

VOLPE HIGHLIGHTS



U.S. State Department Taps Volpe Expertise to Improve Iraqi Railways



Sunset near a 180-foot tower in Khuder, Iraq. (Volpe Project File)

"I was part of a transportation security convoy in the middle of Baghdad. There were sirens and flashing lights all around me as we traveled to the Iraq Railway's Central Station. When I looked up at the helicopter above me, I saw a soldier with a machine gun pointed out the window providing the convoy with extra security."

James Lamond, Engineer and Team Leader for the Iraqi Republic Railways project

JIM LAMOND, PROGRAM MANAGER/CIVIL ENGINEER, visited Iraq prior to his retirement this fall to see first-hand how Volpe's work played a critical role in the implementation of the Iraq Railway's new train control system. This state-of-the-art system makes Iraq's railway network safer and more efficient, as it facilitates the rapid movement of goods, people, and raw materials throughout the country.

Dispatchers can track and control movements throughout the entire railway network, and railroad operators know the exact position of every train with significantly greater accuracy.

The U.S. State Department came to the Volpe Center in 2006 for its expertise in rail and transportation systems. Volpe was asked to provide assistance to the U.S. Department of Transportation Attaché Office in Iraq with the design and installation of the communication infrastructure, which was to serve as the backbone for the Iraq Railway train control system. The Volpe Center's engineers were asked to provide project management, leadership, and technical expertise. Volpe acquisition professionals awarded a multi-million-dollar support contract to assist the Volpe Center in performing specific work for this effort.

Building a communication system throughout Iraq during a very turbulent time period presented a unique set of challenges for the Volpe team. Jim Lamond and his team overcame

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Public Launch Slated for New Aviation Environmental Tool

THE FEDERAL AVIATION ADMINISTRATION (FAA) and Volpe are poised to launch a new environmental analysis tool that will offer a robust, integrated way to quantify the environmental impact of aviation—from a single flight up to full-scale global impacts.

The FAA's Office of Environment and Energy will begin in early 2012 its phased public rollout of the Aviation Environmental Design Tool (AEDT), a software system that dynamically models flight, taking into account the aircraft weight, performance characteristics, and weather conditions, and calculates the resulting noise, air quality, greenhouse gas emissions, and fuel burn. This capability will allow users to analyze the trade-offs between noise, fuel burn, and emissions, and quantify the environmental impact of changes in a flight's trajectory or an engine's design.

"The reality is, there are environmental tradeoffs in aviation, and AEDT will, for the first time, provide the analyst with a means of understanding these tradeoffs in a robust, meaningful way," said Gregg Fleming,

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Iraqi tower construction. (Volpe Project File)

the challenges one might expect from a project being conducted in a war zone almost 6,000 miles from Cambridge, MA, such as language barriers, understanding local customs, ensuring security, and frequent Embassy personnel changes.

Coordinating meetings was an unexpected challenge since the meetings could not take place in Iraq and translators were required for every meeting. The Volpe Center staff facilitated these meetings in Jordan and Turkey. U.S. Embassy staff, Iraq Railway employees, and contractors were brought together frequently to discuss how to resolve issues in a timely manner.

The construction team had a difficult time physically traveling throughout the country, and the movement of equipment and

materials was often delayed. There were 33 construction sites and each had its own set of engineering and security issues, which had to be resolved. For example, during the tower construction, unexpected high water tables were encountered, requiring extensive de-watering. In addition, there is no “dig safe” database in Iraq; therefore, utility pipes were often discovered and had to be relocated.

Unique to this project was the way the workmanship was verified. Since the microwave communication shelters and tower components were built in the United States, the Volpe team had to inspect and test all of the materials prior to shipping them to Iraq. Training on the system was done outside of Iraq and often required bringing Iraq Railway personnel to the United States.

The Digital Microwave Radio Communication Network system that Volpe helped design and install is 1,100 kilometers in length and consists of microwave radio base stations equipped with microwave antennas. There are 33 transmission towers (ranging in height from 180 to 360 feet) and telecommunication equipment shelters and an auxiliary power system at each tower site.

The microwave system transmits the voice and data for the train control system that provides each locomotive a movement authorization from the dispatcher. These authorizations allow the train to move between stations at a specific speed. If the locomotive driver violates the limits of the authorization, the on-board computer will stop the train. Besides the on-board computer, the system consists of a centralized dispatching office, a digital track database depicting the Iraq Railway track system, and programmable track tags, which are read by passing locomotives and provide exact data locations to the dispatching office for each train. With this system now fully operational, more trains are able to move around simultaneously and additional people can safely travel throughout the country. The result: increased economic growth for the country. ■

Recently Published Reports

Connected Vehicle Environment : Governance Roundtable Proceedings from June 20, 2011

