



Harvey Glickenstein
Senior Editor

High-Speed Trains

China Chooses SCADA Platform

The Chinese Ministry of Railways has selected the Wonderware System Platform from the Invensys subsidiary Wonderware as the SCADA platform to control the entire Chinese railway network. By the end of 2009, the system will manage more than 300,000 input/output (I/O) points along the electrified railroad. On completion of the project in 2020, the system will manage more than 3 million I/O points throughout the Chinese railway system, including the Beijing-Shanghai high-speed railroad currently under construction.

According to Wonderware, this will be the largest scale industrial project using Microsoft's structured query language (SQL) server platform. The project budget is 3.5 billion Yuan or about US\$512 billion.

Belgium Expands High-Speed Network

Line 3 of the Belgian rail network between Liège and the German border was inaugurated on 12 June 2009, completing the last link in the star-shaped national high-speed network and making Belgium the first European country to have a network of high-speed lines linking its borders.

When it opened, Line 3 was used only by Deutsche Bahn (DB) ICE3 trains, but Thalys trains were expected to begin running over the route by the

end of 2009, cutting Liège-Köln journey times from 1 h 23 min to 1 h 1 min.

From Chênée near Liège, trains run at 124 mi/h through the Soumagne Tunnel, the 4-mi-long, double-track tunnel in Belgium. Trains then run at 162 mi/h parallel to the E40 motorway to Walhorn, where Line 3 ends as it leaves a 0.68-mi-long, cut-and-cover tunnel to rejoin the upgraded conventional line to the border.

Amsterdam-Brussels High-Speed Train Unveiled

In July, Nationale Maatschappij der Belgische Spoorwegen/Société Nationale des Chemins de fer Belge (NMBS/SNCB) and Nederlandse Spoorwegen (NS) Hispeed, the national railway passenger operators in Belgium and Holland, respectively, unveiled the first prototype 155-mi/h train that will be operating between Amsterdam and Brussels. A new brand name, Fyra, has been chosen for these trains to distinguish them from the existing passenger trains, Thalys, which operate internationally throughout Europe (Figure 1).

At the July unveiling, Michiel van Roozendaal, director of NS Hispeed, said "The unveiling of this train from AnsaldoBreda today brings the connection of the Netherlands to the European high-speed network a step closer. This is a development that will be welcomed by our customers and benefit the Netherlands as a whole. The new train will bring European cities closer together. Passengers

using Fyra will travel more quickly, easily, and in greater comfort." Michel Jadot, director of NMBS/SNCB, added "Brussels is at the center of the European high-speed network. This new train is about to fill the missing link in the network that previously existed among Brussels, Antwerp, and the North. Amsterdam will then be a short one-and-three-quarter hours away from Brussels. This represents a major step forward in the development of the relationship between our two countries."

The Belgian railway company, NMBS/SNCB, will operate the trains on the Belgian side, and NS Hispeed will operate the trains on the Dutch side.

NMBS/SNCB and NS Hispeed have ordered 19 high-speed trains between them (three and 16, respectively). According to the joint news release, the fact that it is technical specifications for interoperability (TSI) compliant means this high-speed train is the first that can be operated on the entire European Union network.

The new trains will have a top speed of 155 mi/h as opposed to the Thalys trains, which have a top speed of 186 mi/h. On the Fyra Web site, it was explained that the new trains were procured under an open public procurement as required by the European Union. The 155-mi/h top-speed trains were cheaper than purchasing 186-mi/h trains, and the difference in speed with the short distances between which the trains will operate amounted to a time

Digital Object Identifier 10.1109/MVT.2009.934664



FIGURE 1 High-speed trains lined up in the Netherlands. (Photo courtesy NS Hispeed.)

penalty of no more than 2 or 3 min in running time.

On this route, the higher speed Thalys will mainly concentrate on the Paris–Netherlands market, whereas the new Fyra high-speed trains will concentrate on the market for the shorter distances between Belgium and the Netherlands.

The Fyra train unveiled to the public is a prototype. The exterior is complete, but the inside is fitted with measurement and test equipment. After completion of the test programs in Belgium and the Netherlands, the train will go back to AnsaldoBreda in Italy to be fitted out. It is anticipated that the high-speed trains will go into operation on the Amsterdam–Brussels route one year after the start of testing. Until the new trains arrive, temporary rolling stock (Traxx

locomotives and conventional coaches, Figure 2) will run at the high speed of 100 mi/h.

