

# Ferrocarrils de la Generalitat de Catalunya

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*“The challenge we have set for ourselves as a company is one of excellence in customer service. Each year, we seek to achieve higher satisfaction levels from our users and Wonderware technology is an essential tool in achieving this.”*

*Alicia Coca, head of the Systems Development Department, Ferrocarrils de la Generalitat de Catalunya*

## Ferrocarrils de la Generalitat de Catalunya Receives Consistent High Marks in Customer Satisfaction with use of Wonderware Automation Software Solutions

### Goals

- To manage the FGC railway system via remote control of rail station operations including ticket sales, opening and closing of doors, lighting, etc
- Continue to achieve high standards of excellence and reliability required by the company

### Challenges

- To maintain a high level of customer support by improving service despite increasing the number of automated processes being controlled via the network
- Complete deployment of the new supervisory system without interrupting existing train and rail stations services such as ticket vending machines, escalators, access control, etc.

### Solutions and Products

- Wonderware® System Platform
- Wonderware InTouch® HMI
- Wonderware Historian

### Results

- The team effectively installed Wonderware automation software solutions without disrupting customer travel via the rail system
- Remote management of all rail processes was achieved, as well as centralizing monitoring of operations in one control center
- Automation software simplified the supervision of the rail service operations, and streamlined the management team's ability to direct all processes



**Barcelona, Spain** – Ferrocarrils de la Generalitat de Catalunya (FGC) is responsible for providing safe, reliable and efficient rail transportation to more than 80 million passengers each year. Operating two of the country's major transport lines, Barcelona-Vallès and Llobregat-Anoia, FGC must manage not only 120 miles of track, but also the 76 train stations which service the businesses and residents in the region.

As a public company managed by the Catalan Regional Government, the mission of FGC is to operate these rail services and infrastructure efficiently and effectively. Based on these goals, the company began an extensive organizational and technological reform strategy to enhance the management of its overall operations.

FGC was the first public rail transport company in Spain to opt for the remote management of stations by automating its operations and ensuring a high quality of service to its customers which includes ticket sales, access control, lighting and air-conditioning. Today, FGC consistently achieves a high level of satisfaction on customer surveys for its impeccable management that delivers unprecedented service excellence in the industry.

## **Innovation Creates New Concept in Rail Management and Service**

Although FGC had been providing rail transport services to citizens for decades, in 1996 it launched a new operational model for stations by providing value added services. The company automated ticket sales through vending machines which enabled station personnel to focus on direct customer support. For example, rather than manually administering ticket sales,

station personnel can now immediately tend to the needs of customers if emergency situations arise. Automation frees up staff to provide immediate customer support when necessary.

“To eliminate ticket offices, albeit a routine but essential function at each station, a supervisory architecture had to be developed to effectively control ticket sales that had, until that time, been handled by staff onsite at each station,” said Alicia Coca, head of the systems development department at FGC. “Customers could not feel that they were being deprived of services because of the change. Customer service had to continue to be our top priority.”

Little by little, automation began to replace the functions previously performed by station staff. The creation of the Station Monitoring Center, operating 24 hours a day, 365 days a year, enabled FGC to manage the operation of all stations from a central location. Through the new remote-controlled model, the Center began overseeing the operations of everything related to the station such as ticket vending machines, CCTV, public address system, opening and closing of entrance doors, air-conditioning, lighting and pump shafts , and countless other functions.

The need to integrate all controlled operations into a single supervisory system through a common management interface was the next stage of the project. The Integrated Command Center (CCI) was created for joint management of the two network lines – Barcelona-Vallès and Llobregat-Anoia.



As a result, the Rubí Operational Center (COR) was created, housing both the Station Monitoring Center and Traffic Control Center. COR is responsible for the operational running of trains, as well as the Customer Information Center. Coinciding with the creation of the new CCI, a complete renovation was undertaken of the integrated station management system to improve and advance system features and incorporate the new multi-line concept.



Upgrading the Station Monitoring Center was managed by SICE, the Wonderware systems integrator managing the project by using Wonderware technology. The open architecture of the Wonderware solutions provided unique interconnection capabilities and fit perfectly with the integration and operational reliability requirements determined by FGC.

