

HIGHLIGHTS

Volpe Supports NextGen, Air Space Systems Research

The Volpe Center has entered into an agreement with National Aeronautics and Space Administration (NASA) Ames Research Center to support the Next Generation Air Transportation System (NextGen) and the Airspace and Airportal projects. NextGen was enacted in 2003 under the VISION 100—Century of Aviation Reauthorization Act. This work complements the Volpe Center’s ongoing support to the Federal Aviation Administration’s (FAA’s) NextGen efforts.



NextGen conceptual image.
(Courtesy of FAA)

The Volpe Center and other NextGen project participants from the Departments of Defense, Homeland Security, and Commerce, as well as the FAA, NASA, and the White House Office of Science and Technology in the development of NextGen. The Volpe Center team will provide technical expertise and collaboration with the Ames and Langley Research Centers and NextGen team experts to develop nominal and off-nominal scenarios

for use in modeling and simulations of current National Airspace System and NextGen concepts.

Volpe Center experts will aid in developing new operational scenarios, based on a common set of external factors representing:

- Identification and classification of existing operational scenarios including those developed by NASA and the Joint Planning and Development Office, which coordinates specialized NextGen efforts of federal agencies.

- The air transportation system of today as well as NextGen.
- All phases of flight and ground operations.
- Nominal and off-nominal conditions.

Volpe Center expertise will also contribute to the review of NextGen air traffic management airborne and surface concepts and the performance of system evaluations, benefit analyses, and safety assessments to ensure the most efficient and safest air transportation system possible.

IN THIS ISSUE

- 2 **Volpe Center Supports Alternative Fuels Initiatives**
- 3 **Tools for Assessment of Environmental Effects of Aviation**
- 3 **Agreement with the Netherlands Renewed**
- 3 **Volpe Center Hosts Career Open House**
- 4 **Volpe Center Goes Green!**

COI Spotlight—Environmental and Energy Systems

In this issue of *Highlights*, 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 Environmental and Energy Systems COI, headed by Director Gregg G. Fleming.

New policies and technological innovations relating to minimizing the dependency on petroleum are needed to improve the way that people and goods move around the country and the world and to reduce our nation’s carbon footprint. With energy independence at the forefront, our future transportation enterprise will need to efficiently and cost-effectively accommodate new energy-saving technologies. Our transportation system will also need to minimize greenhouse gas emissions and be prepared for the potential impacts of climate variability and climate change.

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**

The Environmental and Energy Systems COI provides technical and analytical support for decision-making at all levels of government and industry in three main areas:

- Transportation-related environmental and energy policies, primarily concerning climate variability, air, noise, and environmental compliance, engineering and remediation, and hazardous materials.
- The role of transportation in achieving energy independence both as a consumer of energy and as the critical element in the energy supply chain.
- R&D capabilities supporting all modes of transportation and other Volpe Center COIs.

The cutting-edge knowledge and hands-on expertise of the world-class COI staff provide

Continued on p.2

COI Spotlight—Environmental and Energy Systems Capabilities

clients with the tools to envision the future of energy and transportation more clearly and to evaluate future program applications.

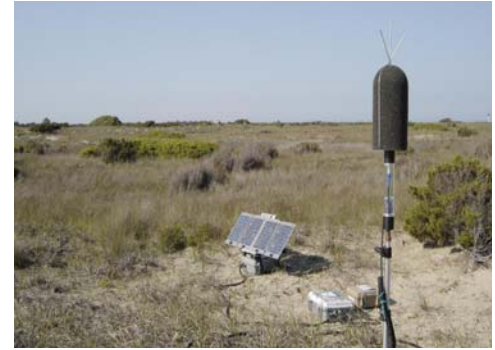
COI clients include the FAA, the National Highway Traffic Safety Administration (NHTSA), the Federal Highway Administration (FHWA), the Environmental Protection Agency (EPA), the National

The Volpe Center maintains a staff of internationally recognized experts in environment and energy poised to support the new administration on initiatives related to fuel efficiency standards, green technologies, and carbon neutral growth.

– Gregg G. Fleming, Director
Environmental and Energy Systems
COI

Park Service (NPS), NASA, the Research and Innovative Technology Administration (RITA), the Federal Motor Carrier Safety Administration (FMCSA), and the U.S. Coast Guard (USCG). The COI's robust portfolio includes projects in areas such as:

- U.S. and international aviation system: provide NextGen support for FAA and NASA and international policymaking support within the International Civil Aviation Organization (ICAO).
- Alternative fuels technologies: developed the alternative fuels road-map to provide strategic guidance to U.S. DOT on the transportation implications of natural gas, hydrogen, biomass, and electricity.
- Corporate Average Fuel Economy (CAFE) standards to regulate and increase the average fuel economy of cars and light trucks sold in the U.S.: developed the CAFE Compliance and Effects Modeling System, which calculates fuel savings and compliance costs.
- Highway traffic noise: researched quiet pavement materials and developed the Traffic Noise Model software to predict highway noise as a resource for highway noise barrier design.
- Environmental assessments and impact statements: researched and wrote Air Tour Management Plans to mitigate adverse impacts on NPS natural and cultural resources;



Noise measurement equipment used in the development of Air Tour Management Plans. (Volpe Center photo)

researched mercury contamination mitigation as well as environmental impacts associated with commercial motor vehicle collisions.

