Volpe's analysts and information technology specialists design many of the tools and methodologies these professionals use to ensure that our system is among the world's safest. Our multimodal safety management expertise enables us to leverage proven practices from one mode to improve safety in others.

PLANNING FOR NATIONAL PARKS AND PUBLIC LANDS

For over 10 years, Volpe has partnered with the Federal Highway Administration, Federal Transit Administration, and Federal land management agencies to develop transportation programs and solutions that improve visitors' experiences and mitigate environmental impacts at national parks and other Federal lands. Each unique project draws from the expertise of Volpe's diverse team of engineers, planners, economists, and policy analysts. Volpe provides Federal land managers with the knowledge to make informed decisions, whether it is the introduction of shuttle bus services or alternative fuel vehicles, enhanced bicycling and pedestrian routes, or relocated parking facilities or visitor entrances.



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ENSURING THE SAFETY AND SECURITY OF ADVANCED TRANSPORTATION SYSTEMS

As computers, networks, and wireless access points become ubiquitous in transportation, the reliability of these complex systems and the vulnerability of transportation to cyber disruptions are emerging concerns. Volpe experts are supporting U.S. DOT to collaborate with both the aerospace and automotive industries to find ways to increase system reliability and reduce cyber vulnerabilities. Using an all-hazards approach, Volpe is helping sponsors develop a comprehensive understanding of potential system risks and has identified best practices that are applicable to all modes of transportation. ■

Transformative Solutions

Volpe is a proven leader in national transportation systems research and applications. We have responded to major transportation challenges, including the need to modernize air-traffic management systems, address critical multimodal safety issues, develop sophisticated logistics and communications systems for security initiatives overseas, meet energy and environmental challenges, and strengthen global maritime domain awareness.

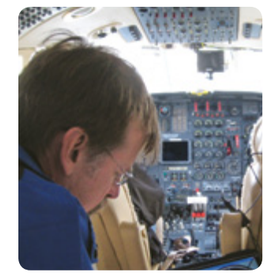
Volpe has successfully contributed to major programs such as the Federal Aviation Administration's Enhanced Traffic Management System (ETMS), the Federal Motor Carrier Safety Administration's Compliance, Safety, Accountability (CSA), and the National Highway Traffic Safety Administration's Corporate Average Fuel Economy (CAFE) standards. ■

Designed and developed by Volpe, the Traffic Situation Display is a primary tool for air traffic controllers to make strategic decisions that enhance the safety and efficiency of our national airspace. Depicted below, a global view of active U.S. air traffic.

©iStockPhoto/Tony Tremblay

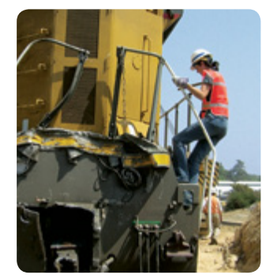
SAFER DRIVERS — SAFER ROADS

To help ensure that the seven million commercial motor vehicle operators on our roadways are medically fit for duty, the Federal Motor Carrier Safety Administration has asked Volpe to develop a new National Registry of Certified Medical Examiners. This transformative information technology system will enable commercial vehicle operators to access an online database of thousands of medical examiners who are trained and qualified to determine drivers' medical fitness for duty. The National Registry will also create a central online repository where medical examiners can record driver medical certificates, thus replacing the current paper-based system.



TRANSFORMING THE NATIONAL AIRSPACE

The Federal Aviation Administration (FAA) is launching a comprehensive upgrade of the air traffic control system, named NextGen, which will increase airspace capacity, decrease congestion, improve safety, and mitigate environmental impacts. Based on our decades of proven experience with aviation systems, the FAA looked to Volpe for help in developing, testing, and managing the deployment of NextGen. We are currently providing technical expertise and guidance through some of the most integral components of the program, including the Automatic Dependent Surveillance-Broadcast (ADS-B) system, a key NextGen solution in which planes broadcast their location to ground stations and surrounding planes using global positioning systems in lieu of en-route radars.



CRUSH ZONES IMPROVE TRAIN SAFETY

Protecting passengers in the event of a collision or derailment is an ongoing area of investment for the Federal Railroad Administration (FRA). The FRA relies on Volpe engineers to improve its understanding of the factors involved with passenger protection and impact absorption, focusing on the type of structural modifications that can prevent rail cars from crushing. Volpe engineers have investigated many severe passenger-train accidents; staged impact tests; analyzed car-crush zones; and studied train and occupant dynamics to improve accident survivability. Volpe's crashworthiness research is being applied to FRA regulations and new industry standards.

