Volpe National Transportation Systems Center

Volpe Center Highlights

Cambridge, MA August 1999

Spotlight

Recently, Mr. Ross Gill, of the Advanced Vehicle Technologies Division, traveled to several sites in Russia in support of a U.S. Department of Defense (DOD) program to assess the condition of Russian railroad lines and rail cars used to transport solid-propellant missiles from storage sites to dismantling and elimination sites within Russia. The program is run by DOD's Defense Threat Reduction Agency (DTRA), Cooperative Threat Reduction (CTR) Program Office. Mr. Gill, a national and international expert in rail transportation, inspected rail facilities in Archangel, Zlatoust and Biysk, and provided DTRA with recommendations for maintenance and repair of tracks and rail cars at these sites for safe missile and propellant transport by rail. Through the CTR program, which follows the Nunn-Lugar program initiated by Congress in November 1991, Congress has budgeted $2.7 billion through fiscal year 1999. DOD provides equipment, services, and technical advice to eligible states of the former Soviet Union to assist them in eliminating (or in the case of Russia, reducing) the weapons of mass destruction remaining from the Soviet era, preventing proliferation, and dismantling the associated infrastructure. This current effort is intended to assist in the transportation of missiles as well as missile components from storage sites to dismantling and elimination sites, which are approximately two to three thousand kilometers apart. Mr. Gill's expertise was specifically requested by DTRA through an interagency agreement by which the Volpe Center supports DTRA. He has been involved with numerous railway projects in both Russia and Ukraine for the CTR program dating back to October of 1993.

Mr. Ross Gill, at extreme left, pictured with the rail inspection team at Archangel, Russia.

Director's Corner

At the April 1997 **Summit for America's Future**, President Clinton challenged us to ensure that America's least-advantaged children have an ongoing relationship with a caring adult as a mentor, tutor, or coach, and are able to develop marketable skills for 21st-century jobs. In response, U.S. Secretary of Transportation Rodney E. Slater established the **Garrett A. Morgan Technology and Transportation Futures Program** to provide students with positive incentives for attaining math, science, and technology literacy.

I am pleased that the Volpe Center has, for the past seven years, been hard at work attaining these goals through its **TEAM (Tutoring, Educating, and Mentoring) Effort**. Since 1992, the TEAM Effort has presented Volpe Center and other DOT employees and contractors with the opportunity to participate in volunteer educational outreach activities, reinforcing the Center's commitment to the Cambridge community. As we begin the eighth year of this effort, the following programs will be offered:

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Safety

Promote public health and safety by working toward the elimination of transportation-related deaths, injuries, and property damage.

Railroad Safety Tests Conducted

The Volpe Center is supporting the Federal Railroad Administration's (FRA) Office of Research and Development in the area of track buckling prevention and track stability. Dr. Andrew Kish and Mr. Andrew Sluz, of the Structures and Dynamics Division; Mr. Harold Harrison, President, and Dr. Thomas McCanney, Senior Engineer, of Salient Systems, Inc.; and Mr. Larry Doll, of the Union Pacific Railroad (UP), recently visited the UP's railroad test site outside Omaha, NE. Part of the program has been to support development of a means of monitoring axial forces and neutral temperature changes in continuous welded rail through remote sensing modules (RSM) that measure force and temperature and can be accessed by cell phone. The tests are part of a cooperative research program between FRA, Volpe, and UP; they evaluate the performance of the RSMs in high tonnage service, to track neutral temperature changes, and to monitor thermal buckling safety, as well as to add to the Volpe Center's thermal buckling database. The Center downloads rail force and temperature data twice daily. To date, the neutral temperature has dropped only slightly through the section. Lateral track movements from the RSMs have been measured throughout the day as the temperature changes, but little or no evidence of "curve breathing" (stress relaxation caused by the rail moving out as the temperature rises) has been found.

