FIVE DECADES

U.S. Department of Transportation

50 YEARS

Volpe National Transportation Systems Center

1970 – 2020

TRANSPORTATION INNOVATION FOR THE PUBLIC GOOD

THE U.S. DOT ESTABLISHED THE TRANSPORTATION SYSTEMS CENTER TO ADVANCE THE NATION'S STRATEGIC TRANSPORTATION GOALS AND THE PRIORITIES OF THE SECRETARY OF TRANSPORTATION.

U.S. Department of Transportation

50 YEARS

Volpe Center

1970 – 2020

TRANSPORTATION INNOVATION FOR THE PUBLIC GOOD

A MESSAGE FROM THE U.S. DOT VOLPE CENTER DIRECTOR

The year 2020 marks the U.S. Department of Transportation (U.S. DOT) Volpe National Transportation Systems Center's 50th year advancing transportation innovation for the public good. This publication celebrates our five decades of cross-modal partnerships and sustained commitment to public service.

Our golden anniversary is an opportunity to look back on the impact of our accomplishments, and look forward to a bright future. It is a transformative time. An anchor tenant in the heart of Kendall Square, Cambridge, we have witnessed and contributed to the amazing transformation of our neighborhood. When we opened in July 1970, the area was rather desolate with a few aging factories and the F&T Diner. Today, Kendall Square is considered "the most innovative square mile on the planet" and the U.S. DOT's new, state-of-the-art facility and our future home is under construction.

U.S. DOT established the Transportation Systems Center—TSC—to support the nation's strategic transportation goals and the priorities of the Secretary of Transportation. This followed an abrupt transition—the Center originally served as NASA's Electronics Research Center, but the nation needed us to refocus on the complex transportation challenges at hand. In 1990, the Center was named for John A. Volpe, former U.S. Transportation Secretary and governor of Massachusetts.

The hallmark of the Volpe Center's first 50 years is a top-notch, multidisciplinary, multimodal, and proactive workforce that tackles tough challenges and informs decision making across the transportation enterprise. During our startup decade, the Center established itself as a unique multimodal transportation system resource. We successfully transitioned from a traditional research and development engineering organization to a systems center able to address public and social policy, transportation economics, and technology advances.

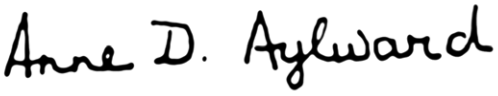
During the 1980s, we expanded our sponsor base, transitioning to a more comprehensive approach that incorporated analysis and assessment of transportation systems for U.S. DOT and other agencies, including the U.S. Department of Defense. The 1990s were marked by widespread political, military, economic, and technological change and we adeptly shifted to meet new national priorities.

In the 2000s, we continued to support efforts to enhance transportation safety across all modes by applying our capabilities in safety management systems, cyber and physical security, and the resilience of the Global Positioning System. In the 2010s, we used our data and system engineering expertise in a decade defined by big data collection and analysis, and fast-spreading automation technologies. And in 2019, U.S. DOT and U.S. DoD renewed a long-standing Memorandum of Understanding regarding the Volpe Center, which ensures our continued collaboration and partnership across DoD commands and offices.

As a leader in transportation systems, analysis, and innovation, the Volpe Center continuously seeks synergy across our projects and works to transfer best practices and technologies throughout the transportation enterprise. Since its founding, the Volpe Center has convened government, private sector, and academic leaders on emerging and future transportation challenges.

On our 50th anniversary, we recognize our U.S. DOT partners and other dedicated colleagues who have been part of this amazing journey. We hope you will take this moment to appreciate the transportation innovations that together we have brought to the nation.

We look forward to collaborating with you over the next half-century and beyond.



Anne D. Aylward, Director
U.S. Department of Transportation
Volpe National Transportation Systems Center
Kendall Square – Cambridge, MA
January 2020

FIVE DECADES

1970 – 2020

SINCE ITS ESTABLISHMENT ON JULY 1, 1970, THE U.S. DOT VOLPE CENTER HAS PROUDLY SERVED THE NATION, 9 PRESIDENTS, AND 17 SECRETARIES OF TRANSPORTATION.

U.S. Secretaries of Transportation

Elaine L. Chao
2017 – Present

Anthony Foxx
2013 – 2017

Ray H. LaHood
2009 – 2013

Mary E. Peters
2006 – 2009

Norman Y. Mineta
2001 – 2006

Rodney E. Slater
1997 – 2001

Federico F. Peña
1993 – 1997

Andrew H. Card, Jr.
1992 – 1993

Samuel K. Skinner
1989 – 1991

James H. Burnley, IV
1987 – 1989

Elizabeth H. Dole
1983 – 1987

Drew Lewis
1981 – 1983

Neil Goldschmidt
1979 – 1981

Brock Adams
1977 – 1979

William T. Coleman, Jr.
1975 – 1977

Claude S. Brinegar
1973 – 1975

John A. Volpe
1969 – 1973

Alan S. Boyd
1967 – 1969

U.S. DOT Research, Development, and Technology Leadership

Joel Szabat
Acting Under Secretary of Transportation for Policy
2019 – Present

Diana Furchtgott-Roth
Deputy Assistant Secretary for Research and Technology (R&T)
2019 – Present

Gregory D. Winfree
Administrator, Research and Innovative Technology Administration (RITA)
2013 – 2014; Assistant Secretary for R&T
2014 – 2016

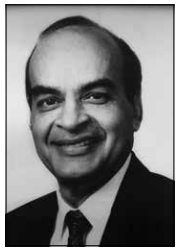
Peter Appel
Administrator, RITA
2009 – 2011

Paul R. Brubaker
Administrator, RITA
2007 – 2009

Ashok Kaveeshwar
Administrator, RITA
2005 – 2006

Ellen G. Engleman
Administrator, Research and Special Programs Administration (RSPA)
2001 – 2003

Kelly S. Coyner
Administrator, RSPA
1998 – 2001



David K. Sharma
Administrator, RSPA
1994 – 1997

Travis P. Dungan
Administrator, RSPA
1989 – 1992

M. Cynthia Douglass
Administrator, RSPA
1984 – 1989

Howard Dugoff
Administrator, RSPA
1979 – 1984

James Palmer
Administrator, RSPA
1977 – 1979

Hamilton Herman
Assistant Secretary for Systems, Development and Technology
1976

Robert Cannon
Assistant Secretary for Systems, Development and Technology
1971 – 1975

U.S. DOT Volpe Center Directors

Anne D. Aylward
2016 – Present

Robert C. Johns
2009 – 2016

Curtis J. Tompkins
2005 – 2007

Richard R. John
1989 – 2004
Director Emeritus
2004 – 2017

Louis W. Roberts
1984 – 1989

James Constantino
1976 – 1983

James C. Elms
1970 – 1974

TABLE OF CONTENTS

PROLOGUE

Creation of the U.S. Department of Transportation

"A new Department of Transportation (DOT) is needed to bring together our transportation activities. The present structure—35 Government agencies, spending $5 billion yearly—makes it almost impossible to serve either the growing demands of this great Nation or the needs of the industry, or the right of the taxpayer to full efficiency and real frugality," said President Lyndon B. Johnson in his January 1966 State of the Union Address. The U.S. DOT was established by an act of Congress that same year. It followed a sweeping reorganization of the federal government that elevated transportation to a cabinet-level post. This was done in an effort to ensure decisive national transportation policy development and to coordinate and manage national transportation programs.

Some of the major operating elements already existed—the Federal Aviation Administration (FAA), Federal Highway Administration (FHWA), the Urban Mass Transportation Administration (UMTA), the St. Lawrence Seaway Development Corporation (SLSDC), and the U.S. Coast Guard (USCG)[1] —and some elements were new—the Federal Railroad Administration (FRA), the National Highway Traffic Safety Administration (NHTSA), and of course, the Office of the Secretary.

The functions of what is now the Federal Motor Carrier Safety Administration (FMCSA) resided predominantly within the FHWA and the functions of today's Pipeline and Hazardous Materials Safety Administration resided within the Office of the Secretary. The legislation also established the National Transportation Safety Board (NTSB) as an independent agency placed within the DOT for administrative purposes. By 1974, Congress reestablished NTSB as a completely separate entity. Worth noting, it wasn't until 1981 that the Maritime Administration was transferred from the Department of Commerce to DOT, completing the consolidation started over a decade earlier.

1 On February 25, 2003, the U.S. Coast Guard became part of the Department of Homeland Security.

The Establishment of a New DOT Systems Center

Meanwhile, in September 1964, the National Aeronautics and Space Administration (NASA) opened the Electronics Research Center (ERC) in Kendall Square, Cambridge, Massachusetts. The new facility was expected to be a major part of the plan to bolster America's space exploration program and support U.S. efforts during the Cold War. Located across the road from the Massachusetts Institute of Technology and two subway stops from Harvard University, ERC was as important to NASA as the Langley Research Center in Hampton, Virginia, or the George C. Marshall Space Flight Center in Huntsville, Alabama.

By 1968, ERC had more than 825 federal employees. In December 1969, President Richard Nixon announced ERC's closure as part of a major shift in the nation's space policy and in federal budget priorities. By this time, however, appreciation had developed for the unique technical expertise and forward-looking perspective that had been assembled in Cambridge.

In an effort to preserve the intellectual foundation that had been established, then-Secretary of Transportation John A. Volpe and members of a bipartisan New England Congressional delegation— including Congressmen Silvio Conte and Tip O'Neill and Senators Ted Kennedy and Edward Brooke—worked to preserve ERC as a national resource. The thinking at the time was that the nation was facing unprecedented transportation challenges and ERC's highly sought after technical capabilities could be applied to complex multimodal issues including mass transit, air traffic flow, and transportation safety.

The New York Times

March 29, 1970

U.S. Transit Agency Taking Over Center Operated by NASA

WASHINGTON, March 28 (AP) — President Nixon has formally authorized the Department of Transportation to take over the Cambridge, Mass., Electronic Research Center being vacated by the National Aeronautics and Space Administration.

Secretary of Transportation John A. Volpe told newsmen at the White House Wednesday that the facility, to be renamed the Transportation

In addition, he said, the installation would probably continue to operate at its old pace because in addition to transportation research, he expected NASA and perhaps the Air Force to use portions of the center under contract arrangements.