- Environmental remediation and cleanup: managed large-scale environmental cleanup operations for a top-priority EPA superfund site.
- Environmental and marine engineering and naval architecture: provided engineering, logistics, acquisition and program management for the decommissioning of the nuclear ship *Savannah*, including decontamination and remediation programs.

Volpe Center Supports Biomass Board, U.S. DOT Alternative Fuels Initiatives

The Federal Biomass Research & Development (R&D) Board, a congressionally mandated interagency organization, tasked the U.S. DOT with organizing a Federal Biofuels Distribution Infrastructure Interagency Working Group (DI-IWG) to evolve bio-based fuel production technologies and processes in accordance with the Board's National Biofuels Action Plan (BNAP).

The Volpe Center assembled the DI-IWG, which includes over 40 participants from across the Federal government, to research impediments to biofuels transport from the point of domestic production to the point of retail sale. The Volpe Center led three key areas of study on behalf of the DI-IWG: 1) assessment of the feasibility of pipeline use for biofuels transport; 2) identification of short- and long-term multimodal infrastructure bottlenecks inhibiting biofuels development; and 3) documentation of existing Federal Geographic Information Systems (GIS)-based assets that may better

link transportation infrastructure, biofuels demand, and resources such as feedstock and water. Volpe Center experts reported DI-IWG efforts to the Biomass R&D Board in December 2008.

Recently the Volpe Center supported the U.S. DOT's and RITA's leadership of national and international industry committees and working groups, including the Hydrogen Technical Advisory Committee, the Rail Energy Transportation Advisory Committee, the Federal Interagency Working Group on Alternative Fuels, the International Partnership for a Hydrogen Economy Regulations, Codes, and Standards subcommittee, and many others.

In addition to thought leadership activities, the Volpe Center supported the highly successful Hydrogen Drive 2008 in Sacramento, California. The event enabled local and national media and other interested parties to experience hydrogen powered

vehicles from major automotive manufacturers in real-world operation.

The event was followed by Hydrogen Road Tour 2008, a 13-day, 31-stop event covering 18 states from Maine to California. The road tour included nine different original equipment manufacturer vehicles, which were driven cross country to increase awareness of hydrogen-powered vehicles. The Volpe Center provided planning, logistics support, and staffing for this event.



The Hydrogen Road Tour 2008 stops at the Volpe Center. (Volpe Center photo)

Agreement with the Netherlands Renewed



Dr. Richard John, Director Emeritus and Acting Director of the Volpe Center, and Mr. Joris Al, Director of the Centre for Transport and Navigation (DVS), renewing the Agreement for Collaboration; a forum for the exchange of information between the Volpe Center and DVS on topics of mutual interest and for facilitating partnerships on future projects. The Agreement was signed in January 2009, during a workshop hosted by the Royal Netherlands Embassy in Washington, D.C. on overcoming barriers to developing major inter-regional transportation projects in the U.S. and the Netherlands. William Lyons, of the Volpe Center's Transportation Policy, Planning and Organizational Excellence Division, and Max Klok, of DVS, planned the workshop. (Volpe Center photo)

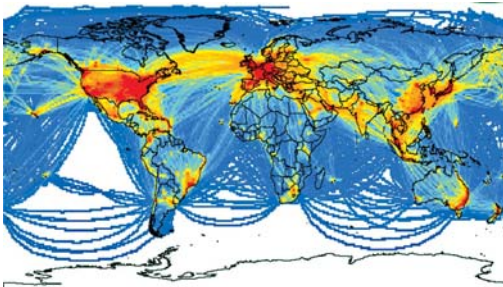
Volpe Center Hosts Career Open House



On February 11, the Volpe Center hosted a Career Day Open House promoting student coop and internship opportunities as well as entry and professional level positions. Volpe Center staff from throughout the COIs were on hand to speak with job-seekers. Staff gave live demonstrations of their work to provide a flavor of the Volpe Center's diverse portfolio of projects that support DOT strategic goals. The event was a huge success with over 80 visitors participating in the fair. (Volpe Center Photo)

New Tools Support Integrated Assessment of Aviation Environmental Effects

In its December 2004 Report to Congress on "Aviation and the Environment," the FAA recommended that "The Nation should develop more effective metrics and tools to assess and communicate aviation's environmental effects. The tools should enable integrated environmental and economic cost/benefit analysis ...". A major part of responding to this mandate is the development of a comprehensive suite of software tools that will allow for a thorough integrated assessment of the environmental affects of aviation and improved estimates of fuel burn. Launched in 2005, the FAA began a multiyear effort, which will result in the development of an



Global CO₂ Emissions from commercial aviation. (Volpe Center image)

entirely new suite of tools, including the Aviation Environmental Design Tool (AEDT). The public release of AEDT is slated for 2011.

