Rail IT – Optimizing Your Rail Operations

References
Siemens Infrastructure & Cities Sector – Mobility and Logistics
Rail Automation
Rail IT solutions – overview of important references

- Canada: Edmonton, Montreal
- USA: New York City Transit’s subway network
- United Kingdom: London’s Victoria Line, King’s Cross Station
- Germany: e.g. Frankfurt, Hanover, Leipzig, Munich
- South Africa: Johannesburg, Pretoria, Durban and Western Cape
- Norway: Oslo, Drammen and Bergensbanen
- Finland: Turku – Riihimäki / Helsinki conurbation
- Austria: Vienna – Metro Lines 1 and 2
- Malaysia: Kuala Lumpur
- Australia: Port Hedland, iron ore rail freight
- South Africa: Johannesburg, Pretoria, Durban and Western Cape
Operations control system
BHP Billiton, Port Hedland, Australia

Siemens provided an advanced operations control and dispatching system for iron ore rail freight operations on a single-track line.

**Challenge:**
- Planning and optimization of rail freight operations
- Transfer of paper-based Train Graph Indication to an electronic system
- Automatic conflict recognition and solution
- Length of line: 650 km with several mines and sidings

**Solution:**
Operations control system, dispatching system, information management system

**Commissioning date:** 2008

Benefits:
- Increase in rail transport capacity and throughput
- Greater planning accuracy for arrival times at both mine and port
- Integrated mine-rail-port supply chain system
Operations control system and timetable validation
Metro Lines 1 and 2 in Vienna, Austria

Siemens has expanded and modified Line U1 (Kagran – Leopoldau) and Line 2 (Stadlau – Aspern) in Vienna with a modern operations control system.

- **Challenge:**
  15 km line extension to 75 km – and replacement of signaling equipment on 15 km of old lines during operation, modern operations control and planning

- **Solution:**
  Continuous automatic train control, electronic interlocking, operations control system and validation tool

- **Commissioning date:**
  Partial operation of Lines U1 / U2 since 2003, 2008 and 2010

**Benefits:**
- Simulation and validation of signaling define signaling performance and secure investment
- Green mobility due to energy management
- Efficient, modern operations control system

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Integrated station management and SCADA system
Metronet Rail SSL, King’s Cross Station, London, United Kingdom

Challenge:
Integration of 13 separate station system services and control of 60 public address zones with more than 1,400 individual speakers

Solution:
SCADA (human computer interface with touchscreen) controlling all station assets (public address system and voice alarm, customer information system, passenger help points, closed-circuit television, 12 remote terminal units collect operational information (e.g. fire system)

Commissioning date: 2008 – 2009

Benefits:
- Faster response to incidents and fault fixing giving improved passenger experience
- One single, easy-to-assimilate overview of station activities

Siemens provided King’s Cross Station with a monitoring and controlling system for communications and security.
Overall line management with data warehouse and reporting system
Metronet Rail BCV, Victoria Line, London, United Kingdom

Siemens upgraded the existing control centre and installed a data warehouse and reporting system.

- **Challenge:**
  Integration of the array of separate information systems and delivery of key performance data for a control center comprising 16 underground stations and tunnel sections

- **Solution:**
  10 remote terminal units with special and complex data warehouse functionality, public address system, closed-circuit television, passenger information systems

- **Commissioning date:** 2007 – 2010

**Benefits:**
- Improvement of reliability and maintainability
- A ‘single source of truth’ for management and control data
Upgrade of operations control system with dispatching assistant
Oslo, Drammen and Bergensbanen, Norway

Siemens upgraded three operations control centers in southern Norway which control and supervise more than 80% of Norway’s mainline rail network.

- **Challenge:**
  - Creation of the biggest timetable-based operations control system for mainline railways (for control of 208 stations; 197 interlockings and 2,000 km of track)
  - Control of different relay interlockings and electronic interlockings of various manufacturers

- **Solution:**
  Operating system and hardware, dispatching assistant, interface to passenger information system

- **Commissioning date:** 2007 – 2011

Benefits:
- Optimized traffic through centralized traffic coordination
- Creation of pre-programmed dispatching scenarios through new dispatching assistant
Operations control system and timetable validation
Turku – Riihimäki / Helsinki conurbation, Finland

Siemens is modernizing and extending the ESKO operations control center responsible for control of the country’s main transport hub.

