Client:
MTA New York City Transit

Project Duration:
2002-2010

Project Value:
$450 million

Parsons Responsibilities:
design engineering, construction inspection, testing & security

MTA New York City Transit (NYCT) operates subway and bus service in the city of New York. NYCT subway network includes 28 routes, 722 miles of track and 468 stations for four of the city’s boroughs—Manhattan, Brooklyn, Queens and the Bronx. The NYCT has one of the most complex subway systems in the world and, with 4.4 million passenger trips per day, the highest ridership in North America. The system is divided into Division A and Division B.

Train control, the process of regulating rail rapid transit vehicles for the purposes of safety and efficiency, includes four types of functions:

- **Train protection**—assuring that trains maintain a safe following distance, that overspeed is prevented, and that conflicting movements at junctions, crossings, and switches are precluded
- **Train operation**—controlling train movements: specifically, regulating speed, stopping at stations, and opening and closing doors
- **Train supervision**—assigning routes, dispatching trains, and maintaining or adjusting schedule
- **Communication**—interchanging command and status information among trains, wayside elements, stations, and central control

In 1992, to improve service and address increased ridership needs, NYCT began planning for a new train control system with Automatic Train Supervision (ATS) for Division A. The ATS system is currently being installed into a new rail control center (RCC) where it will replace control systems in 23 master towers and dispatch offices across the city.
Parsons provided engineering support services to NYCT during the contractor’s detailed design, installation and testing of the centralized traffic control system for Division A’s approximately 175 total track miles. A new computer-based, fully integrated command, control and communications system is being installed that will allow NYCT staff to monitor and control the railroad from the new RCC. Operations data systems and voice communications systems are fully integrated with the train traffic tracking and control systems to allow access to all systems through standard graphical user interfaces at consoles in the operating theater. This will increase safety, service reliability and operating efficiency.

RCC is also the first rail control center with integrated CBTC

Parsons is managing a multi-disciplined team of consultants for control center design and implementation. Support is included for the integration of all NYCT data and voice systems into the ATS system, improvements to the RCC facility for installation of the operating theater and equipment rooms, and their architectural, electrical, structural and mechanical support systems. The project includes interconnection with the existing NYCT’s backbone fiber-optics network and the new integrated communications switch. Parsons is providing support for contract data requirements list (CDRL) review, software process audits, implementation planning for all of NYCT’s ongoing high technology projects, system hazard management support, and support during testing in the supplier’s facility and at the RCC during commissioning and final acceptance testing.

Parsons is also leading the design for Division B’s train control system. With the completion of the ATS-B project, Division B will have centralized traffic control and a large screen overview display similar to the installation for Division A. ATS-B will fully integrate communications based train control (CBTC) functionality for the 2nd Avenue and follow on lines, support P/ACIS functionality, and provide a fully integrated Unified Reporting System (URS) for all NYCT departments.

At the RCC each central controller will occupy a console to monitor train service, initiate minor adjustments to service, pass vital information to other controllers and dispatchers, and oversee the automatic routing of ATS, as well as throw the switches to route trains as required, and otherwise follow desk dispatcher directives. The consoles will connect to a local area network (LAN) and the integrated communication switch (ICS) systems.

The new RCC is a $100 million, four-story facility housing 100 NYCT employees that will be the largest rail control center in the world. This is also the first rail control center with integrated CBTC. Complexity is integrating old systems engineering into latest technology. The RCC will accommodate two new rail lines on 7th and 2nd Avenues. From this third-floor theater, which features 25-foot ceilings and is the length of a football field, the NYCT will be able to observe and control all Division A trains.

Parsons is a leader in designing advanced train control systems. Prior to this NYCT work, Parsons has been a design engineer for the following rail systems: MBTA in Boston; PAAC in Pittsburgh; SEPTA in Philadelphia; MTA in Baltimore; DART in Dallas; and the Hiawatha line in Minneapolis. These projects have provided experience to Parsons to meet the following challenges on the NYTC project:

- Integrating CBTC functionality into ATS
- Capturing data from all NYCT advanced technology projects into a unified reporting system
- Designing a system to provide maximum benefits to rail transit operations
- Managing a diverse group of consultants as a single project team
- Meeting all milestones during a demanding design schedule
- Integrating a multitude of diverse advanced technology systems

The new NYCT train control system and new RCC is scheduled for completion in 2010. Along with the other advanced technology projects for NYCT, this project reinforces Parsons as the industry leader in train control, control center/communications technology design and implementation for rail transit.