“The pioneering Wonderware supervisory control system marked a turning point in how train stations are managed in Spain,” Coca said. “Prior to installing the supervisory system, each function of the rail system was controlled independently via an individual proprietary system. None of these operations were linked so we were managing many ‘islands’ of information which made controlling and managing overall processes very difficult.”

## **The Challenge of Interconnection and Reliability**

The first objective in updating the system was to ensure the reliability of the control architecture.

The project presented several complex challenges to overcome, most importantly installing the new architecture without interrupting current rail and station management systems. The new architecture had to seamlessly replace the existing operational Supervisory Control and Data Acquisition (SCADA), which meant that tests had to be done in parallel without interfering with current operations. In addition, the team had to address integrating the various systems at each of the facilities, none of which had previously worked together.

“Some of the communications equipment that provided information on the state of facilities had been in operation for a long time, but each had its own private communications protocols,” said Julio Martínez at SICE. “Many of these systems did not have any detailed documentation, and for some, the manufacturers no longer existed. Our team was challenged to effectively transition these systems to the new Wonderware applications.”

The first stage of the project began with the team analyzing how the system should be set up based on experiences gathered over the more than 10 years that the previous control architecture had been in operation. The only way to ensure successful implementation was for SICE to work closely with the operational team at FGC.

“The initial focus of the project was to design before constructing,” Coca said. “Once we knew how the system worked, we decided what functions to change, what functions to improve and what functions we needed to add.”

The Multi-Line Integrator System (SIM) was designed as a supervisory environment using Wonderware technology which, for the first time, linked together management of the two rail lines.

The second stage of the project was the implementation of the Barcelona-Vallès line and this was just as complex. The inability to halt the service meant that the development of the new control architecture had to be carried out simultaneously with the existing one, again, without any shutdown.

“In terms of engineering, the hardest part was getting the two systems to coexist simultaneously by capturing field signals without interference,” Coca said.

After only three days of operations with increased staff in the old and new command centers, as well as a week working with backup personnel in case the new system failed, the new architecture to control and monitor stations using Wonderware software was fully operational. A year after implementation, the operation was repeated with the Llobregat-Anoia line, concluding the third stage of implementation.

"Wonderware currently provides integral management for about 50,000 signals from the most diverse existing units. Thanks to the capacity of the supervisory system, only three operators are required for the Barcelona-Vallès line, and only two operators for the Llobregat-Anoia line to ensure excellent service to the 300,000 people using our services every day," Coca said.

## Excellence in Customer Service

The investment in Wonderware technology at FGC has resulted in an increase in overall customer satisfaction year after year as shown in annual customer surveys. The Wonderware supervisory infrastructure that has been implemented ensures prevention protocols in virtually all areas.

"Today, the supervisory system alerts our staff when a cash machine is about to run out of change, or when paper is running low to print train tickets. As soon as the alarm sounds, the responsible control center operator notifies the station agent who resolves the problem immediately, sometimes even before it has occurred," Coca said.

Each station has strict standards of excellence for incident response times. With the system built on Wonderware industrial automation software, FGC teams have access to valuable real-time information as to what is happening in the network. This is one of the key elements that ensures maximum passenger satisfaction.

"Wonderware is able to adapt to the requirements of a continuously developing management



environment," Martínez said. "FGC stations are in a process of constant renovation and growth, and Wonderware System Platform enables us to achieve our objectives for consistent, reliable operation of the rail system."

The benefits of implementing the Wonderware applications are numerous and include improved security and reliability, as well as knowing what is happening at each point in the FGC network. Satisfaction goes beyond the technological aspect of the project, and right to the quality of support received from Wonderware and the system integrator.

"The integrated system has given us the ability to automate logical tasks that were previously carried out manually," Coca said. "If a passenger uses a station intercom, the operator receives the signal, answers and, because the machine also has a camera, the signal is automatically sent to the video wall at the control center so that the operators can see what is happening instantly, enabling them to assess the incident and directly manage the machine operations to resolve the issue."

The Wonderware solution has also helped guarantee system availability, reduce response times and improve the procedures of operators at the Station Monitoring Center, thus achieving impeccable management of the entire rail system.

Each year, FGC seeks to attain higher levels of satisfaction from customers, and Wonderware technology is an essential tool in achieving this.

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