The maximum speed between Brussels and Antwerp will be 100 mi/h, and on the high-speed line north of Antwerp Central, it will be 155 mi/h.

When the new trains enter revenue service, the trip between the center of Amsterdam and of Brussels will take just 1 h 46 min, whereas the journey from Rotterdam to Schiphol airport will take 20 min.

Los Angeles Subway System Retreats from Proof of Purchase

The Los Angeles Metro estimates it loses about US\$5 million/year due to fare evasion with its current barrier-free, proof-of-purchase system.



FIGURE 2 TRAXX Locomotive hauled train operating on high-speed train route inaugurated between Amsterdam Central Station, Schiphol Airport, and Rotterdam Central Station in September 2009. The new service shortens the travel time between Amsterdam and Rotterdam to 43 min. (Courtesy Bombardier.)

Enforcement that patrons have paid the proper fare is handled by civilian fare inspectors and Sheriff's officers who roam the system to request passengers to show a fare receipt. Overall, Metro has found a 6% fare-evasion rate across its rail lines.

Metro has begun installing turnstile fare gates at four Red/Purple Line subway stations and will monitor progress to make sure passenger traffic moves smoothly while still achieving the goals of preventing fare evasion and improving transit station security.

The four stations are Wilshire/Normandie, Union Station, Westlake/MacArthur Park, and Pershing Square. Staff will assist passengers as they get accustomed to the gates, which will be set to free spin until patrons become familiar with entering stations through a physical barrier.

Metro stated that it is the only subway operator in the United States to operate a barrier-free proof of payment, although there are light-rail systems with at least some underground stations that use proof of payment, such as in St. Louis, San Francisco, Dallas, Buffalo, and Newark. New Jersey Transit converted from turnstiles to the proof-of-purchase system on the former Newark City Subway in 2001 coincident with putting into service new low-floor vehicles that do not allow operators to collect fares when the vehicles are operating in the street.

Like Metro, SkyTrain in Vancouver, British Columbia, is converting from proof of purchase to fare gates. Tom Prendergast, CEO of TransLink, Metro Vancouver's regional transportation authority, says "The entrance areas on the original Expo Line stations are not large enough to permit the installation of fare-gate arrays. However, now that we have provincial and federal funding to expand these stations up to the same standards as the Millennium and Canada Lines and to purchase the fare gates themselves, the biggest obstacles to installing them have been eliminated." The fare gates are being installed in conjunction with the

installation of a smart card fare instrument that allows tag-on and tag-off and will allow TransLink to institute new deployment strategies for transit police officers and SkyTrain attendants. Currently, they are often assigned to fare-checking duties for portions of their tours. If these duties are reduced, they will be available for other more significant policing, security, and customer-service responsibilities.

The new fare-barrier system being installed by the LA Metro is compliant with the Americans with Disabilities Act (ADA). During the period of equipment installation, the special ADA gates will remain open to permit disabled persons and patron-operated devices, such as wheelchairs, strollers, walkers, and bicycles, to have clear access to the paid areas of the stations. Separate emergency access gates also are being installed to comply with fire-life safety regulations.

If the results of the limited installations are satisfactory, Metro will proceed with installing a total of 379 fare gates in all stations on the Red/Purple Line subway, Metro Green Line, and key light-rail stations on the Metro Blue and Gold lines. Installation is intended to be completed in six to eight months in early 2010.

Boston's Massachusetts Bay Transportation Authority Cracks Down on Fare Evaders

The Massachusetts Bay Transportation Authority (MBTA) has been having problems with fare evaders who jump turnstiles or attempt to evade fares by slipping onto surface vehicles without paying (Figure 3).

Reflecting the MBTA's stepped-up, fare-collection efforts, transit police reported 1,399 fare evasion incidents (crime category of fraud) in the first six months of 2009, a dramatic increase over the 431 incidents during the same period last year.

Chief MacMillan credited not only the hard work and dedication of his officers but also the involvement of the public and MBTA employees in alerting transit police to problems.

CHIEF MACMILLAN CREDITED NOT ONLY THE HARD WORK AND DEDICATION OF HIS OFFICERS BUT ALSO THE INVOLVEMENT OF THE PUBLIC AND MBTA EMPLOYEES IN ALERTING TRANSIT POLICE TO PROBLEMS.

He said "The involvement of our employees and the riding public is crucial to making the T as safe as possible. Our awareness campaigns have been a success from the standpoint of alerting our passengers to potential problems."

