

## ADS-B Program Enables NextGen Air Transportation

The Federal Aviation Administration's (FAA) Automatic Dependent Surveillance-Broadcast (ADS-B) Program is targeted at significantly improving the safety and efficiency of the U.S. commercial and general aviation enterprise. ADS-B involves digital messages transmitted by aircraft to radio stations as well as other aircraft. Radio stations also broadcast radar, weather, and other data from the National Airspace System (NAS) to create a robust aviation information network. ADS-B is one of two existing major programs that will enable the Next Generation Air Transportation System (NextGen).



Atlantis, is a floating oil and gas production facility operated by British Petroleum in the Gulf of Mexico and the site of an ADS-B VHF Communication Radio Transceiver as well as an Automated Weather Observation System Station. (Volpe Center photo)

The FAA Surveillance and Broadcast Services Office manages the implementation of ADS-B, establishes standards and rules for aircraft and ground equipment systems, and manages the development of radio stations and their integration into the NAS. The Volpe Center provides key support to the FAA by performing technical tasks and managing a team of 120 engineers, operational specialists and analysts.

Volpe Center engineers developed and maintain the Midwest Prototype ADS-B system that is being used to obtain initial measures of ADS-B benefits as well as reduce the risk of the ADS-B system deployment. The Volpe Center is demonstrating that ADS-B provides controllers with surveillance information that supports current separation standards in the enroute areas.

The Volpe Center also leads the program's information and physical security work. Initial ADS-B application regions demonstrate new operational capabilities. In the Gulf of Mexico, the Volpe Center was instrumental in the selection of and negotiation for deployment sites on oil exploration and production platforms. Because radars cannot "see" across the Gulf, it has been treated as Oceanic airspace with aircraft separation minimums of 10 to 15 minutes. With ADS-B radio stations located on petroleum platforms, separations of 1 to 2 minutes will be achieved.

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## COI Spotlight—Communications, Navigation, Surveillance (CNS) and Traffic Management Systems

We continue our series COI Spotlight, which provides an overview of each new Center of Innovation (COI) within the Volpe Center. Featured this month is the Communication, Navigation, Surveillance and Traffic Management Systems COI.

The Communication, Navigation, Surveillance and Traffic Management Systems COI maintains a staff of internationally recognized experts in the areas of communication, navigation, surveillance, and operations management, as well as information technology associated with these fields. It applies its expertise in these disciplines to enhance the capacity, safety, and security of next-generation transportation systems, principally the Next Generation Air Transportation

### Centers of Innovation

- **Multimodal Systems Research and Analysis**
- **Safety Management Systems**
- **Environmental and Energy Systems**
- **Freight Logistics and Transportation Systems**
- **Physical Infrastructure Systems**
- **Communication, Navigation, Surveillance (CNS) and Traffic Management Systems**
- **Human Factors Research and System Applications**
- **Advanced Vehicle and Information Network Systems**

System (NextGen). It serves as a focal point on Positioning, Navigation, and Timing (PNT) systems engineering for the civil community and fosters interagency coordination efforts.

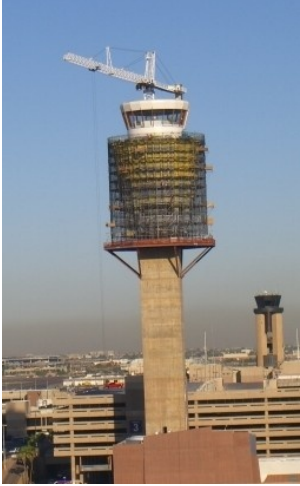
The prime focus of the Communication, Navigation, Surveillance and Traffic Management Systems COI is in support of the Federal Aviation Administration (FAA) in a myriad of programs to enhance the safety, efficiency, and operations of aviation. The COI's robust portfolio of projects includes:

- FAA Automatic Dependent Surveillance-Broadcast (ADS-B) Program, a satellite-based navigation component of the NextGen.

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## COI Spotlight *Continued*

- FAA Wake Turbulence Program, aimed at reducing the impacts of wake vortices on aircraft separation standards and on closely-spaced parallel runways.

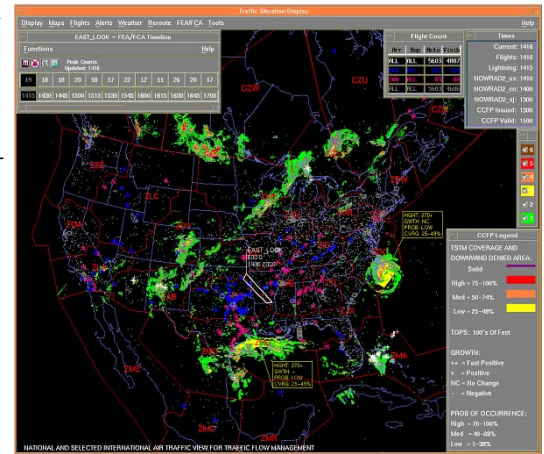


Volpe Center was vital to the construction of the new tower at Phoenix Sky Harbor International Airport. (Photo courtesy of FAA).