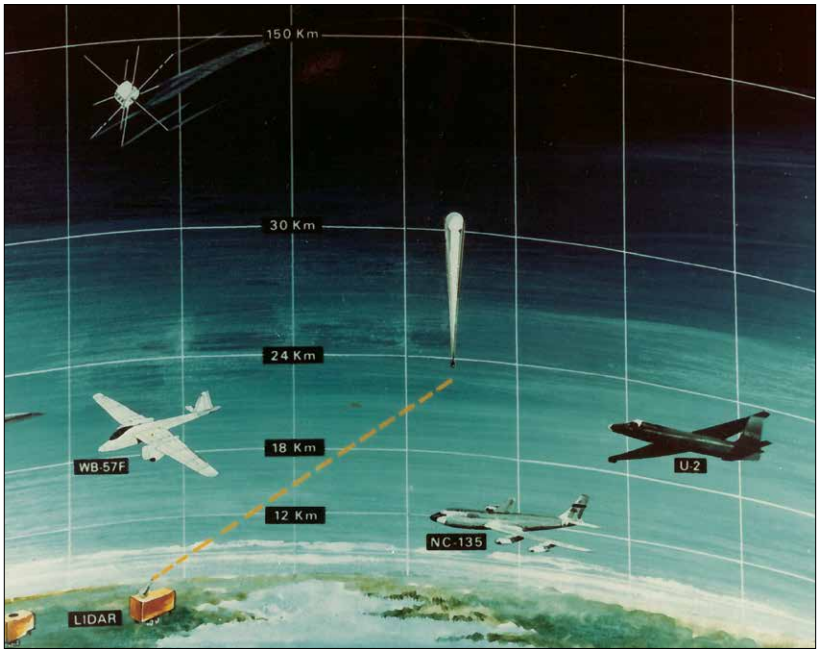
Asked if the move to Cambridge would affect transportation research now conducted in Oklahoma City and Atlantic City, Mr. Volpe replied that he did not expect any change in the status of these facilities.

He said his department was extremely pleased to be taking over the Cambridge center, surrounded by the extensive technological resources of the Boston area, adding that transpor

Facing page: In 1970, U.S. Secretary of Transportation John A. Volpe designated 30,000 acres near Pueblo, Colorado as a test track for high-speed air-cushioned trains. Some of the Center's earliest work was performed at the track in support of FRA. (U.S. DOT image) **Above left:** The Apollo 17 launch, 1972. The Center was originally a NASA facility. When the mission shifted, many of the NASA federal staff stayed on to address the nation's transportation challenges under U.S. DOT. (NASA/Courtesy of nasaimages.org). **Above right:** In March 1970, *The New York Times* quoted Massachusetts Senator Edward Brooke as saying, "It would have been a tragedy had this facility been used for other than research purposes." (*The New York Times*)

ON JULY 1, 1970, NASA'S ELECTRONIC RESEARCH CENTER WAS TRANSFERRED TO THE U.S. DOT AND BECAME THE NATION'S TRANSPORTATION SYSTEMS CENTER.

Right and bottom right: Former NASA employees brought expertise that carried over naturally to some of the Center's earliest projects, such as the design of pilot simulators and a survey of available instruments to measure gases and particulates in the stratosphere. (U.S. DOT images) **Below:** This portrait of John A. Volpe was unveiled by U.S. DOT leadership and members of the Volpe family at the Center's 25th anniversary ceremony. **Facing page, top:** Current day Kendall Square is a thriving center of high-tech innovation. (©2019 Les Vants Aerial Photos) **Facing page, bottom:** When the NASA campus was constructed, 29 acres in the Kendall Square area were cleared to make space for the federal facility. (U.S. DOT image)



In a March 1970 memorandum, Lee Dubridge, the science advisor to President Nixon, and Robert Mayo, the Director of the Bureau of the Budget advised that the transfer of ERC to U.S. DOT would both strengthen transportation research and development and support the responsibilities of the Office of the Secretary of Transportation to ensure coordination and management for intermodal and cross-modal activities.

On July 1, 1970, the ERC was transferred to U.S. DOT for one dollar and became the nation's Transportation Systems Center, or TSC. Because the transfer occurred during a period of austere budgets, the Center did not receive a line item in the federal budget. The U.S. DOT's newest asset was established as a unique, self-sufficient, fee-for-service federal organization, reporting to the Assistant Secretary for Systems Development and Technology. ★

"THIS CENTER WILL PROVIDE A FOCUSED TECHNICAL CAPABILITY FOR OUR DEVELOPMENT OF NEW TRANSPORTATION SYSTEMS ... EVEN MORE THAN THAT, WE BELIEVE THAT THIS CENTER WILL BE A TREMENDOUS ASSET TO THE DEPARTMENT AND WILL ENABLE US TO SPEED PROGRESS TOWARD MEETING THE RESEARCH OBJECTIVES AND THE PROGRAM OBJECTIVES OF THE DEPARTMENT."

JOHN A. VOLPE

SECRETARY OF TRANSPORTATION

APRIL 1970

1970 – 2020

U.S. DOT VOLPE CENTER KEY CONTRIBUTIONS

70

Presidents	**Richard M. Nixon** 1969 – 1974	**Gerald R. Ford** 1974 – 1977	**James Carter** 1977 – 1981
Secretaries of Transportation	John A. Volpe Claude S. Brinegar	Claude S. Brinegar William T. Coleman, Jr.	Brock Adams Neil Goldschmidt

- Simulating **national air traffic flow**
- Developing anti-hijacking **aviation security** screening systems
- Examining constraints and required characteristics for **anticipatory sensing of impending automobile crashes**
- ▲ Pioneering the use of **alcohol breath analysis** for transportation safety
- Examining the control and information system and operational requirements for the **St. Lawrence Seaway**
- Supporting introduction of advanced **urban transit** technologies
- Conducting the first federal study on **automated fare collection**
- ▼ Informing the first **Corporate Average Fuel Economy** standards
- ▶ Examining highway-rail **grade crossing** protection in high-density corridors

- ▲ Testing **wake vortex** sensing systems at major U.S. airports
- Conducting engineering tests and demonstrations of **rail rapid transit** vehicle technology
- ▼ Exploring the potential for flexicab services and **innovative uses of taxis** and jitneys for public transport
- Informing ***National Transportation Trends and Choices to the Year 2000***

- ▲ Studying the impact of **energy trends** on the automobile industry
- Contributing to the **financial analysis of the motor vehicle industry**
- Developing the first-ever U.S. DOT-DoD **Federal Radionavigation Plan**
- Evaluating airport **ground access capacity** at commercial airports
- Assessing **fire safety** in a transportation setting
- Conducting **noise assessments** of transportation systems
- ▼ Analyzing **ridership** levels of the Morgantown Personal Rapid Transit System

80

Ronald Reagan
1981 – 1989

Drew Lewis
Elizabeth Hanford Dole
James H. Burnley, IV

▲ Deploying groundbreaking **air traffic management** concepts including the Enhanced Traffic Management System

- Assessing the capability of the **GPS** to meet civil navigation requirements
- Examining **transportation security** issues and countermeasures
- Creating an assessment tool to evaluate the **safety record of air carriers**—both military and commercial
- Contributing to an aviation **human factors** research plan
- Assessing prospective safety hazards associated with **commercial space launch** activities
- Studying the influence of **advanced communications** on the future of transportation
- Exploring **public-private partnerships** for urban transportation
- Studying **rail integrity** and the behavior of propagating fatigue cracks
- Examining the implications of stalling on **motor vehicle safety**
- Evaluating the effects of mandatory **seatbelt use** laws on safety

90

George H.W. Bush
1989 – 1993

Samuel K. Skinner
Andrew H. Card, Jr.

- Supporting development and implementation of the **intelligent vehicle highway system** program
- Studying the effect of the **65 mph speed limit** on highway safety
- Assessing the use and design of **flight crew checklists and manuals**
- Evaluating the **ridership, cost forecasts, and performance** of federally funded transit projects
- Supporting DoD's **strategic mobility and logistics** priorities

▼ Conducting a **port needs study** for the U.S. Coast Guard

- Contributing to ***Moving America: A Statement of National Transportation Policy***

William J. Clinton
1993 – 2001

Federico F. Peña
Rodney E. Slater

- Developing and installing a real-time communications and navigation system for the **Panama Canal**

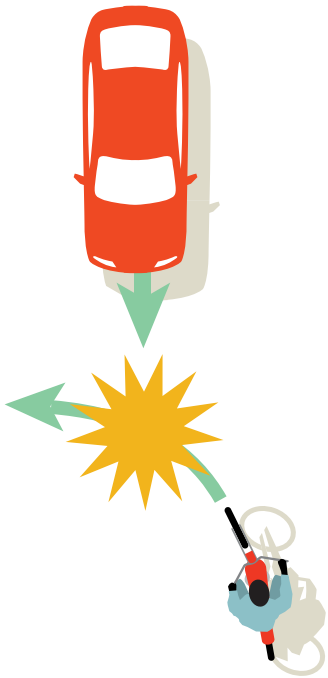
▲ Assessing the **crashworthiness of rail passenger equipment**

- Laying the foundation for Amtrak's all-electric **Acela** high-speed service
- Testing and analyzing commercial vehicle **front and side collision warning systems** and adaptive **cruise control**
- Developing the system to calculate **aviation's contribution to global fuel burn and emissions**
- Enhancing the **integrated model for prediction and analysis** of aviation and highway traffic noise
- Implementing an **integrated security plan** for the U.S. Capitol area
- Contributing to a **surface transportation vulnerability assessment**
- Undertaking major **environmental remediation** at U.S. DOT and Superfund sites
- Supporting development of U.S. DOT's **policy architecture for transportation decision making**
- Supporting White House **National Science and Technology Council's** transportation initiatives

George W. Bush
2001 – 2009

Mary E. Peters
Norman Y. Mineta

- Supporting U.S. DOT's response to the **September 11 attacks**
- Performing groundbreaking research and analysis on **GPS vulnerability**
- Supporting installation of a **communications-based train control system** in Iraq
- ▲ Expanding the multinational **maritime situational awareness** network
- Designing and deploying a landmark **Automatic Identification System-based data network** on the St. Lawrence Seaway
- ▶ Advancing **motor vehicle crash avoidance** research
- ▶ Strengthening analysis of **federal motor carrier safety** programs
- Synthesizing data and information related to **Electronic On-Board Recorders** for reporting hours of service
- Assessing the U.S. Postal Service's Alaska **hovercraft demonstration** project
- Supporting **Intelligent Transportation Systems** programs
- Contributing to ***Transportation Vision 2030***