The Volpe Center leads the management, design, development and integration of AEDT, which will replace existing aviation noise, emissions, and pollutant dispersion computer-modeling tools of the FAA's Office of Environment and Energy. AEDT is capable of providing comprehensive environmental analysis of the aviation system as well as estimates of tradeoffs and interdependencies associated with technical, operational and policy options designed to reduce aviation environmental impacts. The tool is currently being used to support environmental analyses for the Next Generation Air Transportation System (NextGen) and ICAO's Committee on Aviation Environmental Protection (CAEP). Upon release, it is planned that AEDT will be the centerpiece of an unprecedented broader suite of environmental consequence and cost benefit tools to be used to support the development of

NextGen and associated U.S. environmental policy changes.

The Volpe Center developed a new method to compute fuel burn for Boeing aircraft, using the Boeing Climb-Out Program. This method improves fuel-burn modeling in the terminal area compared with actual airline-reported fuel-burn data. Work has begun to expand the aircraft fleet coverage of the database and implement the new terminal area fuel-burn method into AEDT for use in FAA, NextGen, Atlantic Interoperability Initiative to Reduce Emissions, and CAEP analyses.

The FAA has set the goal of identifying and analyzing uncertainties of source-data algorithms and assumptions for each core computational AEDT module, including Aircraft Acoustics, Aircraft Emissions, Aircraft Performance, Ground Emissions, and Fleet and Operations. The process used in the first round of assessment will serve as a template for future module-level assessments, with the ultimate goal of evaluating the entire integrated system.

Volpe Center Goes Green! Initiatives Underway on Campus

The Volpe Center recently achieved a number of “greening” initiatives, particularly in energy efficiency and recycling. Through recycling information campaigns, installation of recycling receptacles in hallways, conference rooms, and common areas, and a campus-wide clean-up event, the Volpe Center “Green Team” has fostered a culture of recycling and reuse.

Last year, the Volpe Center’s recycling rate for paper, plastic, glass, and aluminum increased from 2 percent to over 40 percent. The more than 60 tons of total recyclables the Volpe Center diverted from landfills represents 900 trees saved and conservation of 370,000 gallons of water and 185 metric tons of



The “fruits” of the Volpe Center staff labors at the May 2008 campus-wide clean-up day. (Volpe Center photo)

CO₂ emissions—the equivalent of emissions from 42 automobiles.

Recently, a program has begun to compost yard waste and recycle “hard-to-recycle” items, such as recordable media and computer peripherals. The Green Team is also conducting a comprehensive waste audit to identify additional waste-reduction opportunities and provide

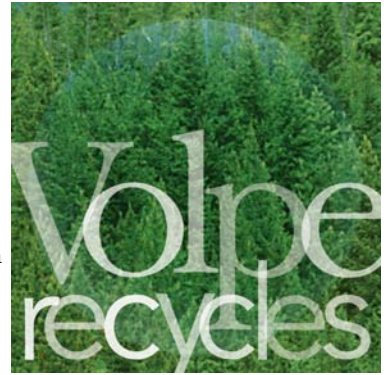
tailored training to facilities staff and contractors.

The Volpe Center also engaged NSTAR in an energy audit to identify additional opportunities for energy conservation. While the audit team determined that the Volpe Center’s energy consumption is better than that of 75 percent of contemporary buildings, the audit report highlighted many recommendations to further increase energy conservation at the Center. In addition

to the excellent progress in recycling, reduction and conservation, the Green Team is also pursuing a rigorous environmental performance improvement process through the U.S. Green Building Council (USGBC).

The Volpe Center has registered for certification in USGBC’s Leadership in Energy and Environmental Design (LEED) for excellence in operations and maintenance. LEED is a third-party certification program and is the nationally accepted benchmark for the design, construction and operation of high performance green buildings. LEED certification requirements will help the Volpe Center meet and exceed Federal facility requirements and include attaining an ENERGY STAR building/campus rating of 65, reducing potable water consumption by 20 percent, and recycling at least 50 percent of consumable materials.

Before the Volpe Center can apply for LEED certification, much work must be done to incorporate “green” best practices for facilities management ranging from indoor air quality to environmentally beneficial procurement practices. Full implementation is expected by as early as fall 2010, in time for the Volpe Center’s 40th Anniversary. This is well ahead of the 2015 deadline mandated by the Federal government.



Did You Know...

Recycling one ton of paper saves:

- 17 trees
- 160+ gallons of oil
- 7000 gallons of water

Source: U.S. Environmental Protection Agency Waste Reduction Model (WARM)


Volpe Center Highlights

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