- FAA Traffic Flow Management (TFM) Program focused on developing tools, techniques, and future innovations throughout the U.S. aviation system.
- Prototype NextGen surface management

systems implementations at international airports in New York, Orlando, FL, and Memphis, TN.

- Loran and GPS feasibility study examining merging the technologies into a tracking system in the urban and maritime environments.
- Construction support for FAA Terminal Facilities' airport traffic control towers (ATCT) construction and terminal radar approach control facilities at Dayton and Columbus, OH, Reno, NV, Sacramento, CA, and Gulfport, MS.
- Civil lead to develop an evolutionary path for government-provided PNT systems and services aimed at increasing efficiency and effectiveness.
- Implementation of Low Cost Ground Surveillance systems at Manchester, NH, West Palm Beach, FL, and San Jose, CA International Airports.



Developed and deployed by the Volpe Center, the Enhanced Traffic Management System (ETMS) is a mission-essential FAA system. (Volpe Center Image)

- ATCT safety risk management support to projects in Memphis, TN, New Orleans, LA, Charlotte, NC, and Morristown, NJ.

## Future Plastics and Composite-Intensive Vehicles Increase Fuel Efficiency

In order to promote the development of more fuel efficient vehicles that do not compromise safety, Congress directed the National Highway Traffic Safety Administration (NHTSA) to “examine the possible safety benefits of lightweight plastic and composite intensive vehicles (PCIVs).” NHTSA engaged the Volpe Center to explore this topic by working with other vehicle safety stakeholders in the government

and private sector to identify, summarize and evaluate the existing knowledge base and determine additional research needs and priorities to accomplish this goal.

Initial studies led to the release of a Center-authored report in 2007, *A Safety Roadmap for Future Plastics and Composite Intensive Vehicles (PCIVs)*, posted at [Safety Roadmap](#). The report covers research needs for the next fifteen years. It also identified a number of potential collaborators in this research, including the American Chemical Council-Plastics Division (ACC-PD) and the United States Council for Automotive Research (USCAR) FreedomCar Partnership Automotive Lightweight Materials R&D Consortia, as well as standards-setting organizations such as the Society of Automotive Engineers and the American Society for Testing and Materials.

and milestones necessary for assessing the crash-worthiness of PCIV materials, and refined the potential safety challenges and opportunities of using additional lightweight materials in vehicles.

The summary and proceedings of this workshop are now available online at [PCIV Proceedings](#). A key conclusion was that “safety research for future PCIVs must be strategically focused on providing adequate tools and data to the automotive industry to allow them to confidently design and produce economically viable commercial light and fuel-efficient vehicles with crash safety performance equivalent to or better than today’s vehicles. The most basic element of this research will require enhancing the understanding of relevant crash environment material failure mechanisms and their interactions.”



Dr. Aviva Brecher, right, led Center efforts to develop a research agenda for the safety of next generation lightweight fuel efficient vehicles. The PCIV safety research project team also includes Samuel Toma and Dr. John Brewer. (Volpe Center photo)

In August 2008, the Volpe Center hosted a workshop with attendees from the U.S. DOT and the broader stakeholder community. Participants identified knowledge gaps and developed a consensus on research and technology priorities, discussed the metrics

Ongoing research is addressing the knowledge gaps identified by the Roadmap. Drs. Aviva Brecher and John Brewer of the Volpe Center collaborated with NHTSA to prepare a paper on this project for presentation at the International Enhanced Safety of Vehicles Conference in Stuttgart, Germany this summer.



## Study Aims to Improve Transit on Long Island

In response to a suggestion by the local transportation advocacy group, Five Towns Rural Transit (5TRT) for enhanced transit service in eastern Long Island, local town officials from Southampton, East Hampton, Riverhead, Southold and Shelter Island jointly commissioned the Volpe Center in 2007 to analyze options to improve regional bus and rail service in the. The Long Island Rail Road (LIRR) provides commuter rail service connecting the region with western Long Island and New York City and Suffolk County Transit provides local bus and paratransit service.

The resulting feasibility study includes two concepts. The first, termed the “coordinated rail-bus concept,” is based on a significantly expanded local bus network connecting to local rail stations. A number of train

stations would need to be reopened or upgraded, and a significant number of new buses procured. Total concept cost could reach \$175 million. The second concept, which is less expensive, would phase in upgrades and service expansions based on the growth of demand. Point-to-point bus service would be emphasized and rail service would be improved within the constraints of the existing rail infrastructure.

On Friday, April 17, a local state assembly representative hosted a forum in Riverhead to discuss the report’s findings. Volpe Center staff presented the two alternative concepts prior to public comment and a panel discussion. Significant interest was expressed in the coordinated bus-rail concept as a long-term outcome. The Volpe Center will continue its analysis in concert

with the local community including a review of environmental issues and a proposed management structures for the service.