Barack Obama
2009 – 2017

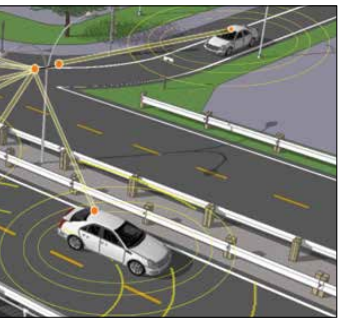
Ray H. LaHood
Anthony Foxx

- Supporting the **Next Generation Air Transportation System** program
- Pioneering **GPS spectrum interference protection**
- ▶ Advancing safety of **crude oil and ethanol by rail** initiatives
- ▲ Supporting **connected and automated vehicle** research, evaluation, and planning
- Supporting **high-risk motor carrier** prioritization
- Providing analytical and engineering support related to **High-Speed Intercity Passenger Rail** service
- ▶ Bolstering development of the first-ever **aviation CO_2 emissions standard**
- Developing a national model to evaluate **freight and fuel transport options**
- Supporting **global disaster relief efforts** in Haiti and Japan in the aftermath of the devastating earthquakes
- Responding to natural disasters, including **Superstorm Sandy**
- Supporting development of ***Beyond Traffic 2045***

20

Donald J. Trump
2017 – PRESENT

Elaine L. Chao



©123RF.com/cheskyw

©123RF.com/Bidouze Stephane

- ▶ Providing **infrastructure** and **automated vehicle** policy support, including ***AV 3.0***
- • Enhancing the **Environmental Review and Permitting Process**
- • Applying **machine learning** methods to inform transportation safety decision making
- • Assisting in the design and development of the technology for transmitting **electronic logging device** motor carrier data to safety officials
- ▶ Advancing **safe integration of new entrants** into the National Airspace System
- • Advancing **data sharing** across the aviation community through the System Wide Information Management system
- ▲ Informing potential changes to **supersonic flight** regulations
- • Conducting **GPS** adjacent band compatibility assessments
- • Supporting deployment of the **Strategic Highway Research Program** and its products
- • Developing a first-ever National Long Range Transportation Plan for the **National Park Service**
- • Responding to natural disasters including **Hurricanes Harvey and Irma** and the **California wildfires**
- ▶ Preparing for relocation to a **new U.S. DOT Volpe Center facility** in Kendall Square, Cambridge, Massachusetts

Image: Patrick Mulvihill, Hood River News

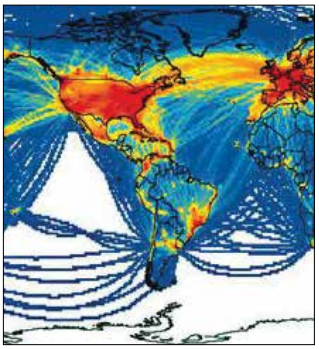


Image: Massachusetts Institute of Technology

1970 – 1979

AN EMERGING TRANSPORTATION LEADER

During its startup decade, the Center's multidisciplinary experts went to work on a number of the issues and challenges associated with the recently established U.S. DOT. There was a growing national concern about transportation safety and security, transportation-related noise and air pollution, and new technologies.

Getting to Work During Our Startup Decade

At this time, there were more than 52,000 annual motor vehicle traffic fatalities. The Center's Alcohol Countermeasures Laboratory grew to become the premier laboratory testing and approving authority for alcohol-detection devices used by law enforcement

and the transportation industry. In response to a number of high-profile airplane hijackings, the Center was closely involved in strengthening airport security and helped develop infrared radiation to detect concealed metal objects.

The Center continued to be at the forefront of emerging technologies including air-cushion and high-speed tracked vehicles, personalized rapid transit, anticipatory automobile crash sensors, grade crossing protection systems for passenger trains, aircraft wake vortex sensing systems, and microwave landing systems for aircraft. The Center also began its early work on noise abatement across the modes.

Becoming a Catalyst for Solutions to Complex Challenges

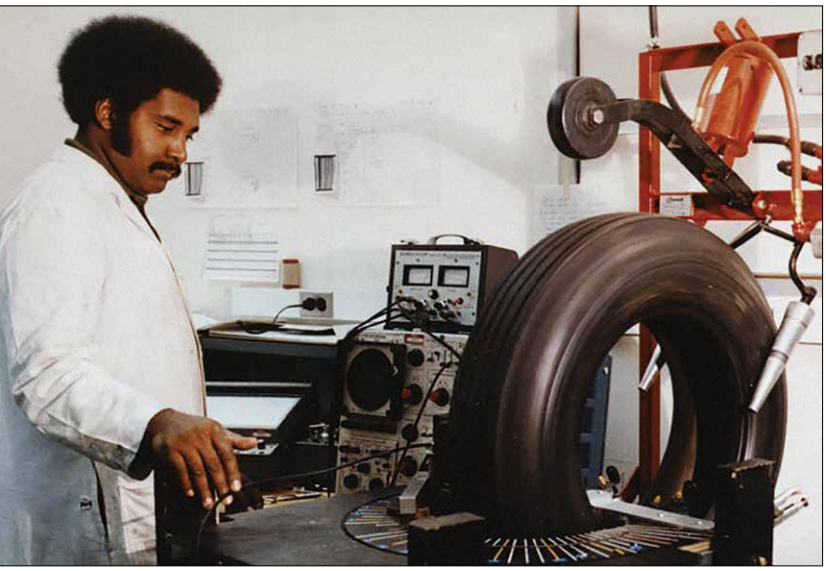
When the 1973 international oil embargo led to unprecedented inflation and an energy crisis, the country turned its attention to domestic energy independence and Congress passed the Energy Policy Conservation Act of 1975 which established the nation's first Corporate Average Fuel Economy (CAFE) standards for passenger cars and light trucks. In support of NHTSA, the Center went to work and to this day continues to provide critical analytical support on the development of CAFE standards for cars and light trucks sold in the U.S.

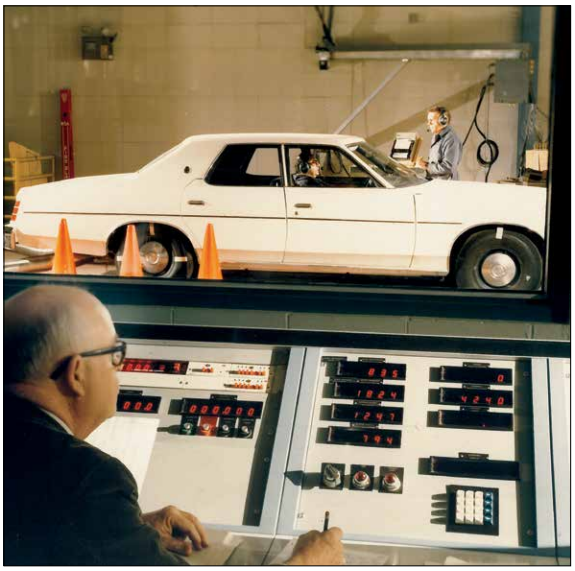
Facing page, top: A theoretical driverless, rail-based freight system to improve efficiency, reduce road congestion, and decrease air pollution was visualized for U.S. operation. (U.S. DOT image) **Facing page, bottom:** In support of NHTSA, the Center developed a miniature rotational mouthpiece accelerometer to measure the angular acceleration of a person's head during a vehicle crash or sudden impact. (U.S. DOT image) **Above, left:** The Center, in support of FAA, played a significant role in developing anti-hijacking aviation security screening systems, such as the use of infrared radiation to detect concealed metal objects. (U.S. DOT image) **Above, right:** The Center supported the U.S. Coast Guard's pollution abatement initiative by measuring diesel engine exhaust at the Boston Coast Guard station. (U.S. DOT image) **Right:** The Center supported the Urban Mass Transportation Administration in evaluating electronically powered Automated Guideway Transit Systems. (U.S. DOT image)

During the 1970s, the Center convened automobile industry leaders for an important dialogue titled *Government, Technology, and the Future of the Automobile.* The next year, the Center contributed to the long-term assessment of the viability of the Chrysler Corporation, which informed the government's Chrysler Loan Guarantee in 1979.

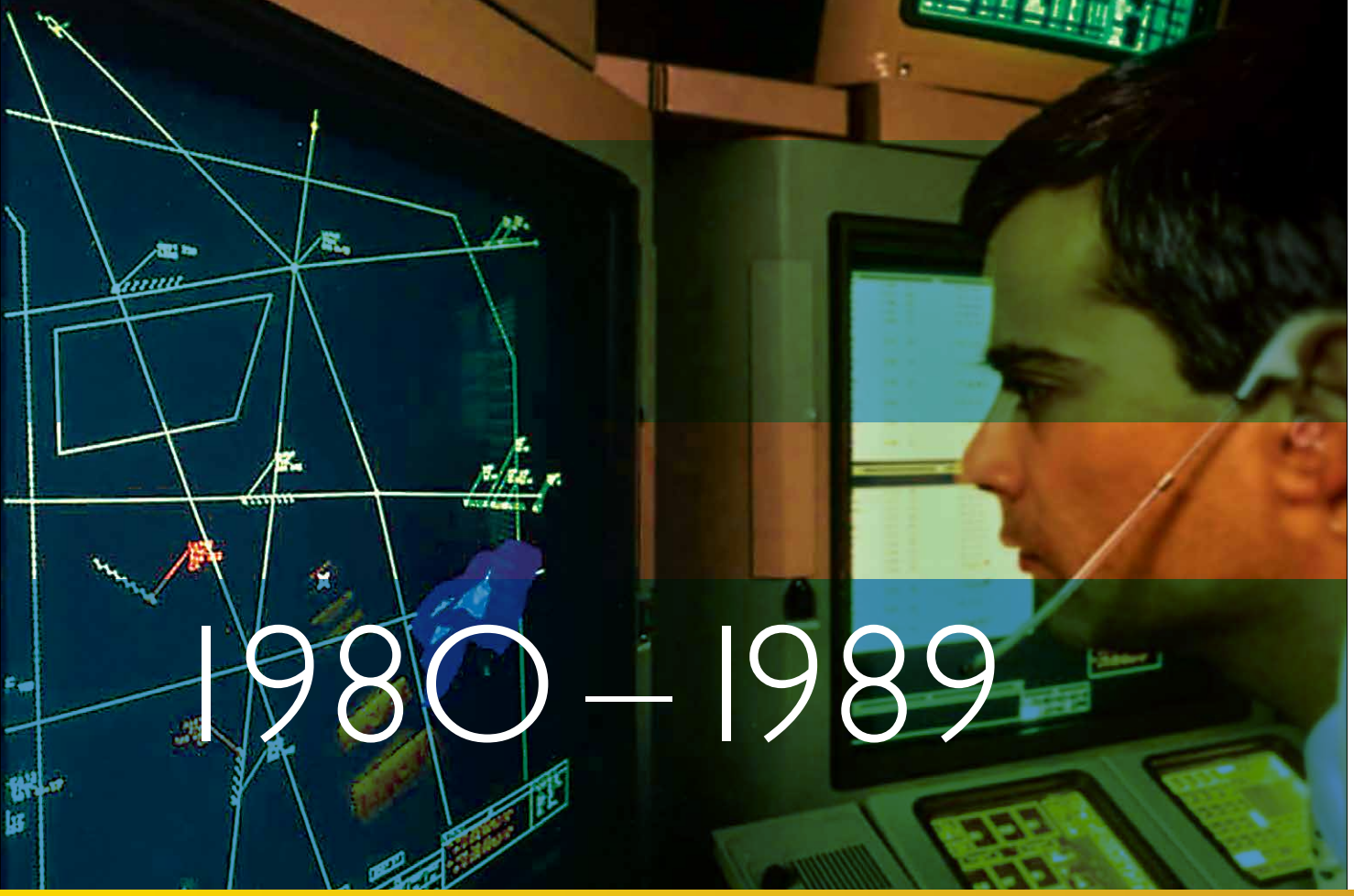
Federal decision makers increasingly needed to understand how new technologies would impact society and transportation system users. Throughout the 1970s, the Center developed and hosted workshops, conferences, and symposia that addressed a number of pressing issues, including rail grade crossing safety, ride quality for intercity maglev, high-speed rail, the design and development of automated transit vehicles, satellite-based air traffic management, and the environmental impacts of supersonic aircraft. In support of U.S. DOT, the Center also convened a major Climate Impact Assessment Symposium, with 38 nations represented.