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PARTNERING WITH SMALL BUSINESSES TO PROMOTE INNOVATION

For over 25 years, Volpe has administered the U.S. DOT Small Business Innovation Research Program, a highly competitive program aimed at developing technological innovation using expertise from the small business community. DOT surface modal administrations provide funding and recommend topics for solicitation, and Volpe administers the program and conducts outreach to the small business community. Volpe also assists small businesses in accelerating commercialization of their innovations through a program that provides a one-time bridge award to the most promising awardees. Recent innovations from this program include new tools for assessing rail track condition, improved detection of pedestrians at street crossings, and improved detection of corrosion and other damage in pipelines. ■

Entrepreneurial, Objective, Efficient

Volpe is a unique Federal agency that is 100 percent funded by sponsor projects. Volpe receives no direct appropriations from Congress, which makes it efficient in its work, agile in its approach, and entrepreneurial in its nature. Working with Volpe offers the accessibility and collaboration of an in-house resource, with the flexibility and responsiveness of a consultant.

As a vital partner and objective advisor to transportation agencies, Volpe serves as an integral collaborator that can function as an extension of staff, internalizing goals and objectives; fully fluent in operations, practices and protocols; and serving agency and public interest with a highly educated and creative staff.

Guided by a deep understanding of Federal practices, Volpe delivers innovative solutions in infrastructure, advanced transportation systems, and technologies to support the global transportation mission. ■

Advancing transportation innovation for the public good sometimes takes Volpe's entrepreneurial staff into diverse terrains, including the Florida Everglades, where this team sets up ambient noise monitoring systems to help characterize the soundscapes in national parks.

EVALUATING ACTIVE CRASH WARNING SYSTEMS

Active safety technologies such as blind-spot detectors and forward collision warning are becoming common on vehicles. Unlike passive safety technologies such as airbags, active safety technologies work to warn drivers of potentially hazardous situations. In work sponsored by the National Highway Traffic Safety Administration, Volpe plays a large role in examining the efficacy of these new technologies. Our role as a Federal entity enables us to objectively assess technologies with a focus on safety and the public good.

MODERNIZATION STREAMLINES IT SYSTEMS, REDUCES COSTS

The Federal Motor Carrier Safety Administration (FMCSA) operates over 20 critical information technology (IT) systems that support its mission to save lives. These systems, many of which are housed at Volpe, are used by more than 1,000 FMCSA field and headquarters staff and 12,000 state partners to assess the safety of companies and drivers and to support enforcement and compliance activities. Because of our proven track record in IT system development and our deep institutional knowledge of motor carrier safety, FMCSA asked Volpe to help develop an IT modernization roadmap that, when implemented, will reduce the total ownership costs of the IT systems, enhance FMCSA employee efficiency, and modernize the user experience.

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MEASURING TRAVELER BEHAVIOR

Traffic congestion is a problem for drivers, the environment, and the economy, and it significantly affects the quality of life of many Americans. Some of these problems can be mitigated by changes in traveler behavior. Volpe social scientists and economists are conducting longitudinal surveys for the Federal Highway Administration and Intelligent Transportation Systems Joint Program Office that measure the impacts on traveler behavior of recently implemented pricing and corridor management policies and programs in four major metropolitan areas. Our expertise in survey design, implementation, and data analysis positions Volpe as a chief resource in objectively measuring the efficacy of policy changes. ■

A Dynamic, World-Class Resource

Volpe enables our sponsors to harness the collective power of hundreds of transportation experts with a shared vision of success.

We are powered by transportation thought leaders, driven by tough challenges, dedicated to making a better transportation system, and committed to the public good.

Volpe is a unique, world-class transportation resource with broad technical and institutional expertise not replicated elsewhere. Our staff specializes in a wide range of transportation disciplines, including civil, electrical, mechanical, computer, and aeronautical engineering; physical and social science; human factors; economics; analysis; planning; information technology; and safety operations, among others.