Matthew Cuddy, Michael Kay, Anita Kim, Valerie Kniss, Terrance J. Regan, Suzanne M. Sloan
August 2011 | Report no. FHWA-JPO-11-129

Integrated Vehicle-Based Safety Systems (IVBSS) Light Vehicle Field Operational Test Independent Evaluation

Emily Nodine, Andy Lam, Scott Stevens, Michael Razo, Wassim Najm
October 2011 | Report no. DOT-VNTSC-NHTSA-11-02

Quieter Cars and the Safety of Blind Pedestrians, Phase 2 : Development of Potential Specifications for Vehicle Countermeasure Sounds

Aaron Hastings, John K. Pollard, Lisandra Garay-Vega, Mary Stearns, Catherine Guthy
October 2011 | Report no. DOT-VNTSC-NHTSA-11-04.

Shenandoah National Park Traveler Information Coordination Study

Kenneth Miller, Kathleen Sylvester
August 2011 | Report no. DOT-VNTSC-NPS-11-22.

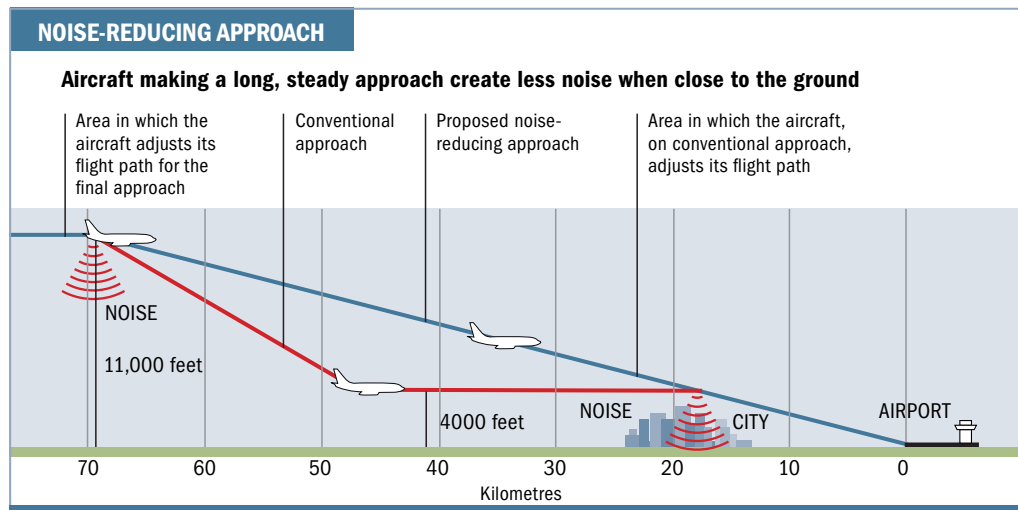
Technical Criteria and Procedures for Evaluating the Crashworthiness and Occupant Protection Performance of Alternately Designed Passenger Rail Equipment for Use in Tier I Service

Michael Carolan, Karina Jacobsen, Patricia Llana, Benjamin Perlman, David Tyrell
October 2011 | Report no. DOT/FRA/ORD-11/22

White Mountain National Forest Alternative Transportation Study

Alex Linthicum, Charlotte Burger, Larry Garland, Benouni Amsden, Jacob Ormes, William Dauer, Thaddeus Guldbrandsen
September 2011 | Report no. DOT-VNTSC-USDA-11-01

Public Launch Slated for New Aviation Environmental Tool (continued from page 1)



In conventional landings, airline pilots descend and level off in stages as they approach an airport. However, in continuous descent arrivals, pilots throttle back to idle power at the point of initial descent and glide into an airport, burning less fuel and creating less noise and emissions in the process. AEDT provides the capability for the first time to be able to analyze the benefits of continuous descent arrivals.

director of Volpe's Center for Environmental and Energy Systems. Volpe is the lead AEDT developer, functioning as the system architect and integrator of all modules and related databases. "As the FAA moves towards NextGen, it is critical to be able to accurately quantify fuel burn changes associated with various NextGen initiatives, and AEDT provides that capability," Fleming said.

Part of a broader suite of FAA analysis tools, AEDT is used by the U.S. Government and supports domestic decisions related to NextGen, as well as international policymaking within the International Civil Aviation Organization.

In its ability to capture the gate-to-gate, integrated environmental impacts of flight, AEDT offers substantial enhancements over existing air quality and noise analysis tools, which model only individual environmental consequences (like noise or emissions) for a single airport or region. As another major advancement over legacy systems, AEDT incorporates geographic information systems, which provide the environmental analysis with a data-driven visual representation of aviation operations in concert with noise, air quality, greenhouse gas emissions, and fuel burn.