In addition to assessing a series of fines based on whether it was a first, second, or subsequent offence, the MBTA is now using its authority under a 2007 law to prevent violators from having their driving licenses renewed after a third offence. The transit police have reported 455 people to the Registry of Motor Vehicles in the first six months of 2009.

The *Boston Globe* interviewed MBTA riders to get their responses to the crackdown:

"That's crazy nonsense," said a 21-year-old woman from Dorchester who declined to give her name because she routinely avoids the fare by piggy-backing behind friends. "I can't drive my car because I didn't pay US\$1.25?"

Besides, she said of dodging fares: "Everybody does that." But others

said the crackdown would deter fraud, if only to avoid the embarrassment of being chased down by transit police.

"I don't feel like having to deal with it," said Nicholas Ferrara, a 19-year-old construction worker from Quincy, taking a drag on a cigarette after getting off the Red Line at the JFK/UMass stop. He said he always pays.

Richard Cruz, a 29-year-old graduate student at the University of Massachusetts, Boston, said the crackdown is a good idea, as long as it prevents fares from rising. "There are set rules already, so it's just a matter of implementing the rules," he said.

Chicago Transit Authority Proposing New Fare Instrument

The Chicago Transit Authority (CTA) is planning to introduce the use of contact-less credit cards, debit cards, and prepaid cards to ride the system. The transition would save the CTA in money now used to issue fare media and manage the fare payment and collection system. The contact-less



FIGURE 3 Typical turnstiles in Boston. (© Massachusetts Bay Transportation Authority.)

THE NEW FARE-BARRIER SYSTEM BEING INSTALLED BY THE LA METRO IS COMPLIANT WITH THE AMERICANS WITH DISABILITIES ACT.

fare-payment system is expected to reduce the need for customers to carry cash or have the right denomination or currency to ride the system. In addition, the same card that would pay for fares to ride CTA also could be used for everyday transactions such as purchases at retail outlets, thereby reducing the number of cards an individual would need to carry.

The first phase of the procurement process will examine the CTA's options for developing the card, considering possible procedures, management, and cost of the program. After reviewing these proposals and developing a final plan, the second phase will give companies the opportunity to submit proposals for the actual implementation of the program.

"The CTA continually seeks initiatives that will help improve efficiency and convenience for customers," said Chicago Transit Board Chair Carole Brown. "With this new system, customers would benefit from the faster boarding times and ease of use as nearly all fare transactions would be touch and go."

The fare card would be a smart card containing a computer chip that allows customers to pay a fare and also serves as a standard credit or debit card tied to a customer's bank or credit card account. A prepaid card could provide the option for customers who choose not to have the card tied to a bank account.

"CTA wants to examine ways to use the technology available today to transition to a more modern contact-less fare media system," said CTA President Richard L. Rodriguez. "Once implemented, the smart card would bring the agency's fare-paying process more in line with the way people prefer to conduct their business." The CTA expects to complete the two-step process and begin the transition to an open-fare system in the summer of 2010.

Denver's Regional Transportation District Takes Delivery of New Light-Rail Vehicles

On Friday, 21 August 2009, Denver received the first of 55 new light-rail vehicles ordered in 2007 to take advantage of cost savings (Figure 4).

The cars are being built in the Siemens Transportation Systems plant in Sacramento, California. Before entering revenue service, each vehicle will undergo a 1,500-mi burn in period designed to ensure the safety and functionality of the LRVs. During this process, the LRVs will be operated out of service throughout the existing system to test its operations. The new light-rail cars will initially provide more seats on the existing system before being used for the future openings of the West Corridor, I-225 Corridor, Southeast, and Southwest extensions.

Florida Applies for High-Speed Rail Money, Again

The high-speed rail to link Tampa, Orlando, and Miami was proposed in 1982. In 1992, a consortium known as Florida overland express (FOX) had a proposal on the table for building a 200-mi/h high-speed rail line using European technology with a combination of public and private money. An application was made to the Federal Railroad Administration (FRA) for regulatory permission to operate trains at 200 mi/h, as the FRA did not have any rules at that time for operating at such high speeds. The FRA published a notice of proposed rulemaking (NPRM) for the line in 1997, but the final rule was never issued by the FRA, as the project ran out of money.

In 2000, the same year that the brother of then-governor Jeb Bush of Florida was elected president, Florida passed a constitutional amendment, requiring the state to fund a high-speed rail system with trains operating in excess of 120 mi/h. In 2002, the Florida High-Speed Rail Authority advertised for new proposals for high-speed rail. One of two finalists was chosen for the first route, Tampa to Orlando, which was to be built mostly in the median of Interstate 4.