Key Participation in European Conference on Transport Psychology

Dr. Mary D. Stearns, of the Operator Performance and Safety Analysis Division, gave a presentation entitled "Implementation of a Computer Aided Dispatch/Automatic Vehicle Locator System (CAD/AVL): Response of the Bus Drivers" at the European Conference on Transport Psychology in Angers, France. The presentation identified the human factors issues which arose when a bus operator installed new technology to upgrade communication, improve safety, and provide real-time vehicle surveillance. The technology changed some work procedures and the bus drivers had difficulty learning the new communication and alarm procedures. This research illustrated the importance of consulting with the eventual users of a new technology and to facilitate their understanding of new features. Dr. Stearns also chaired a workshop session.

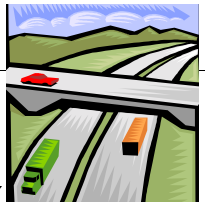
Presentation at Society of Automotive Engineers Future Technology Conference (NHTSA)

Messrs. Wassim G. Najm, Marco P. DaSilva, and Christopher J. Wiacek, of the Accident Prevention Division, presented their paper, "Safety Benefits Estimation of an Intelligent Cruise Control System Using Field Operational Test Data," at the August 1999 Society of Automotive Engineers (SAE) Future Technology Conference, held in Costa Mesa, CA. The technical paper was prepared as part of a collision avoidance research project being conducted by the Volpe Center for the National Highway Traffic Safety Administration (NHTSA). The paper provides an assessment of the potential safety benefits of an Intelligent Cruise Control system in terms of the number of rear-end crashes that might be avoided on U.S. freeways if all vehicles were equipped with such a system.

Volpe Center Supports FAA in Optimizing AMASS at 34 Airports

Recently, Messrs. Ian McWilliams, David Olster, and Brendan English, of the Airport Surface Division, performed the first optimization of the Airport Movement Area Safety System (AMASS), at Atlanta's Hartsfield International Airport. AMASS is one of a number of systems developed and evaluated under the Runway Incursion Reduction Program (RIRP); the Volpe Center's Airport Surface Division supports the FAA Integrated Product Team for Terminal Surveillance and Weather in efforts to prevent runway incursions. The Integrated Product Team, in its effort to provide safe and efficient management of air traffic, is particularly concerned with airport surface safety because of the concentration and mix of traffic. AMASS uses the Airport Surface Detection Equipment (ASDE-3) surveillance radar to provide surface (i.e., aircraft and ground vehicle) target information, which it processes to obtain and project target tracks and to alert controllers of potential conflicts. The Volpe Center has been assigned the role of optimizing the AMASS at each of the 34 airports that are scheduled to receive the system; the Atlanta effort represented the first part of the overall system optimization. The optimization process involves modifying system parameters in order to achieve a higher level of on-site adaptation and to reduce false alarms. The two-week Atlanta effort focused on optimizing the system for the follow-on Operational Test and Evaluation (OT&E). This was the first of a series of tests in order to ensure that the system is ready for operational use. This optimization effort was specific to OT&E; future system optimizations will require eight to ten weeks to complete.

Mobility



Ensure that the transportation system is accessible, integrated and efficient, and offers flexibility of choices.

Case Study Findings Presented at Western Transportation Conference

Mr. Andrew Johnsen, of the Policy and Technology Analysis Division, was a panelist at a session on interagency partnerships during the 1999 Western Association of State Highway and Transportation Officials (WASHTO) Annual Conference, held recently in Juneau, AK. During the session, Mr. Johnsen presented an overview of the findings and perspectives gleaned from a series of case studies sponsored by the Federal Highway Administration (FHWA) and recently conducted by an interdivisional team of Volpe Center staff. The case studies, which are now being published, examined the processes used in developing regional and statewide intelligent transportation systems (ITS) architectures. Other speakers among the 750 WASHTO conference participants included Alaska Governor Tony Knowles, Maritime Administrator Clyde Hart, FHWA Deputy Administrator Gloria Jeff, Washington State Secretary of Transportation Sid Morrison, American Association of State Highway and Transportation Officials Executive Director John Horsley, and several others from public and private sector transportation organizations.