A typical Long Island Rail Road commuter rail platform, Southold Station. (Volpe Center Image)

## Alternative Fuel Trams for National Wildlife Refuges

As part of its mission to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people, the Department of the Interior’s U.S. Fish and Wildlife Service (USFWS) is interested in expanding the use of low environmental impact and alternative fuel tram vehicles at some of its 550 national wildlife refuges. Leveraging funds made available through the Federal Transit Administration’s Transit in the Parks (TRIP) program, USFWS headquarters, in coordination with its Region 5 office and the Patuxent Research Refuge in Maryland, asked the Volpe Center to conduct a technical and market study of hybrid, alternative fuel, and low environmental impact tram vehicles.



An all-electric, open-air tram at the Patuxent Research Refuge. (Photo Courtesy Steve Noyes, USFWS)

Since 1994, the Patuxent Research Refuge has successfully maintained and operated an all-electric open-air tram to provide interpretive tours. In addition to producing zero-emissions, some of the tram’s characteristics that are attractive to staff at other refuges and federal lands include:

- Carry approximately 40 riders
- Operate at low noise levels
- Meet ADA-accessibility guidelines
- Ability to drive at slow speeds
- Provide short-haul service, yet be able to carry significant loads
- Operate on a variety of unpaved surfaces
- Can be stored for several months during off-seasons without degradation
- Have appropriate systems to host interpretive tours (PA systems, seating, lighting)

The study, which will incorporate both a technology assessment of existing products and a market assessment of potential procurements, began in September 2008. The technology assessment includes four major steps. First, develop “typical operating environments” that represent the varied

regional conditions in which an USFWS tram would operate. Second, compile a catalog of suitable existing tram vehicles and components (propulsion systems, batteries, suspensions, chassis, etc.). Third, assess these products against one another in order to determine whether to proceed by procuring an existing vehicle, creating a customized vehicle from existing components, or developing a new, specialized vehicle suitable to the USFWS environment. Finally, develop “technical considerations” to guide the potential development of a new vehicle.

The market assessment will review the low-environmental impact tram vehicle needs of the other Federal Lands Management Agencies (FLMAs) and assess their current tram vehicle fleets as well as the future fleet plans. It will compile the FLMAs’ desired low-environment impact vehicle characteristics and determine how best to meet their needs (procure existing vehicles, custom-build vehicles from existing components, or design a new vehicle). The market assessment will feature activities like telephone discussions, data analysis, and a Webinar during which field staff can share information and discuss their needs. Study findings and results will be available in summer 2009.

## Volpe Center Honored at FRA's 35<sup>th</sup> Annual Awards Ceremony



The Volpe Center has a long history of supporting FRA programs that impact commercial and passenger rail. (Volpe Center photo)

The Federal Railroad Administration (FRA) recognized the Volpe Center's contributions to several FRA teams at the organization's 35th Annual Awards Ceremony held recently at U.S. Department of Transportation headquarters in Washington, D.C.

Stephanie Markos and David Tyrell of the Physical Infrastructure

COI and John Pollard of the Human Factors Research and System Applications COI were recognized for their efforts on the FRA Passenger Equipment Emergency Systems Rulemaking Team. The team performed exemplary legal and technical work leading to the agency's final rule on passenger emergency response.

Robert Adduci of the Physical Infrastructure Systems COI was recognized for his exceptional contributions to efforts of the Utah Transit Authority's (UTA's) FrontRunner Commuter Rail Start-Up Team. The team assisted UTA in addressing safety issues and establishing risk reduction programs prior to launching Front Runner in revenue service.

Fred Mottley of the Physical Infrastructure COI was recognized for his key contributions to the FRA's Railroad Safety Advisory Committee's Door Safety Task Force Team that audited the safety features of passenger side doors on several U.S. passenger rail properties, enhancing FRA's work on Passenger Equipment Safety Standards.

Michael Coltman and Jeffrey Gordon of the Physical Infrastructure Systems COI received awards for their contributions to the FRA

Research and Project Development Team that developed and implemented the Office Research and Development project selection process, enabling the rating and ranking of candidate R&D projects to achieve maximum safety benefit of the R&D portfolio.

Drs. Jordan Multer and Joyce Ranney of the Human Factors Research and System Applications COI and Rachel Barolsky of the Multimodal Systems Research and Analysis COI were recognized for their leadership of the FRA Risk Reduction Program Team that will develop a National framework that promotes the adoption of innovative risk reduction methods to improve railroad safety and enhance safety culture.

## Building Partnerships to Educate and Empower



Children of Volpe Center employees pause for a picture during "Take Our Sons and Daughters to Work Day". The children were treated to a fun day at the Center where they learned about their parents' exciting transportation work. (Volpe Center picture)


## Volpe Center Highlights

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