As dedicated public servants, we have devoted our careers to advancing a better transportation system. Whether we're providing new ideas or helping implement our sponsors' programs, Volpe consistently delivers transformative transportation solutions. ■

Volpe has played a significant role in helping reduce the nation's energy consumption over the past 35 years through our work with the Corporate Average Fuel Economy (CAFE) standards. Below, President Barack Obama recognizes Volpe staff (among others) in the Oval Office for their contributions to CAFE.

PREEMINENT WAKE TURBULENCE EXPERTS ENSURE SAFETY

As a consequence of aerodynamic lift, aircraft in flight create disruptions in the air known as wake turbulence that can be potentially dangerous to other nearby aircraft if not accounted for operationally. The foremost experts in the field of wake turbulence reside at Volpe. Since our inception in 1970, our engineers and scientists have studied the wake structure extensively for the Federal Aviation Administration and understand the factors involved in the creation and subsequent evolution of wake vortices. This understanding is critical for establishing safe and efficient spacing standards for aircraft and has been utilized for specific aircraft models and establishing new airport arrival procedures.

VOLPE MODEL HELPS ESTABLISH NATIONAL VEHICLE STANDARD

The Corporate Average Fuel Economy (CAFE) standards, administered by the National Highway Traffic Safety Administration, help reduce the nation's energy consumption by requiring manufacturers to increase the average fuel economy of vehicles. Volpe's world-class experts in mechanical engineering, environmental science, physics, economics, computer science, and operations research have played a significant role in CAFE over the past 35 years, conducting detailed analyses and modeling to help determine the feasibility of such far-reaching standards.

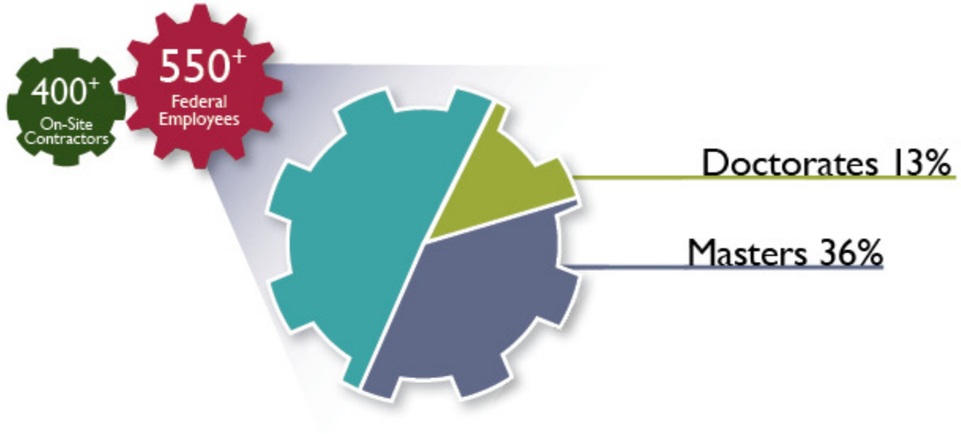
Photo: Ingrid Taylar at Creative Commons