Economic Growth & Trade

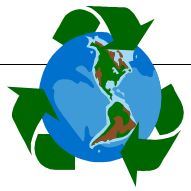
Advance America's economic growth and competitiveness domestically and internationally through efficient and flexible transportation.

Volpe Center Enhances and Operates Traffic Management System

The Traffic Management System (TMS), maintained and operated by the Volpe Center, was developed by the Volpe Center for the FAA to improve utilization of the limited capacity of the national airspace. Over the ten years that TMS has been used, Volpe Center staff have worked closely with FAA personnel to improve the tools contained in the system, such as Monitor Alert, used to provide early warning of potential areas of congestion in the airspace. Recently, the Center's staff developed a new set of improvements to Monitor Alert to permit local adaptation of the airspace, referred to as profiles. Profiles improve the modeling of flight trajectories during the ascent and descent phases of flight. Two air traffic managers from the Boston Air Route Traffic Control Center visited the Volpe Center earlier this summer. Their feedback on the new tailored profiles for Monitor Alert was extremely positive. They stated that the new tailored descent profiles raised the accuracy of modeling flights through the correct airspace sector from 80% to 95%. In addition, they are planning to provide additional profiles to raise the success rate further and may also provide tailored ascent profiles.

The Volpe Center houses the TMS "Hubsite" and operates the system 24 hours per day, seven days a week. During the month of July, the Volpe Center TMS Hubsite achieved 100% success by processing all the 125 Ground Delay Programs (GDPs) issued by the Air Traffic Control System Command Center (ATCSCC) during a month that featured an extraordinary amount of severe weather across the United States. GDPs are the most far-reaching and important traffic management tool that air traffic managers at FAA's ATCSCC in Herndon, VA, can use. GDPs are traffic management actions utilized during periods of severe weather, such as the recent national thunderstorm activity, which directly affected safety of air traffic operations. Successful execution of GDPs depends on uninterrupted TMS Hubsite operations to reallocate flight slots and departure times and to send data to FAA and airlines.

Human and Natural Environment



Protect and enhance communities and the natural environment affected by transportation.

Key Support in Developing New Aviation Data Standard

As part of ongoing Volpe Center support to the FAA's Office of System Safety, Mr. Richard Jordan, of the Automation Technology Division, recently delivered a logical data model to support the proposal of a new data standard for aircraft identification. The model indicates that a combination of make, model, and serial number provide a unique identifier for an aircraft. Also, Mr. Jordan delivered a business rules document containing data definitions and descriptions of related business rules to support the logical data model. The FAA and the International Civil Aviation Organization (ICAO) are reviewing the draft standard for use as an international data standard. A collaborative web-based tool provided by the FAA is being used to review and comment on the draft standard.

Coast Guard Research and Development Center: Comprehensive Marine Environmental Protection

In a recent meeting with the U.S. Coast Guard, staff from the Volpe Center's Environmental Engineering Division discussed a new task that requires a technology assessment of methods and equipment that could be used to eliminate aquatic nuisance species from ship's ballast water prior to discharge in U.S. ports. Volpe has been assisting the U.S. Coast Guard in analyzing and developing techniques for reducing spills of oil and other hazardous materials, and mitigating environmental damages. The Volpe Center has also been studying the effects of and control procedures for aquatic non-indigenous species that are being introduced into U.S. waters from foreign vessel cargoes and ballast water. Currently, there are no regulations controlling these discharges (though the International Maritime Organization has issued voluntary guidelines). The ongoing study is being conducted by the Volpe Center for the Coast Guard's Research and Development Center in Groton, CT; it will consider performance capabilities, costs, and environmental risks for the various systems. The results will be used by the Coast Guard to assess the magnitude of the problem and determine if regulatory development is necessary.

