

Research and Innovative Technology Administration

HORIZONS

Innovation for a Nation on the Move



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Transmission tower at Hilla, Karbala province in Iraq.

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Iraq Railroad Reconstruction: A Success Story

Every day, American men and women are working closely with Iraqis to build stability and peace; to construct roads, rails, and airports; and to forge ties of friendship, understanding, and respect that will last lifetimes.¹

– Transportation Secretary Mary E. Peters

The Research and Innovative Technology Administration's (RITA's) Volpe National Transportation Systems Center is proud to be part of a major endeavor for the Iraqi Republic Railways (IRR) that is regarded as a noteworthy achievement among Iraq Reconstruction efforts focused on transportation. A large-scale upgrade to the Iraqi railway-communications system spearheaded by the Volpe Center is nearing completion, an effort that Transportation Secretary Mary Peters has already hailed as having "helped get passenger train service back up and running between Baghdad and Basra."¹ A new, centrally controlled and highly secure communications capability is at the heart of the system

By 2003, Iraqi railways had been torn apart by decades of neglect and recent sectarian violence. With bridges and signaling in disarray and no reliable means of communication among trains or between trains and stations, instructions for train movements were often delivered by taxi. This situation contributed to several head-on collisions and severely limited the number of trains that could operate with any degree of safety. Resumption of normal railway service is regarded as an economic necessity in Iraq, supporting international commerce. With its potential to transport massive amounts of cargo, stimulate the



At work on the Iraqi Republic Railways

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economy, provide employment, and improve the quality of life of Iraqi citizens, it was easy to identify a fully functioning railway system as an important component of an Iraqi recovery.

Providing a system to dispatch, control, and track trains was a top priority; it had become clear that conventional signaling was not a realistic option, and a decision was made to pursue installation of a state-of-the-art Communications-Based Train Control (CBTC) system. The system requires use of a digital microwave radio communications network (DMRCN) consisting of microwave radio

base stations, transmission towers, telecommunications equipment shelters, and auxiliary power systems. The DMRCN will serve as the railway's backbone communications link for both voice and data transmission and will be an essential component of the CBTC for IRR.

The Volpe Center identified requirements for the microwave communications system, developed a detailed statement of work that included engineering specifications for the DMRCN system, managed contract awards and the procurement of equipment, and oversaw microwave communications system installa-

¹ From "Air Traffic and Transportation Progress in Iraq" in *Welcome to the Fast Lane: The Official Blog of the U.S. Secretary of Transportation*, May 29, 2008.

tion. The initial network consists of 33 sites, running from the Syrian border through Baghdad to the port facility at Umm Qasr. Umm Qasr is Iraq's primary port and is also the key rail-transport link for imports and exports, making it vital for freight movements. The DMRCN project, which is funded at \$41 million, is the largest fixed-price procurement in the Volpe Center's history. The project combines the latest CBTC-system technology with reliable microwave radio technology over 1,000 kilometers of track. The interoperability of the two technologies was verified as part of the contract.

When completed, the IRR will host the longest CBTC/microwave-based control system in the world, providing computer-aided dispatching of trains from the Central Control Office in Baghdad. Authorization for trains to occupy tracks between stations will be conveyed automatically and displayed on a screen in the cab of the locomotive. A global positioning system (GPS) tracking device on each locomotive will provide location information to the train dispatcher.

By midsummer of 2008, 27 of the 33 microwave towers had been constructed, and 20 communication shelters were being installed and the microwave alignment verified. The project is scheduled for completion in the fall of 2008, at which time IRR will be able to communicate between the Baghdad dispatching office and all locomotives and stations along the north-south right-of-way.

Successful accomplishment of all stages of this large scale, highly visible undertaking has drawn on the Volpe Center's unique combination of project management and acquisition expertise, along with its decades of experience with railroad

equipment and its understanding of new communications technologies and their application to transportation systems. Because Volpe Center staff had previously faced the challenges of working in Iraq, they brought an ability to adapt their methods to meet the needs of an ever-changing environment. Along the way, they have established good working relationships with U.S. Embassy personnel and Iraqi railroad managers and have worked effectively with the major U.S. contractor as well as with subcontractors from Turkey, Jordan, and Iraq.



Iraqi team inspects telecommunications equipment shelter at the Bagdad site

Training

In anticipation of completing the project, the Volpe Center has provided oversight to a CBTC training course for Iraqi personnel, which includes both dispatcher and computer instruction on the system. The Volpe Center is supporting the Iraq Transition Assistance Office by monitoring the training to ensure a cohesive approach in integrating the train-control system with the communications system.

Next Steps

With the implementation phase nearing completion, the Volpe Center team is developing a hand-over

strategy. The team has met with the USDOT Attaché and with representatives from the Iraq Transition Assistance Office, IRR, and the Iraq Ministry of Transportation, along with the contractors, to identify and resolve issues related to project acceptance and hand over, future operations and maintenance of the system, and the development of operating rules. The Volpe Center also may be involved in the initial transitional training and system operations and maintenance process. Once the system is up and running, many more trains will become operational.

This project is part of a larger effort to expand economic opportunity in Iraq with the goal of helping to offset the frustration and lack of hope that many Iraqis feel about their future. Despite unusual circumstances and many challenges, implementation of this project has been extremely successful due largely to the Volpe Center's careful planning, anticipation of problems, and close work with contractors, U.S. officials, and Iraqi personnel.

The work has been performed in support of the USDOT Attaché Office and U.S. Department of State's Iraq Transition Assistance Office, which is funded by the Iraq Relief and Reconstruction Fund (IRRF).

Key Personnel

James Lamond of the Rail and Transit Systems Division leads the Volpe Center effort and is actively involved in project reviews and troubleshooting as needed. Other key Volpe Center participants are Fred Mottley of the Rail and Transit Systems Division and Orin Cook and Dan Leone of the Acquisition Division. 🔄