GLOBAL INITIATIVE ADVANCES JET FUEL ALTERNATIVES

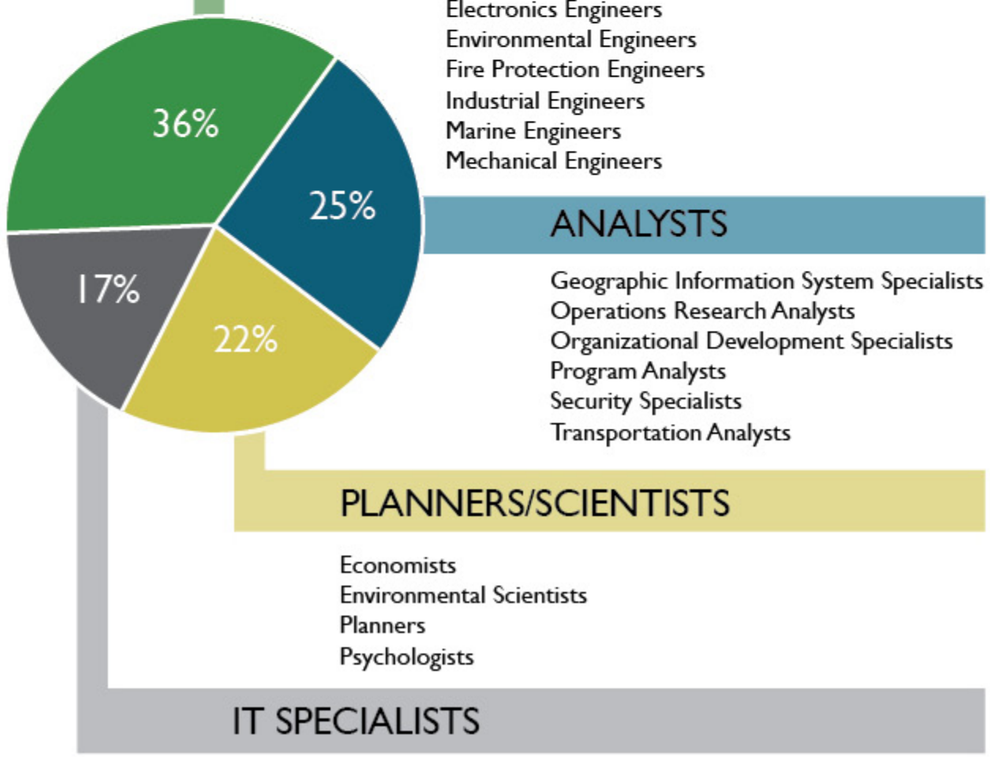
Volpe is working with the Federal Aviation Administration on the Commercial Aviation Alternative Fuel Initiative (CAAFI) to promote the development of alternative jet fuel options that are safe, cost effective, and environmentally sustainable. CAAFI is a multi-organization coalition of energy producers, researchers, airlines, manufacturers, U.S. government agencies, and international participants. At the heart of this initiative is uniting these stakeholders behind the common goal of finding alternative fuel solutions. Volpe environmental engineers and biologists facilitate the vital coordination and information exchange among these global stakeholders. ■

Staff Stats

STAFF OVERVIEW



DISCIPLINES OF TECHNICAL STAFF



Sponsors

The Volpe Center attracted $249 million in new work in 2011 from 57 separate organizations—of which 75 percent are U.S. Federal government agencies and 25 percent are international, state, local, or private sector organizations.

U.S. Department of Transportation
- Federal Aviation Administration
- Federal Highway Administration
- Federal Motor Carrier Safety Administration
- Federal Railroad Administration
- Federal Transit Administration
- Maritime Administration
- National Highway Traffic Safety Administration
- Office of the Inspector General
- Office of the Secretary of Transportation
- Pipeline and Hazardous Materials Safety Administration
- Research and Innovative Technology Administration
- Saint Lawrence Seaway Development Corporation

Federal Agencies
- Central Intelligence Agency
- Department of Agriculture
  - U.S. Forest Service
- Department of Commerce
  - National Oceanic and Atmospheric Administration
  - National Institute of Standards and Technology
- Department of Defense
  - U.S. Air Force
  - U.S. Army
  - U.S. Navy
  - U.S. Northern Command
  - U.S. Southern Command
- Department of Energy
- Department of Homeland Security
  - Federal Emergency Management Agency
  - Transportation Security Administration
  - U.S. Coast Guard
- Department of the Interior
  - Bureau of Land Management
  - National Park Service
  - U.S. Fish and Wildlife Service
- Department of State
- Environmental Protection Agency
- National Aeronautics and Space Administration
  - Dryden Flight Research Center
- U.S. Access Board
- U.S. Postal Service

State and Local
- Chicago Metropolitan Agency for Planning
- Massachusetts Port Authority
- Metropolitan Washington Council of Governments
- Minnesota Department of Transportation
- New York State Thruway Authority
- Orange County Transportation Authority
- State of Arizona
- University of Florida
- Washington Metro Area Transit Authority

International
- International Civil Aviation Organization
- United Kingdom Ministry of Defence

Other
- Boeing Commercial Airplanes
- The Mitre Corporation

Organizational Distinctions

Volpe received numerous awards at both the organizational and individual level in 2011. Particularly noteworthy were the following:

Employer of the Year Award: Women's Transportation Seminar (WTS) National and Boston chapters recognize Volpe

Lifetime National Associate Designation: National Research Council recognizes Robert C. Johns, Volpe Director, for his extraordinary service to the council in its role as adviser to the Nation in matters of science, engineering, and health