The Center's initial workforce was dominated by engineering disciplines, but over the decade widened to include social and behavioral sciences, such as economics, human factors, and operations research. The Center closed out the 1970s having fulfilled U.S. DOT's initial vision, emerging as a major, innovative contributor to solving transportation challenges across modes and sectors. ★





Above, left: The Center's Tire Analysis Laboratory developed novel nondestructive methods for the purpose of stress testing the resilience of automobile, bus, and aircraft tires for multiple DOT modal agencies. (U.S. DOT image) **Above, right:** The Center's work advanced the U.S. DOT's vehicle safety and environmental stewardship goals. (U.S. DOT image) **Left:** The Center's Graphics-Oriented Transportation Simulation System in 1970 could be used to model optimum runway lengths. (U.S. DOT image) **Facing page, top:** The Center's expertise enabled the development and deployment of the Advanced Automation System and the Air Traffic Management System, both major initiatives of the FAA. (Volpe Center image) **Facing page, bottom:** The Center's *Hazard Analysis of Commercial Space Transportation* showed the locations of commercial communications satellites. (U.S. DOT image)



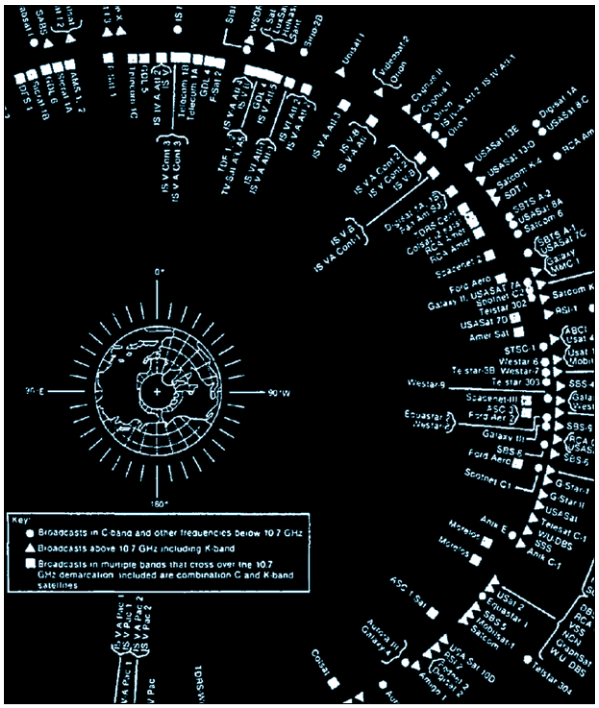
1980 – 1989

SHIFTING NATIONAL PRIORITIES

In the 1980s, the Center's workforce and technical expertise shifted in response to changing government policies and priorities. At this time, much of the Center's work for U.S. DOT centered on research, development, and demonstrations of advanced technologies and new surface vehicle concepts. While safety remained the major departmental priority, national security became a renewed focus.

Focusing on Aviation Safety, Efficiency, and Economic Growth

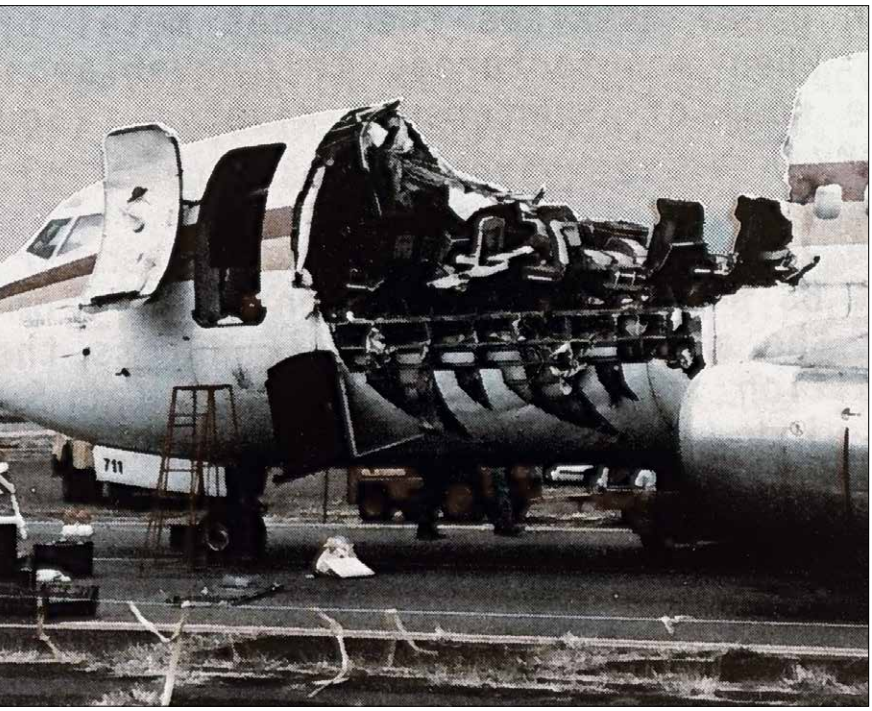
There was a major increase in aviation-related work in support of the FAA during the 1980s. At the start of the decade, the Center supported development of the country's first Federal Radionavigation Plan that met the requirements of civil and military users and delineated DOT's responsibilities related to transportation safety and

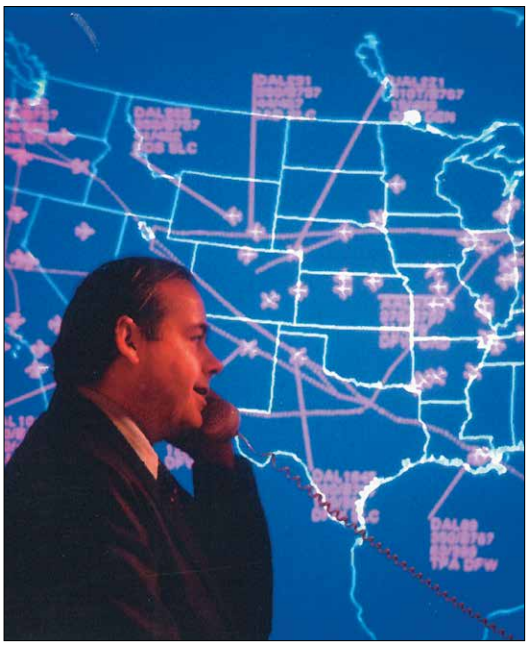


the economy and DoD's national security responsibilities—today the Department of Homeland Security (DHS) has been added as a signatory.

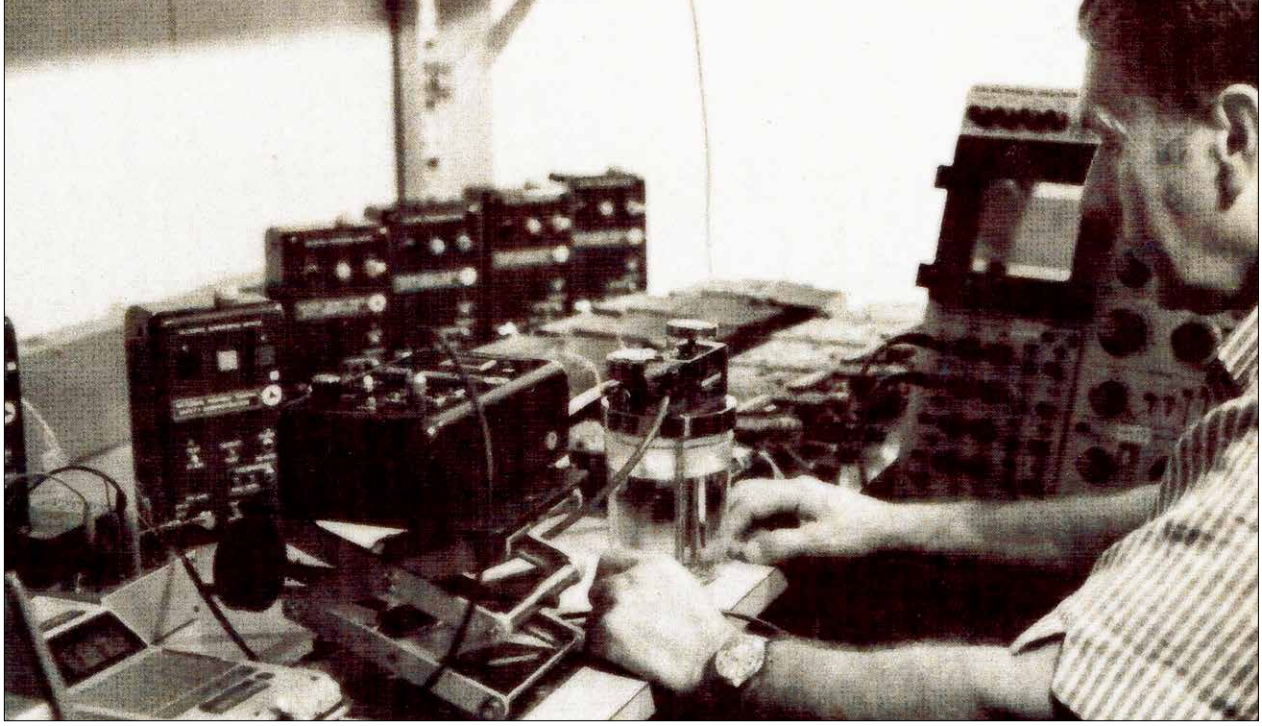
Aviation experts at the Center also developed and deployed groundbreaking air traffic management and control concepts for FAA. Major initiatives, such as the Enhanced Traffic Management System and Advanced Automation Systems relied on the Center's extensive expertise in advanced information, communications, navigation, and surveillance technologies. The Center's work in this area enhanced FAA's ability to monitor and react to air traffic congestion both in real time and in the future.