In the development of this multi-year, multi-million-dollar project, Volpe's software architects, aviation

engineers and specialists, acousticians, and emissions and dispersion modeling experts have worked collaboratively with a team of over 70 people that includes the FAA, the National Aeronautics and Space Administration (NASA), MIT, Georgia Tech, ATAC Corp., CSSI Inc., Metron Aviation, and Wyle Laboratories.

The first public version of AEDT that is slated for release in early 2012 will provide regional noise modeling capabilities. Once the full public software version is rolled out, AEDT will be used by government, industry, and academia—both nationally and internationally—with an estimated user base of 3,000-plus. ■

Volpe Team Receives Prestigious American Evaluation Association Award

VOLPE EVALUATORS working on a project to help change at-risk behavior and conditions in the rail industry received the American Evaluation Association's prestigious and highly competitive 2011 Outstanding Evaluation Award.

This award is given for the successful completion of a single evaluation project that can stand alone as an example of an outstanding, high quality evaluation. Volpe's winning team includes Joyce Ranney and Michael Zuschlag. Michael Coplen of the Federal Railroad Administration was also recognized.

The team is recognized for its evaluation of the Changing-at-Risk Behavior (CAB) safety intervention that resulted in significant day-to-day safety improvements for the Union Pacific Railroad and influenced a broader shift in safety culture in the railroad industry. The safety intervention that the evaluation studied incorporated peer-to-peer observation and feedback, safety leadership development, and continuous process improvement

"The data generated by the evaluation, and the strategically valuable findings, convinced me to try this on a larger scale," said Joe Boardman, former FRA Administrator and current President/CEO of Amtrak. "When I came to Amtrak, I initiated the 'Safe-2-Safer' program, which is modeled on the CAB approach. Safe-2-Safer is a \$14 million multi-year effort intended to improve safety and safety culture in every department across the entire company."

The American Evaluation Association is a preeminent professional association for evaluators, comprised of more than 6,500 members from every state in the United States and more than 60 foreign countries. The results of this safety evaluation have made a major impact on the rail industry. The Federal Railroad Administration, the Brotherhood of Locomotive Engineers and Trainmen, the United Transportation Union, Amtrak, and the Union Pacific Railroad have all endorsed the evaluation as outstanding. ■

Integrating Unmanned Aircraft into the National Airspace is a Complex Undertaking

THE POTENTIAL of having unmanned aircraft fly in the national airspace raises many complex safety issues. Volpe, with its deep technical expertise in air traffic control systems, has entered into a five-year agreement with Dryden Flight Research Center to assist NASA in the process of examining the safety issues surrounding unmanned aircraft integration. The key areas of focus are ensuring that unmanned aircraft can sense and avoid other aircraft and determining ways to address the potential loss of a command and control link to the unmanned aircraft.

Under the direction of Volpe Center project manager Kevin Clark, Volpe will assist NASA in analysis, requirements development, and strategic planning. A major goal of these activities is to enable effective communication between the many aviation system stakeholders to identify and mitigate technical and regulatory barriers and expand unmanned vehicle access to the national airspace without affecting safety.

Complementing this work for NASA, Volpe experts James Hill and Jason Glaneuski are assisting the U.S. Air Force in a proof-of-concept demonstration to show how existing airspace surveillance sources can be used to provide unmanned vehicle operators with a visualization

of surrounding air traffic. This will allow for self-separation maneuvers and compliance with the Federal Aviation Administration's "see and avoid" regulations.

Together, these two Volpe projects are playing a critical role to ensure that when unmanned systems begin to operate in the national airspace, safety levels are maintained. ■



Unmanned surveillance plane. (Photo courtesy of FAA NextGen Outreach Division)

Volpe's Straight from the Source Speaker Series Fosters Collaboration

<http://www.volpe.dot.gov/coi/outreach/source/index.html>

The Volpe Center is an organization that places tremendous value on collaboration. The Straight from the Source speaker series, new to Volpe last year, has proven to be a valuable tool for information exchange. Straight from the Source events are held at Volpe in Cambridge, Massachusetts, and are also accessible via webinar.

This engaging speaker series enables participants to interact with today's transportation leaders. One of the early events featured speaker Joseph F. Coughlin, PhD, founder and director of the AgeLab and director of the New England University Transportation Center at the Massachusetts Institute of Technology. Dr. Coughlin is one of the foremost experts on how baby boomer expectations and technology shape the future of public policy and drive innovation across global industries such as transportation. Another featured speaker was Matthew A. Coogan, director of the New England

An **innovation** information exchange for the transportation community

Transportation Institute, who discussed the issue of high speed rail and air travel to a standing-room-only audience. Matthew Coogan is a leading expert in the deployment of integrated multimodal mobility strategies.

These Straight from the Source events have been well-attended and are excellent venues for individuals to listen to experts and share their ideas about transportation.

For more information on recent and future exchanges, visit and bookmark the Straight from the Source webpage at:

<http://www.volpe.dot.gov/coi/outreach/source/index.html>

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