Governor Bush was against the concept of a publicly financed high-speed rail system, and in 2004, he was successful in getting the constitutional amendment repealed. The law establishing the High-Speed Rail Authority



FIGURE 4 Picture of crowd waiting to board a Denver light-rail train at Lincoln Station. (© Regional Transportation District.)

was not repealed, however, although meetings of the authority were suspended after they began to run out of money that had been appropriated by the legislature. The high-speed rail in Florida appeared dead again.

With the Obama administration call for a nationwide system of high-speed rail lines and the successful authorization of money to begin work on such a system, the FRA published its vision for high-speed rail. This was mostly based on designations of high-speed corridors that were made by the FRA under federal legislation in effect during the administration of President George Bush. The Florida high-speed rail system was a part of that designation.

In 2009, the FRA advertised for preapplications for the federal high-speed rail money. Florida has submitted a preapplication for the Tampa to Orlando to Miami route based on the

THE CONTACT-LESS FARE-PAYMENT SYSTEM IS EXPECTED TO REDUCE THE NEED FOR CUSTOMERS TO CARRY CASH OR HAVE THE RIGHT DENOMINATION OR CURRENCY TO RIDE THE SYSTEM.

environmental impact study for the Tampa to Orlando portion with federal money to pay for an additional environmental impact statement for the balance of the route. The construction schedule in the new preapplication is from October 2011 through October 2014 for the Tampa to Orlando segment and mid-2013 through mid-2017 for the Orlando to Miami segment.

Galileo, the Global Positioning System Being Rolled Out by the European Union, Slowly Advances

Although the global positioning system (GPS) maintained by the United

States has started to be used in railroad applications, the rival European satellite navigation system, called Galileo, is still not operational.

In preparation for the roll out of the Galileo system, Siemens is gearing up to test the applications for rail transportation at its Test and Validation Center in Wegberg-Wildenrath (Figure 5). A test area for satellite-based navigation for rail systems being set up there will enable tests to be carried out under real conditions before the Galileo system actually goes into operation.

The Siemens tests are in support of the railGATE project that is being conducted by Aachen University and