In December 1985, a chartered plane crashed in Gander, Newfoundland, with more than 240 American soldiers aboard. The Center, in response to a joint request from FAA and DoD, carried out a technical review and found the plane was overloaded and there was a lack of safety protocol. The Center created a valuable aviation





Above: The Center developed an aviation assessment tool to study the 1988 Aloha Air incident in which the plane experienced explosive decompression and structural failure in mid-flight. (U.S. DOT image) **Above, right:** Following the 1983 bombings of the Marine Corps barracks and the U.S. Embassy in Beirut, the Center's security experts were consulted on the retrofitting of anti-blast structures to federal facilities. (State Department image) **Right:** The Center's experts worked with FAA to advance air traffic management systems and theories. (U.S. DOT image) **Facing page, top:** Commercial breath-sensing technology is tested for NHTSA's Alcohol Countermeasure Program. (U.S. DOT image) **Bottom left:** The Center worked closely with the U.S. Coast Guard on a comprehensive analysis of its service-wide command and control operations. The first area targeted for improvement was search and rescue. (Coast Guard image) **Bottom right:** For the FRA, the Center conducted studies of automated crossing gates at multiple sites in the Northeast to evaluate the extent of effective rail-highway grade crossing protection. (U.S. DOT image)



assessment tool to evaluate the safety record of carriers used by the military. The Center also adapted and improved that tool on behalf of FAA after a mid-air Aloha Airlines incident in 1988. Lending critical support to FAA's National Aging Aircraft Research program, the Center undertook new work designed to prevent further accidents due to aircraft structural fatigue.

Strategic Mobility and Logistics

The U.S. military turned to the Center to enhance its strategic mobility and logistics capabilities, particularly following the devastating terrorist bombings against the Marine Corps barracks and the U.S. Embassy in Beirut. The Center expanded its national security support, including applying anti-blast concepts to federal facilities, such as U.S. State Department embassies and other critical infrastructure.

During the 1980s, DoD signed a formal agreement recognizing the Center's value in transferring transportation technology between the civil and defense sectors. In addition, work transitioned to a more comprehensive approach that incorporated analysis and assessment of transportation systems. That led to the Center's expertise being applied to critical transportation missions in federal agencies outside of U.S. DOT.

As the decade wrapped up, the Center contributed to extensive outreach activities related to future transportation issues and helped inform development of *Moving America,* a major statement of national transportation policy directed by Secretary of Transportation Samuel K. Skinner and, at the time, Deputy Secretary of Transportation Elaine L. Chao. The publication was unveiled by President George H.W. Bush in 1991. ★

1990–1999

SEEKING COMMON GROUND

The 1990s were marked by unprecedented global economic growth, the end of the Cold War, and the global spread of the Internet. The Volpe Center adeptly pivoted to meet new priorities and to develop innovative solutions to the nation's transportation challenges. The Center was renamed the John A. Volpe National Transportation Systems Center at the dawn of the decade.

The Volpe Center's primary activities reflected the widespread political, military, economic, and technological change underway. The Center's work focused on major themes of national transportation policy: safety and security, mobility and the economy, and energy and the environment. The Volpe Center continued to expand its support of air traffic management improvements and tools for assessing the interdependency of aviation, noise, and emissions. Major new safety initiatives included railcar crashworthiness evaluations, vehicle crash-avoidance research, runway incursion reduction, motor carrier safety data collection and analysis, and risk analysis for transporting hazardous materials. A year-long study of Boston-to-NYC rail improvements for the FRA and the FTA led to infrastructure upgrades, electrification, and the introduction of Acela Express service that cut trip times and expanded capacity in the Northeast Corridor.

Developing Intelligent Transportation Systems (ITS) Programs

Following the passage of the landmark Intermodal Surface Transportation Efficiency Act of 1991, the Volpe Center became heavily involved in forming what would become a key U.S. DOT surface transportation activity: Intelligent Vehicles/Highway Systems, which evolved into today's Intelligent Transportation Systems (ITS) and automated vehicle programs. The Center supported development of strategic program directions and, for NHTSA, performed safety evaluations of operational tests. Using video image processing technologies, the Center also directed an urban travel-time study for FHWA and for FTA examined the implementation status of advances in technology in the public transportation industry.

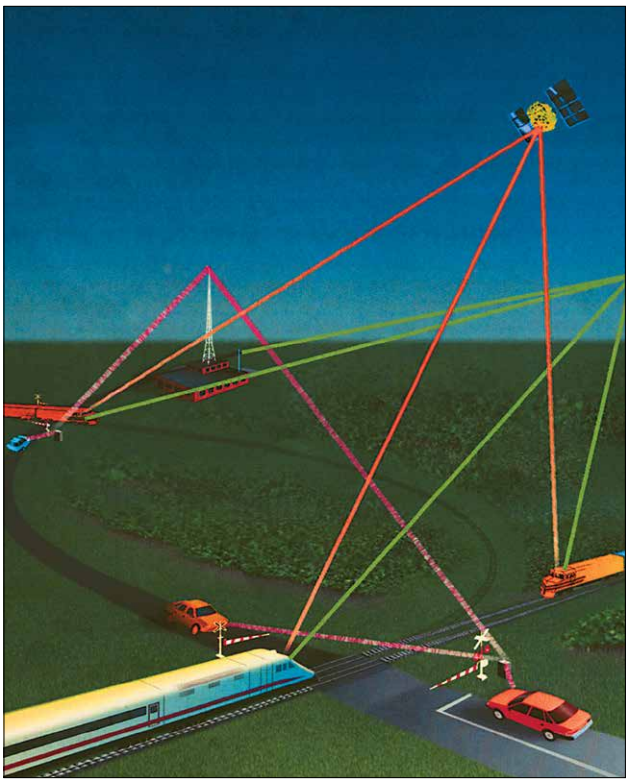
The Center also studied automotive displays and controls and future trends including automated fare collection. Recognizing that the future impact of these new technologies and services depended, in large part, on the public's willingness to purchase and incorporate these

services into daily transportation activities, the Center worked in the area of benefits, evaluation, and costs and developed new ways to measure the impact of ITS deployments.

Growing International Expertise in GPS and Maritime Domain Awareness

The Volpe Center developed internationally renowned expertise in using Global Positioning System (GPS) satellites to support transportation and logistics needs of military and civilian users. The Volpe Center created the first Federal Radionavigation Plan (FRP) and was instrumental in developing and deploying new air traffic control systems. The FRP is the official source of positioning, navigation and timing (PNT) policy and planning for the federal government, and is today prepared jointly by DOT, DoD, and DHS every two years.

Throughout the decade, and to this day, the Center has been in the vanguard of developing and deploying state-of-the-art, easy-to-use, cost-effective vessel tracking networks that enhance maritime situational awareness in waterways around the world. The Volpe Center developed and installed systems for identifying and tracking commercial vessels on the St. Lawrence Seaway and the Panama Canal that are still in use. For the Seaway, the Center designed and deployed an Automatic Identification System-based data network, dramatically improving navigation safety and traffic management. Throughout



Facing page, top: Infrastructure improvements and electrification of the Boston-to-New York City Acela route. (U.S. DOT image) **Facing page, bottom:** For the FTA, the Volpe Center supported the design, development, and deployment of alternative fuel transit vehicles and infrastructure systems. (U.S. DOT image) **Right, top:** A Volpe-developed GPS-based system for tracking commercial vessels in the St. Lawrence Seaway to improve maritime situational awareness. (U.S. DOT image) **Right, middle:** On September 18, 1990, the Center was renamed in honor of the second U.S. Secretary of Transportation, John A. Volpe. Participating in the ceremony was then-U.S. DOT Deputy Secretary Elaine L. Chao. (U.S. DOT image) **Right, bottom:** The Center contributed to an understanding of the multimodal vehicle location and tracking capabilities of GPS. (U.S. DOT image)

the 1990s, Volpe Center engineers developed and installed a real-time Communications, Traffic Management and Navigation system in the Panama Canal, which resulted in improved situational awareness and a significant reduction in accidents.

Extending Critical Support to a Range of Partners

Beginning in the 1990s and continuing through the mid-2000s, Volpe Center experts provided key support on behalf of the Office of the Secretary of Transportation, to the White House Office of Science and Technology Policy and the National Science and Technology Council. The Volpe Center served as executive agent to a number of dynamic multiagency committees and contributed to a series of highly visible reports, including the first-ever national Transportation Science and Technology Strategy.

A growing number of federal agencies, challenged by issues related to transportation and the environment, looked to the Volpe Center for assistance. Volpe Center experts supported implementation of environmental policies for the U.S. Postal Service and contributed to a three-year demonstration program in which hovercraft were used to transport mail to remote villages in Alaska.

By mid-decade, the Environmental Protection Agency (EPA) urgently sought out the Volpe Center's capabilities to lend technical assistance to provide sampling, site assessment, and analytical support to the EPA in accordance with a new Memorandum of Understanding between the two federal organizations. At the time, the national spotlight was on Libby, Montana and Stockton, Utah, two towns experiencing a large number of deaths and disease related to exposure to asbestos and other contaminants.

The Volpe Center's extensive, well-established physical security expertise was instrumental to the missions of many federal partners. Border security systems for passengers and cargo were developed and deployed by the Volpe Center in support of the Immigration and Naturalization Service; the U.S. Capitol Police and U.S. Bureau of Printing and Engraving sought the Center's help following major breaches in security at the U.S. Capitol and the U.S. Treasury.