- **Challenge:**
  - Control of different relay interlockings and electronic interlockings of various manufacturers
  - 1,300 daily train movements, line length: 400 km

- **Solution:**
  Timetable-based operations, conflict detection and semi-automatic conflict solution (dispatching assistant), interconnection with various external customer interfaces, e.g. passenger information system

- **Commissioning date:** 2011

**Benefits:**
- Standardized solution to connect external interfaces (XML data format)
- Detection and semi-automatic solution of conflicts
- Continuous import of timetables and export of forecast messages

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Operations control system
German Railways (DB AG), Germany

Challenge:
Largest automation program in rail operations management worldwide – with seven operations control centers to control approx. 28,000 route-kilometers

Solution:
Centralization of dispatching and control (comparable to airport control centers), central operation of electronic interlockings from the signaling control area, overlapping dispatching and control

Commissioning date: 2004

Benefits:
- Continuous control and dispatching of a large network
- Integration of the control area
Passenger information and public address system
New York City Transit’s subway network, USA

Siemens provided New York City’s subway network with a passenger information and public address system.

**Challenge:**
- Equipment of 13 lines and 156 stations with a fully redundant rail control center
- 24/7 operation of NYCT’s subway network

**Solution:**
- Public address system, customer information screen system, rail control center, travel information center

**Commissioning date:** 2009

**Benefits:**
- Full integration with the operations control center
- High-level system integrity with regard to redundancy, IT security, response times and maintainability
- Tested scalability for up to 500+ stations
**Operations control system**
New York City Transit’s subway network, USA

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**Siemens provided one of the most complex subway networks in the world with an integrated operations control center.**

- **Challenge:**
  Centralized operations control center for approx. 1/3 of NYCT’s 24/7 subway network. Automatic train supervision system (ATS-A) controls and automates about 175 track km, 172 stations, 50 interlockings, 220 simultaneous trains with merging, diverging local and express services on seven interconnected subway lines.

- **Solution:**
  Operations control center, fully integrated voice communication system, comprehensive timetable management, state-of-the-art PACIS integration, automatic vehicle identification

- **Revenue service:** 03/2008

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**Benefits:**
- Real-time train tracking and monitoring
- Automatic merging and rerouting logic to increase throughput
- Dispatchers released from routine tasks
- Extensive reporting capabilities
- Real-time train arrival and service status information available for comprehensive passenger information

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### Operations control system
CN (Canadian National Railways), Canada

Siemens provided three operations control centers with modern integrated operations control systems.

- **Challenge:**
  Operations control of freight rail lines with approx. 20,000 route-kilometers

- **Solution:**
  Operations control system, three operations control centers (Edmonton, Montreal e.g.)

- **Commissioning date:** 2005 – 2008

### Benefits:
- Integrated signal and dark territory control
- Web applications
- Superior availability features, incl. online database and software updates
- CN manages continuously changing territory and databases
Operations control system
Malayan Railways Limited (KTMB), Kuala Lumpur, Malaysia

Siemens is providing an operations control system in Malaysia to maximize capacity, punctuality, reliability and safety for the national railway operator.

- **Challenge:**
  Adaptation of the Swiss operational model to match local customer requirements

- **Solution:**
  Fully integrated operations control system to cover centralized dispatching and operation of the complete rail network

- **Commissioning date:** 2007

- **Current project:** Additional operations control system to be commissioned in Gemas in 2012

**Benefits:**
- Centralized and automated train operations
- Maximization of rail capacity
- Reduction of lifecycle costs
- Interfacing with variety of interlockings
Siemens provided an integrated passenger information system for four different regions in South Africa.

- **Challenge:**
  Country-wide roll-out in four regions: Johannesburg, Pretoria, Durban and Western Cape

- **Solution:**
  Passenger information and public address system, passenger help points, closed-circuit television, integrated fiber-optic WAN, intermodal bus terminal information, multi-source train describer input

- **Commissioning date:** 2009 – 2010 (in time for World Cup 2010)

**Benefits:**

- Live information automatically gathered and displayed in real time
- Improved reliability of information with less input by operators – train run prediction

**Passenger information system**
Passenger Rail Authority of South Africa