Public Service Award: American Institute of Aeronautics and Astronautics recognizes Dr. Richard John, Volpe Director Emeritus, for excellence in national leadership and lifelong contribution to the nation's aviation and aerospace enterprise

Distinguished Service Award: Transportation Research Board recognizes Robert C. Johns, Volpe Director, for his three years of service as chair of the Technical Activities Council

Massachusetts Excellence in Commuter Options Pinnacle Award: Massachusetts Department of Transportation recognizes Volpe

Outstanding Evaluation Award: American Evaluation Association recognizes Volpe team for work that resulted in significant day-to-day safety improvements on the Union Pacific Railroad and influenced a broader shift in safety culture in the railroad industry

Presidential Early Career Award for Scientists and Engineers: National Science and Technology Council recognizes Dr. Kristin Lewis

U.S. Government Award for Engineering Safety: The National Highway Traffic Safety Administration recognizes Dr. Wassim Najm for his extraordinary contributions in the field of vehicle safety technology

Excellence in Technology Transfer Award: Federal Laboratory Consortium for Technology Transfer, Northeast Region, recognizes the SafeTrip 21 team

Congratulations by the President: President Barack Obama recognizes Kevin Green and Ryan Harrington in the Oval Office for their work on CAFE standards

Excellence in Government – Initiative Award: Greater Boston Federal Executive Board recognizes Adam Klauber

Industry Conference Participation

Volpe plays a significant role in leading industry conferences.

With the Transportation Research Board (TRB) in 2011, Volpe experts:

- Served on 54 committees
- Chaired three committees: Intelligent Transportation Systems, Railroad Operational Safety, and Transportation-Related Noise and Vibration
- Chaired 11 sessions and authored 19 presentations at the TRB Annual Meeting

Volpe contributes to the Intelligent Transportation Systems (ITS) World Congress, serving on the program committee, moderating sessions, and authoring 38 papers in 2011.

Volpe experts play leadership roles in other key industry conferences and organizations as well, including the following:

- Aerospace and Electronic Systems Society (AES) Integrated Communications, Navigation, and Surveillance Conference: Session chair
- American Institute of Aeronautics and Astronautics (AIAA) Conference: Session chair
- AIAA Modeling and Simulation Technology Conference: Session chair
- American Society of Mechanical Engineers (ASME) 2011 Rail Transportation Division Conference: Assistant technical program chair and session chair
- 2011 Biometrics Consortium Conference (BCC): Session chair
- 2011 Joint Rail Conference: Organizing chair, conference co-chair, and track chair
- Digital Avionics Systems Conference: Five session chairs
- First Transportation and Development Institute Congress on Integrated Transportation and Development for a Better Tomorrow: Co-chair of the Advanced Technologies and Infrastructure Systems Track
- Human Factors and Ergonomics Society Annual Meeting: Session chair
- Global Navigation Satellite System (GNSS) Implementation Team for the Asia Pacific Economic Cooperation (APEC) Transportation Working Group: Team co-chair
- Institute of Navigation (ION): Committee chair
- International Civil Aviation Organization: Co-Rapporteur

Meet Our Leaders

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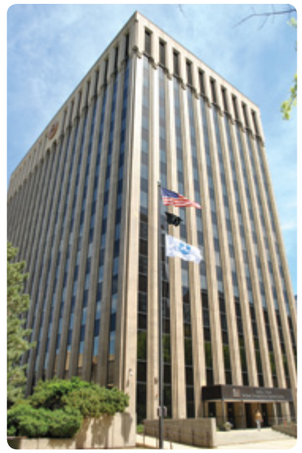
History

The Volpe Center was established in 1970 to provide analytical, scientific, and engineering support to the newly established U.S. Department of Transportation. From the beginning, the Center was envisioned as a place where a broad range of skills could be focused on major issues that cut across the traditional modal structure of the transportation enterprise.

Housed on the campus of NASA's former Electronics Research Center, the Center opened as the Transportation Systems Center. In 1990, the Center was renamed in honor of former Transportation Secretary John A. Volpe.

A distinguished civic leader, Federal administrator, and public servant, John A. Volpe served as the first Federal Highway Administrator from 1956 to 1957 and was elected Governor of Massachusetts in 1960. In 1969, Volpe became the second U.S. Secretary of Transportation. ■



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