Preparing for a New Century

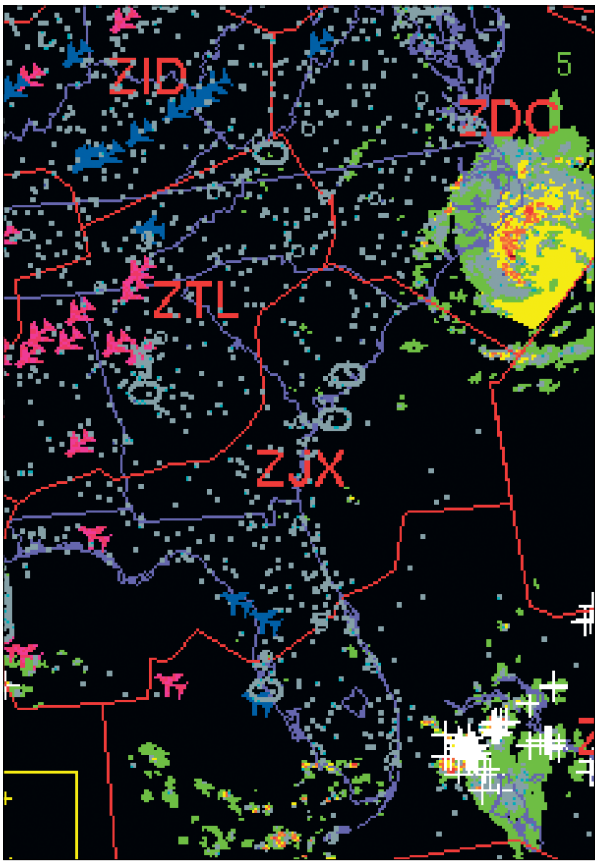
To support federal decision making and prepare for the new century, the Volpe Center continued to bring together global transportation experts during a series of high-profile outreach events that explored major transportation challenges. These included a special series at the start of the decade on *Charting a New Course in Transportation;* the *First International Congress on New Information Technologies and Operations Research Methods in Transportation and Telecommunications,* co-sponsored with MIT; *Challenges and Opportunities for Global Transportation in the 21st Century; Transportation Opportunities for Technology Reinvestment* in support of Secretary Federico F. Peña's agenda to support national defense conversion priorities; and the *Spirit of Innovation in Transportation Symposium,* held on behalf of Secretary Rodney E. Slater prior to the turn of the new century. ★

Above: The Volpe Center worked with the U.S. Postal Service to study the technical, regulatory, ecological, and cultural complexities of delivering mail in Alaska by hovercraft. (U.S. DOT image) **Facing page, top:** Volpe's Global Maritime Domain Awareness Program won a prestigious Innovations in American Government Award from Harvard's Kennedy School of Government. (U.S. DOT image) **Facing page, bottom:** The Volpe Center helped to develop the Enhanced Traffic Management System (ETMS) for FAA. (U.S. DOT image)

2000–2009

EMPHASIZING SAFETY AND SYSTEM SECURITY

Throughout the 2000s, the Volpe Center continued to provide key technical support and leadership on pressing national transportation priorities impacting safety, security, the environment, energy, and mobility. On September 10, 2001, the Volpe Center released a groundbreaking report on the vulnerabilities of GPS to intentional or unintentional interference. The report also found that the safety and economic risks of GPS vulnerability had been underestimated. Less than 24 hours later, the September 11 terrorist attacks happened, bringing into stark relief global concerns about the vulnerability of our nation's critical transportation infrastructure, including GPS. Just hours after the attacks, Volpe Center staff provided technical support to the Federal Emergency Management Agency operations center in Washington, D.C.



Assessing and Solving Real-World Safety Challenges

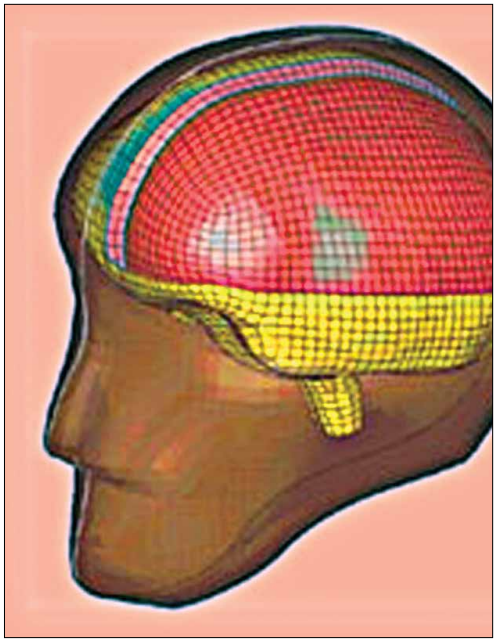
After September 11, the Volpe Center conducted vulnerability risk assessments related to cargo and port security and intercity bus security, and analyzed the effects of catastrophic events on transportation system

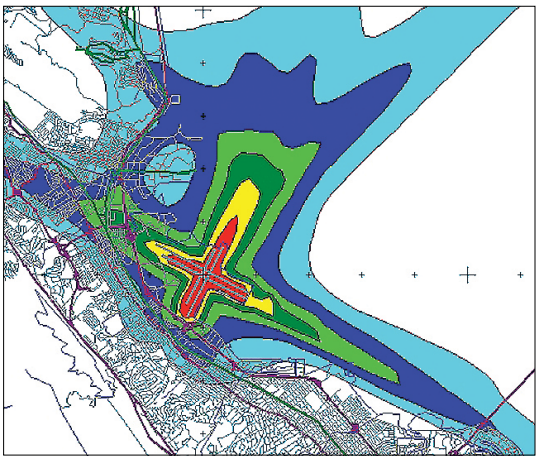
management and operations. The Center also supported the U.S. Army, Transportation and Communications Sector in Iraq with the deployment of a microwave communications network for the Iraqi Republic Railways.

In supporting U.S. DOT safety objectives, the Volpe Center's work moved from responding to and analyzing crashes to anticipating and avoiding them. The Volpe Center helped promote the Federal Motor Carrier Safety Administration's nationwide commercial vehicle safety effort and broadened its multimodal understanding of unintended consequences from human-automation interaction. For FRA, the Volpe Center supported highway-rail grade crossing safety efforts and full-scale train-to-train crash energy management testing. For NHTSA, Volpe Center human factors experts evaluated driver-fatigue detection technologies along with multiple safety innovations, including road-departure crash warning systems. For Secretary Ray H. LaHood, Volpe Center experts also contributed to forming the U.S. DOT Safety Council. Chaired by the Deputy Secretary, the council continues as an important, multimodal forum for developing solutions to critical safety challenges.

Expanding New Navigation Technologies and Improving the Parks Experience

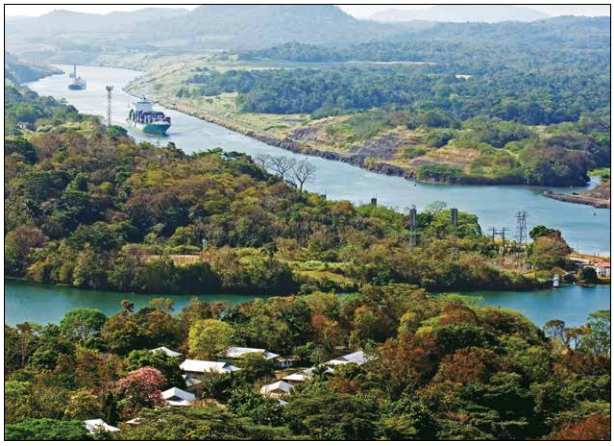
The Volpe Center's decades of technical experience in assessing, developing, and deploying multimodal positioning, navigation, and timing systems were applied in a number of





Above, left: For the FTA, the Volpe Center designed, developed, and operated the interactive Advanced Public Transportation Systems Mobile Showcase to demonstrate technologies to the transit industry, decision makers, transit users, and the public. (U.S. DOT image) **Above:** As part of the Center's research for NHTSA, Volpe experts developed internationally recognized models for use in biomechanics and crashworthiness research to support protective vehicle design requirements. (U.S. DOT image) **Left:** The Aviation Environmental Design Tool, developed by the Volpe Center for FAA, considers the interdependencies between aircraft-related fuel burn, noise, and emissions associated with proposed airport and airspace improvements. (U.S. DOT image)

Left: To help the public transit industry manage high-risk security demands, the Volpe Center prepared design considerations for transit security as part of the nation's response to the terrorist attacks of 9/11. (U.S. DOT image) **Below, left:** Working with the NTSB, Volpe Center investigators studied the causes and aftermath of a train-to-train accident between a passenger train and a freight train. (U.S. DOT image) **Below:** The Volpe Center developed the Communications, Traffic Management, and Navigation system for the Panama Canal Commission to make the Canal passage safer and more efficient. Volpe used satellite data to create a real-time display that shows the location of every vessel in the Canal. (© Harold Stiver/123rf.com)



programs, including Next Generation Air Transportation System or NextGen, Positive Train Control, ITS, and Maritime Safety and Security Information System (MSSIS).

Previous global maritime domain awareness work led Volpe Center experts to develop MSSIS, which provides data on the location of tens of thousands of vessels with a high degree of reliability, security, and data integrity. Today, MSSIS includes more than 70 nations. The MSSIS program was honored by the John F. Kennedy School of Government and received the Ash Institute's prestigious Innovations in American Government Award.

On behalf of FAA and the National Park Service (NPS), Volpe Center experts initiated air tour management plans to reduce the intrusion of aviation activities, mainly noise, into national parks. Vital work continued on potential applications of fuel cells and electric batteries for FTA, assessment of alternative transportation modes for NPS, and the benefits and costs of transportation biofuels.

From 2000 to 2002, the Center held its *New Dimensions in Transportation Leadership* speaker series, bringing together transportation experts to discuss groundbreaking innovations. The Volpe Center also continued to convene Friends of Volpe forums, where visiting and returning experts discussed advances in automation and robotics, GPS vulnerability, advanced multimodal transportation weather services, aviation modeling and simulation needs and requirements, transportation decision making, information security and transportation, the future transportation workforce, and sustaining transportation innovation. The Center also supported the development of Secretary Mary E. Peters' *Transportation Vision for 2030,* a guide for transportation research and investment decisions.