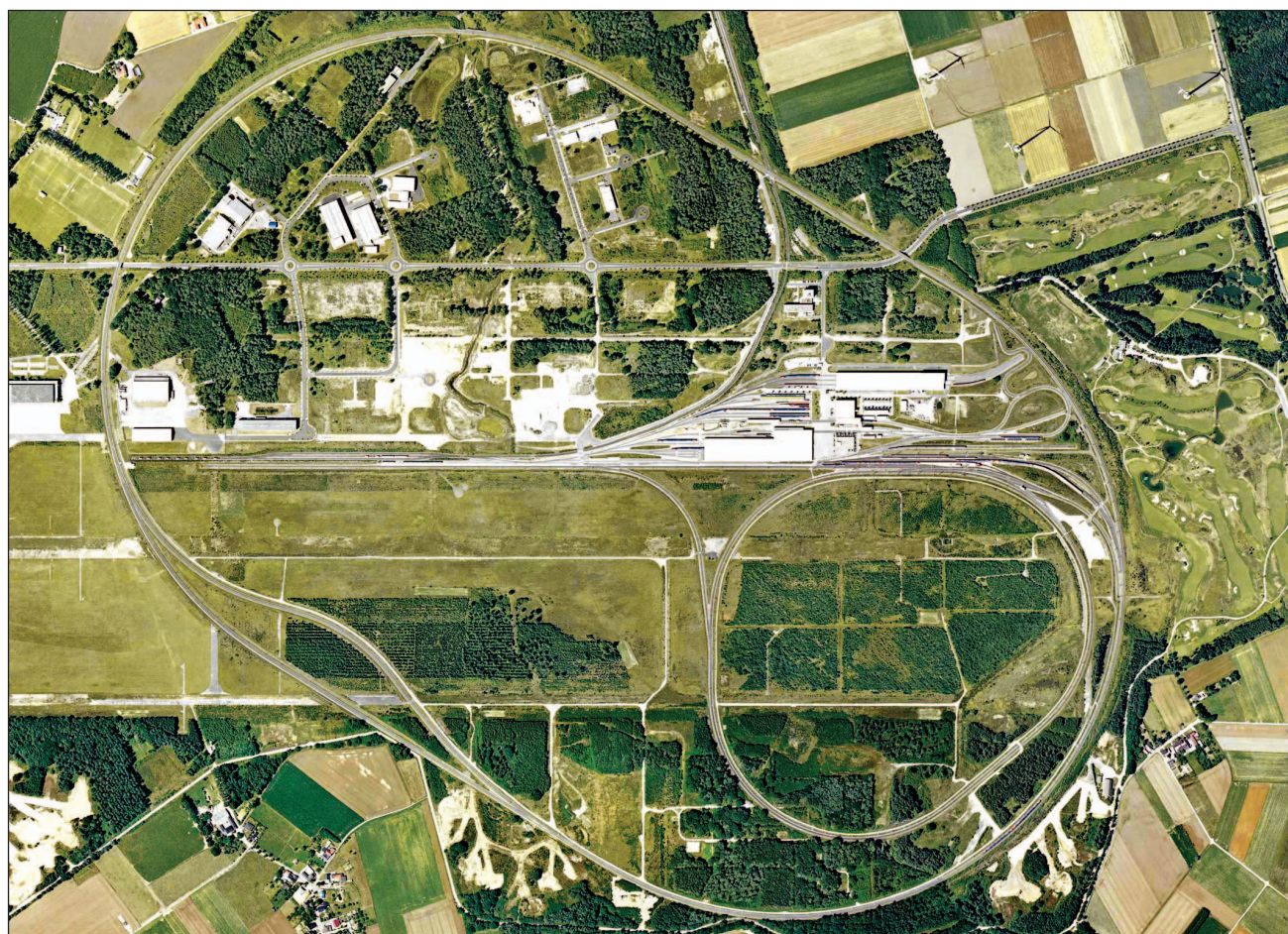


FIGURE 5 Siemens Test and Validation Center in Wegberg-Wildenrath. (Courtesy Siemens.)



FIGURE 6 Alstom Metropolis cars for Barcelona. The cars proposed for Brasilia will be similar but have a lower floor to facilitate access for disabled and elderly passengers. (Courtesy Alstom.)

sponsored by the space agency of the German Aerospace Center with funds provided by the Federal Ministry of Economics and Technology. With testing slated to begin in 2010, Galileo is currently scheduled to enter operation in 2013.

According to a press release issued by Siemens, “satellite navigation has not yet gained a foothold in the field of automatic train control (ATC) because ATC involves a considerable level of technical complexity and necessitates a high degree of reliability due to the exceptionally high safety requirements.” The press release goes on to say that “Galileo, the future satellite navigation system of the European Union, will overcome unreliable

positioning functions of current global navigation satellite systems such as GPS and the lack of integrity information and an operating guarantee.”

The railGATE project was started to give potential users in the field of rail transportation the opportunity to test innovative applications before the real Galileo signal is available. The aim is to explore potential applications for the future Galileo satellite system in rail-bound transportation and to make it even more reliable in the future. A test environment is being created on the 86-acre site of the Siemens test and validation center for rolling stock in Wegberg-Wildenrath. Eight signal generators, called pseudolites, will be mounted on top of 164 feet high-

transmission masts. They will be used to transmit Galileo signals within a locally restricted area.

Trains fitted with receiving devices will be able to receive signals from the nearby pseudolites. This means that positioning system applications for rail transportation, such as for classification yards or for train tracking, can be tested without danger on 17 mi of nonrevenue track. The major advantages of the test and validation center are its location in a wooded area and the existing infrastructure, allowing the Galileo system to be tested in different receiving situations, such as on a clear section of track, in a forest, or in the depot.

Brasilia Orders New Metro Cars and Automatic Train Operation

The Brasilia Metro system has awarded a contract worth €110 million for 48 new metro cars and a new signal system that will provide automatic train operation (ATO) to Alstom. This order will support the expansion of the present system from 25 to 29 mi long.

The new vehicles consist of 12 train sets of four Metropolis cars each (Figure 6). The current system operates with 20 train sets. The new cars and signal system will provide for cutting the existing 4.5-min headway to 3 min.

Supercapacitor Energy Storage for Trams

The Régie Autonome des Transports Parisiens (RATP/Autonomous Operator of Parisian Transports) and Alstom Transport have joined forces for a year-long trial of a new onboard energy storage solution, supercapacitor technology, fitted to a Citadis tram on the T3 tramway in Paris (Figure 7). The system is being tested as part of the maximized energy-efficiency tramway system (STEEM) project. It will enable the trams to run without catenary power, allowing them to be integrated more effectively into the urban environment and generate energy and infrastructure savings.



FIGURE 7 Citadis tram on the RATP Line 3 in Paris. (Courtesy Alstom.)