Fuel Storage Tank Removal/Replacement Support

The Volpe Center is supporting the fuel storage tank removal/replacement activities of the FAA's Western Pacific Region — removing or replacing fuel storage tanks that do not meet requirements for corrosion, leak detection, and spill prevention. Since 1996, the Volpe Center has been preparing designs for removal/replacement activities, providing construction oversight, and conducting project management support for 28 sites throughout the Hawaii Pacific Sector, the Golden Gate Sector, and the Desert Pacific Sector. Reflecting a project milestone, Ms. Julie Borgesi, of the Environmental Engineering Division, recently submitted the final construction as-built drawings to the FAA Western Pacific Region.

Director's Corner Continued...

Garrett A. Morgan Technology and Transportation Futures Program
(with the Cambridge Rindge and Latin School)

Volpe's relationship with the Cambridge Rindge and Latin High School (CRLS), Cambridge's only high school, has evolved over the past seven years from a one-on-one Tutor/Mentor Program to the current emphasis on the Garrett A. Morgan Technology and Transportation Futures Program. Volpe volunteers provide teachers with a transportation-related project that could be used as the theme for teaching their curriculum, or with opportunities to learn about transportation-related new technologies or new applications of current technologies. This may involve one or more tours of the Volpe Center, project demonstrations and/or seminars. In addition, the volunteers may work with students to develop transportation projects as part of their studies or possibly for entry into the school's Science Fair.

Kendall Square Learning Project ~ English as a Second Language

Established by Volpe Center employees in 1992, the Kendall Square Learning Project (KSLP) is a non-profit, charitable organization that provides classes in English as a Second Language (ESL) and basic life skills to adults two nights a week at the Volpe Center. ESL classes are open to anyone willing to learn. Four levels of classes are offered, ranging from little or no English skills at Level I to advanced conversation and grammar at Level IV. Students over the years have come from such countries as Haiti, China, India, Pakistan, Russia, and El Salvador. While learning or improving their English, students are also encouraged to improve basic life skills. The overall goal of KSLP is to help integrate the students into American society and enable them to get better jobs. Since its inception, the KSLP has attracted more than 100 volunteers to reach out to more than 300 students.

Robert F. Kennedy Elementary School Lunch Buddies Program

Lunch Buddies, the newest of the TEAM Effort programs, involves Volpe community volunteers reading to Robert F. Kennedy Elementary School 2nd graders, on average twice a month during the students' lunch period. The purpose of Lunch Buddies is to instill in children a love of reading and to provide an adult role model. Lunch Buddies began this past March and continued through the end of the school year. In its first year of operation, about 60 Volpe community employees volunteered to become a Lunch Buddy. This assured that all of the 47 Kennedy School 2nd graders had their own personal Lunch Buddy or a "stand-in" during periods of travel, vacation, or illness.

This program proved to be an incredible success in its first year. The enthusiasm of the 2nd graders for these reading sessions was surpassed only by that of the volunteers! The June visit by Transportation Secretary Rodney E. Slater to the Kennedy School provided a fitting end for the 1998-1999 Lunch Buddies program. He spoke eloquently about the limitless opportunities that education provides; citing as an example the achievements of Garrett A. Morgan, a son of former slaves who became a renowned inventor. Due to the overwhelming response to this new program, Lunch Buddies 2000 is being expanded to recruit a new cadre of volunteers to read to this year's Kennedy School 2nd graders. Last year's volunteers have graduated to the 3rd grade along with their Lunch Buddies from last year!

Keeping in mind the President's challenge to become "a mentor, tutor, or coach to America's least advantaged children," I encourage all members of the Volpe community to consider volunteering to be a Volpe "TEAM player." Today's school children are tomorrow's leaders. Let's do our part now to prepare them for the challenges that lie ahead.

Richard R. John