By the end of the decade, the Volpe Center was well-positioned to continue to expand its collaborative efforts with sponsors and the broader transportation sector to improve safety and security across the nation's transportation systems. ★

2010–2020

EMBRACING AUTOMATION AND BIG DATA

Transportation innovation in the 2010s was increasingly defined by massive data collection, analysis, and fast-spreading automation technologies. The Volpe Center's multidisciplinary automated vehicles team developed strategy, research, and policy approaches for automated vehicle projects across surface transportation modes. The Office of the Secretary of Transportation asked the Volpe Center to take the lead in developing *Preparing for the Future of Transportation: Automated Vehicles 3.0.* Released by Secretary Elaine L. Chao in 2018, it was the first federal automated vehicle guidance to take a multimodal approach.

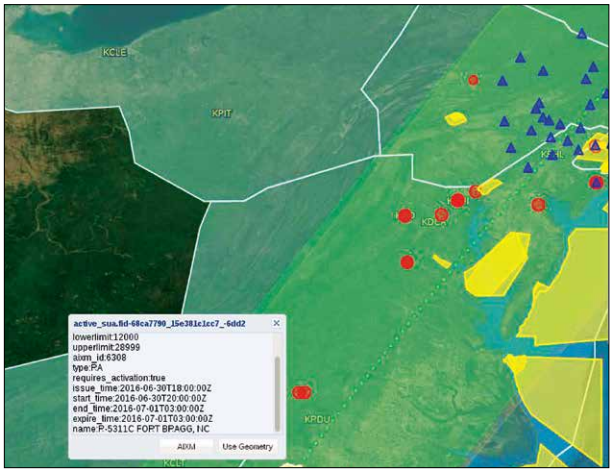
At the start of the decade, the Volpe Center again began supporting the White House Office of Science and Technology Policy, working closely with NASA, FAA, and others to develop the Aeronautics Research and Development Plan, which stressed the importance of addressing enterprise-level issues in transforming the air space system. The Volpe Center carried out near- and long-term multidisciplinary systems research and assessment that informed policy decisions associated with NextGen and other future air transportation systems. Near the decade's end, the Volpe Center was tapped by FAA to serve on a select multi-agency panel to review the safety of the Boeing 737 MAX.

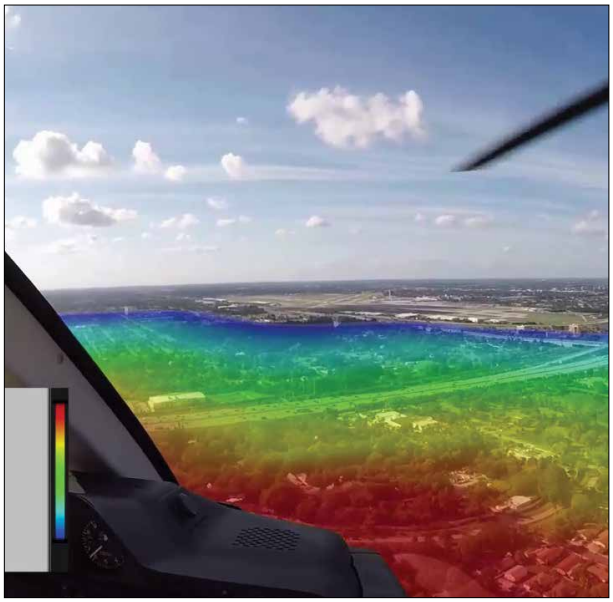
Turning to Machine Learning to Improve Road Safety

Motor vehicle deaths remained a critical safety issue for U.S. DOT. According to 2018 estimates, 36,750 people were killed in motor vehicle crashes, while over 2.7 million were injured in motor vehicle crashes in 2017. Throughout the decade, with the evolution of active safety technology, Volpe Center engineers have been at the forefront of crash prevention—informing rulemaking, federal guidelines, and investment decisions on crash avoidance technology. Simultaneously, Volpe Center data experts, in support of the U.S. DOT undersecretary of transportation for policy, are leading the Waze Pilot Project, which is advancing U.S. DOT's vision of integrating government data with big data from private companies to estimate crash risk and improve real-time reporting.

Driver behavior is a critical factor in nearly all road vehicle crashes. Volpe Center data science experts developed the skills and subject matter expertise needed to create a video reduction and analysis tool on behalf of the FHWA. Using machine learning and computer vision techniques, the tool can extract knowledge relevant to naturalistic driving research questions from dash cam video at a rate two orders of magnitude faster than a human analyst.

In support of FMCSA, the Volpe Center assisted in the design and development of the technology for transmitting Electronic Logging Devices (ELD) data to safety officials, and a software application—Electronic Records of Duty Status—to assist safety officials in viewing and analyzing that data. This supported implementation of a federal law requiring that trucks have ELDs that track on- and off-duty time for drivers.





Facing page: In support of the Office of the Secretary's Safety Data Initiative, the Waze Pilot Project takes on a machine learning task with big data. (Source: ©123rf.com/Galina Peshkova) **Facing page, bottom:** The Volpe Center developed SeaVision for U.S. Naval Forces Africa to enable governments to view and track vessel movements. (Image: Google Maps and U.S. DOT image) **Above, left:** The Center was instrumental in developing the System Wide Information Management (SWIM) data services and infrastructure that allow airlines to share information with the FAA and airport operators. (U.S. DOT image) **Above, right:** Low-speed automated shuttles are one novel vehicle class that the Volpe Center examined in a recent state-of-the-practice report. (U.S. DOT image) **Left:** A photographic example of a helicopter noise exposure 'footprint' overlaid on the cockpit video used during pilot training to increase awareness of helicopter noise generation. (U.S. DOT image)

Expanding Analysis of Maritime Safety and Security Data

The Volpe Center continued to draw from its data and system engineering expertise to enhance transportation safety and efficiency and to expand global maritime domain awareness. Maritime safety experts created SeaVision, which lets governments view, track, and analyze vessel data in near real-time to improve the safety and security of the world's oceans and waterways.

Increasing Capacity and Making Air Travel Safer, More Efficient, Greener

To improve air travel, Volpe Center experts were vital in developing, on behalf of FAA, the System Wide Information Management (SWIM) program, which improves data sharing across aviation using defined, standardized, secure, flexible, and scalable connections. Data sharing improves efficiency and reduces delays by providing common situational awareness and improved planning capabilities.

Volpe Center systems engineering experts also provided engineering and analysis, operations research, and associated information technology expertise to enhance aviation safety. They continued to provide technical and risk analysis expertise for aviation and aerospace challenges, and a large portion of the Volpe Center's aviation safety management systems activity focused on designing, developing, and maintaining information systems used by FAA safety inspectors.

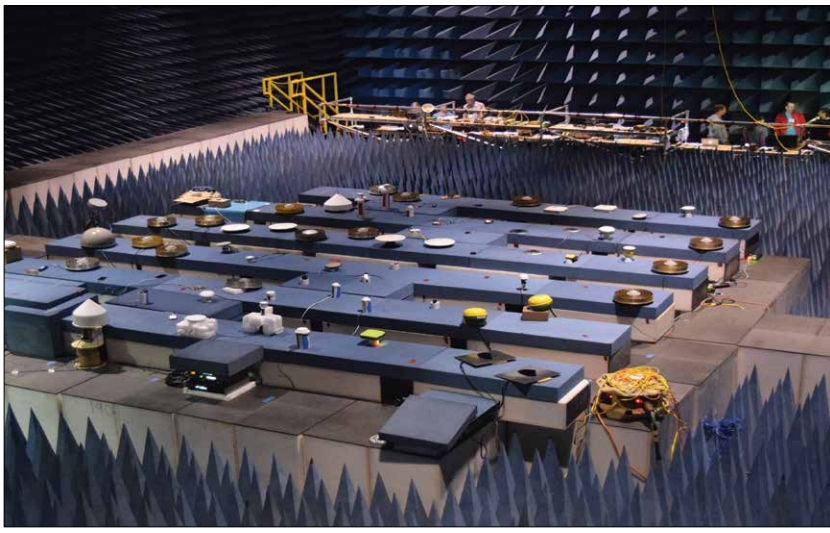
Also in support of FAA, the Center continued its longstanding efforts to better understand the behavior of wake turbulence and to recommend critical adjustments to aircraft separation standards and spacing criteria. As a result, some airports saw a marked increase in airport capacity and the industry reaped savings in fuel costs due to less time waiting on the tarmac.

In support of FAA, NASA, and the International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP), the Volpe Center led the design, development, maintenance, training, and user support of the Aviation Environmental Design Tool (AEDT). AEDT calculates noise, fuel burn, and emissions during ground and flight operations across various scales: individual flights, airport, regional, national, and global levels.

Strengthening Transportation System Resilience

The 2010s were marked by several major weather events, including Hurricane Harvey in 2017, which led to major flooding in the Houston area, and Hurricane Maria, which devastated Puerto Rico. Emergency response experts at the Volpe Center were deployed throughout the 2010s to coordinate large-scale transportation responsibilities that come with massive emergency response efforts, including from major storms. Two Volpe Center outreach initiatives—*Beyond Bouncing Back* and *Transportation System Resilience*—explored frameworks for addressing challenges related to increasing interdependencies among physical and

Left: The Volpe Center in support of FRA has been a leader in the crashworthiness assessment of rail equipment, and the related issue of crash survivability. (U.S. DOT image) **Facing page, top:** An outreach event at the Volpe Center with then U.S. DOT Under Secretary Derek Kan and Kyle Vogt, Founder and CEO of Cruise Automation, Inc. (U.S. DOT image) **Facing page, bottom left:** For FRA, the Volpe Center evaluated the effectiveness of engineering treatments to deter vehicles from turning onto the rail right-of-way. (U.S. DOT image) **Facing page, bottom right:** GPS Adjacent Band Compatibility testing at the Army Research Laboratory's Electromagnetic Vulnerability Assessment Facility increased DOT's understanding of how adjacent-band transmitters affect GPS/Global Navigation Satellite System devices. (Photo: White Sands Missile Range staff)



cyber systems that underlie the critical infrastructure in the U.S.

U.S. DOT worked to develop a robust, nationally applicable model to quantify the direct and indirect costs these extreme weather events have on transportation infrastructure. The Volpe Center built on a coastal flooding project in Hampton Roads, Virginia, by integrating data, methodologies, and algorithms to support a new model that operates under a variety of transportation disruption scenarios. Ultimately, the tool will be replicable and usable across the nation and may be expanded to include additional threats.

Continuing a Rich Legacy of Looking Beyond the Horizon

Throughout the decade, the Volpe Center continued its legacy of bringing together leading transportation thinkers to address pressing challenges. The Center's staff were key contributors to *Beyond Traffic 2045,* released by Secretary Anthony Foxx.

The work continued Volpe's tradition of supporting Secretarial-level efforts to capture current and future trends in transportation. The Center had supported Secretaries Coleman, Skinner, and Peters on landmark documents examining emerging trends.

The Volpe Center also convened *Transportation and the Economy,* an outreach series, which considered future issues crucial to moving people and goods to remain competitive in the global economy. *Reimagining Transportation* and the *Ongoing Transformation of the Global Transportation System* delved into technology trends poised to dramatically change how we travel and deliver goods and services. The speaker series *Transportation in the Age of Artificial Intelligence and Predictive Analytics* convened experts in government innovation, vehicle automation, and logistics to consider the promise and potential of recent breakthroughs in machine learning and data analysis. And at the end of the decade, *Our New Mobility Future* supported Secretary Elaine L. Chao's innovation agenda and further explored novel transportation modes and the promise and pitfalls of our new mobility future.

Looking to the 2020s, Volpe Center experts stand ready to apply their cross-modal, multidisciplinary transportation expertise to solving the nation's most pressing national and global transportation challenges. ★

THANK YOU

ON THE OCCASION OF OUR 50TH ANNIVERSARY, WE RECOGNIZE AND APPRECIATE OUR PARTNERS WHO HAVE SPONSORED OUR WORK AND COLLABORATED WITH US TO ADVANCE THE NATIONAL AND GLOBAL TRANSPORTATION SYSTEM. ★

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 Secretary of Transportation
  - Office of the Under Secretary for Policy
  - Office of the Assistant Secretary for Aviation and International Affairs
  - Office of the Assistant Secretary for Research and Technology
    - Bureau of Transportation Statistics
    - Intelligent Transportation Systems Joint Program Office
    - Transportation Safety Institute
  - Office of the Assistant Secretary for Administration
  - Office of the Chief Information Officer
  - Office of Drug & Alcohol Policy & Compliance
  - Office of Intelligence, Security and Emergency Response
  - DOT Safety Council
- Office of Inspector General
- Pipeline and Hazardous Materials Safety Administration
- Saint Lawrence Seaway Development Corporation
- Surface Transportation Board

OTHER FEDERAL AGENCIES

- Millennium Challenge Corporation
- National Aeronautics and Space Administration
- National Capital Planning Commission
- Panama Canal Commission

Through the years, the U.S. DOT's Volpe Center has worked collaboratively in support of U.S. DOT, other federal agencies, state and local governments, other public authorities, private organizations, and foreign countries.

- Presidio Trust
- U.S. Access Board
- U.S. Architectural and Transportation Barriers Compliance Board
- U.S. Capitol Police
- U.S. Department of Agriculture
  - Forest Service
- U.S. Department of Commerce
  - National Oceanic and Atmospheric Administration
- U.S. Department of Defense
  - Office of the Secretary of Defense
  - 21st Theater Sustainment Command
  - 266th Range Squadron
  - Air Combat Command
  - Air Mobility Command
  - Combat Systems & Combat Services Support
  - Defense Advanced Research Projects Agency
  - Defense Information Systems Agency
  - Defense Logistics Agency
  - Defense Threat Reduction Agency
  - Joint Chiefs of Staff
  - Joint Improvised-Threat Defeat Organization
  - Office of the Chief of Naval Operations
  - Office of the Secretary of Defense
  - Space and Naval Warfare Systems Command
  - Surface Deployment & Distribution Command
  - U.S. Africa Command
  - U.S. Air Force
    - Air Education and Training Command
    - Air Materiel Command
    - Air Mobility Command
    - Civil Engineer Center
    - Cryptologic Support Center
    - Fort Irwin (Edwards AFB)
    - Pacific Air Forces
    - U.S. Air Forces in Europe
    - U.S. Air Force Flight Standards Agency
    - U.S. Air Force Life Cycle Management Center
    - U.S. Air Force Reserve Command
    - U.S. Air Force Southern Command
    - U.S. Air Force Space Command
    - U.S. Air Force Special Operations Command
    - U.S. Air National Guard
  - U.S. Army
    - Aeromedical Research Laboratory
    - Combat Systems and Combat Services
    - Headquarters Department of the U.S. Army G4
    - Office of the Secretary of the Army
    - U.S. Army Corps of Engineers
    - U.S. Army Forces Central Command
    - U.S. Army Intelligence & Security Command
    - U.S. Army Materiel Command
    - U.S. Army Office of the Program Manager, Saudi Arabian National Guard Modernization Program
    - U.S. Army Reserves
    - U.S. Army Tank-Automotive and Armaments Command
    - U.S. Army XVIII Airborne Corps
  - U.S. Marine Corps
    - Joint Logistics Systems Center
  - U.S. Navy
    - Africa Command
    - U.S. Naval Forces Africa
    - U.S. Naval Forces Central Command
    - U.S. Naval Forces Europe
    - U.S. Navy International Programs Office
    - Naval Air Systems Command
    - Naval Air Warfare Center Weapons Division
    - Naval Education and Training Security Assistance Field Activity
    - Naval Facilities Engineering Command
    - Naval Research Laboratory
    - Naval Sea Systems Command
    - Naval Supply Systems Command
    - Naval Surface Warfare Center
    - Office of the Chief of Naval Operations
    - Commander, Navy Region Japan
  - U.S. Northern Command
  - U.S. Southern Command
  - U.S. Transportation Command
    - Directorate of Acquisition
    - Surface Deployment and Distribution Command
- U.S. Department of Energy
  - Bioenergy Technologies Office
  - Office of the Secretary of Energy
  - Sandia National Laboratories

- Vehicle Technologies Office
- Western Area Power Administration

U.S. Department of Health and Human Services
- Office of the Secretary

U.S. Department of Homeland Security
- Federal Emergency Management Agency
- Science and Technology Directorate
- Transportation Security Administration
- U.S. Customs and Border Protection
- U.S. Coast Guard

U.S. Department of the Interior
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Fish and Wildlife Service
- National Park Service
- Alaska Region
- Midwest Region
- Washington Support Office
- Southeast Region

U.S. Department of Justice

U.S. Department of Labor

U.S. Department of State

U.S. Department of the Treasury
- Bureau of Engraving and Printing

U.S. Environmental Protection Agency
- Office of Environmental Information
- Office of Solid Waste & Emergency Response

U.S. Food and Drug Administration

U.S. Government Accountability Office

U.S. General Services Administration

U.S. Nuclear Regulatory Commission

U.S. Postal Service

U.S. Social Security Administration

STATE AND LOCAL

California High-Speed Rail Authority

Cape Cod Regional Transit Authority

Chicago Metropolitan Agency for Planning

City of Baltimore, MD

City of Boston, MA

City of Cambridge, MA

City of Chicago, IL

City of Colorado Springs, CO

City of Flagstaff, AZ

City of Los Angeles, CA

City of New York, NY

City of San Francisco, CA Municipal Transportation Agency

City of St. George, UT

City of Stockton, UT

City of Washington, DC

Delaware Department of Transportation

Fairfax County Department of Transportation

Houston-Galveston Area Council, TX

Illinois State Board of Education

Lower Manhattan Development Corporation

Manchester-Boston Regional Airports

Maryland State Highway Administration

Massachusetts Bay Transportation Authority

Massachusetts Department of Transportation

Massachusetts Port Authority

Metropolitan Transportation Authority Bus Company, NY

Metropolitan Washington Council of Governments

Miami International Airport

New York State Department of Transportation

New York State Energy Research and Development Authority

New York State Thruway Authority

North Carolina Department of Transportation

Orange County Transportation Authority

Oregon Department of Transportation

Pennsylvania Department of Transportation

Pitkin County, CO

Port Authority of New York & New Jersey

State of Arizona

State of California

State of Delaware Department of Transportation

State of Florida Department of Transportation

State of Georgia

State of Maine

State of New Mexico

State of Maryland

State of Washington

Town of Southampton, NY

Tri-County Metropolitan Transportation District of Oregon

Washington Metropolitan Area Transit Authority

INTERNATIONAL

AirServices Australia

Civil Aviation Authority, UK

COCATRAM (Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama)

Defence Science & Technology Laboratory (UK)

DFS Deutsche Flugsicherung GmbH

Dutch Ministry of Transport

International Civil Aviation Organization

Japan International Transport Institute

NAV CANADA

Province of Ontario, Canada

Transport Canada

United Kingdom Ministry of Defence

World Bank

ACADEMIA

Harvard University, John F. Kennedy School of Government

Medical College of Wisconsin

Pennsylvania State University

Rutgers University

University of Alabama

University of Florida

University of Maryland

University of South Florida

University of Wisconsin

Wake Forest University Health Sciences

Wentworth Institute of Technology

Wright State Applied Research Corporation

NON-PROFIT

Alliance of Automobile Manufacturers

American Association of State Highway and Transportation Officials

American Concrete Pavement Association

American Public Transportation Association

Columbia River Pilots

Columbia River Regional Maritime Security Coalition

Maureen & Mike Mansfield Foundation

National Academy of Sciences

National Association of City Transportation Officials

National Motor Freight Traffic Association, Inc.

The MITRE Corporation

Woods Hole, Martha's Vineyard and Nantucket Steamship Authority

COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS

Astronics DME Corporation

Cisco Business Systems/Internet Business Solutions Group

Federal Express

Her Majesty The Queen In Right of Ontario as Represented By the Minister of Transportation

Hewlett-Packard Company

Kollsman, Inc.

Massachusetts Institute of Technology

University Research Foundation, Maryland Advanced Development Laboratory

Rockwell Collins, Incorporated

Silicon Graphics Federal Incorporated

Tufts University

U.S. Department of the Interior National Park Service; Cape Cod National Seashore; Wentworth Institute of Technology; Electric Transit Vehicle Institute

University of Massachusetts Amherst

U.S. Department of Transportation

50 YEARS

Volpe National Transportation Systems Center

1970 – 2020

TRANSPORTATION INNOVATION FOR THE PUBLIC GOOD

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The U.S. Department of Transportation (U.S. DOT) established the Transportation Systems Center (TSC) in 1970 to serve as a federal resource positioned to provide world-renowned, multidisciplinary, multimodal transportation expertise on behalf of U.S. DOT operating administrations, the Office of the Secretary and other federal and non-federal organizations. For fifty years the Volpe Center 's extensive cross-modal partnerships have led to innovative solutions that advance national and global transportation systems for the public good in steps with the nation's strategic transportation goals and the priorities of the Secretary of Transportation. In 1990, the TSC was renamed in honor of John A. Volpe, former U.S. Transportation Secretary and governor of Massachusetts.

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