Train Management

PSItraffic/TMS
A Pioneering Solution
for Rail Transport

PSI

Intelligent Software for the Railway Operations of the Future

Solid Foundation for Rail Transport

Innovative, networked software systems such as the PSItraffic Train Management System (TMS) are essential when considered in the context of a growing world population and increasing mobility needs that include strict demands for safety, on-time service, and modern equipment. It is the foundation for the digitalization and automation of rail traffic processes and enables safe, trouble-free, and economical train operation. PSItraffic/TMS integrates both subways and railways.

Central Monitoring and Control

The system has continuous access to all required data and presents it clearly to dispatchers. An integrated fault management system ensures that unforeseen events, such as defective switches, signals and delays are detected and addressed in real time with appropriate suggested solutions. In this way, dispatchers can react as quickly as possible to disruptions without losing time, ensuring that planned train operations are restored. All of the data collected in PSItraffic/TMS forms the basis for supplying passengers with up-to-date passenger information.

Persuasive Advantages

Optimized planning via an overall view of the operational situation enables improved on-time train operation and better information for passengers.

Routine tasks are performed automatically by the system, allowing dispatchers to concentrate on dealing with irregularities.

A system supplying suggestions supports employees when dealing with faults. This is an enormous relief, significantly improving safety in dangerous or exceptional circumstances.

Modular, Scalable and Open

The open interfaces and modular structure of PSItraffic/TMS make it particularly flexible. Adjustments can be made at any time to evolving operational processes – even during active operation.

The system offers several automated interfaces, enabling it to exchange data with other systems or integrate customer-specific functions. The result is a top-to-bottom solution to support the entire railway operation. This integrated approach makes PSItraffic/TMS unique.

Complex Tasks, Simply Solved

Train Monitoring – Vehicle Monitoring During Operation
Recorded location data is continuously compared with the dynamic timetable and forecast location data. Arrivals at the stations can be registered and deviations, delays or track usage conflicts can be detected fully automatically. Dispatchers are alerted according to individually definable criteria.

Automatic Conflict Detection and Resolution
PSItraffic detects conflicts on single-track lines or at junctions, informs dispatchers and suggests solutions for fast dispatching steps such as shifting crossing points or deploying additional trains.

Train Routing
The train control system implements the current timetable by requesting the assignment of the appropriate track section in a timely manner, enabling short-term scheduling decisions.
An integrated controllability check ensures that only executable commands are sent to the signal boxes.

Autonomous Train Operation
PSItraffic/TMS calculates the optimal driving strategy and speed – even taking into account sudden events and updates – and sends the data to assistance systems. These can intervene in operations semi- or fully-autonomously, supporting the driver in relevant situations.

Ensuring Connections
The system checks in real-time whether connections can be maintained. If certain limits are exceeded, the dispatcher is alerted and can act accordingly. Drivers and passengers are informed automatically.

Coupled Train Operation
PSItraffic/TMS supports the separation and subsequent joining of combined trains to reach different terminal stations as part of the dispatching and passenger information system.

Passenger Information
Data from the system forms the basis for real-time passenger information – in vehicles, at stations and on mobile terminals. Special texts can be created for regular operations and for possible dispatching measures that are automatically selected, depending on the operating state.

Vehicle Management
Vehicle management ensures that vehicles are available in accordance with operational requirements. It plans and dispatches vehicles to the garages and controls vehicle parking at the assembly facility.

Quality Management PSI Cockpit
PSI Cockpit enables flexible access to archive data, determines key performance indicators and creates predefined management reports as proof of quality for task owners, etc.
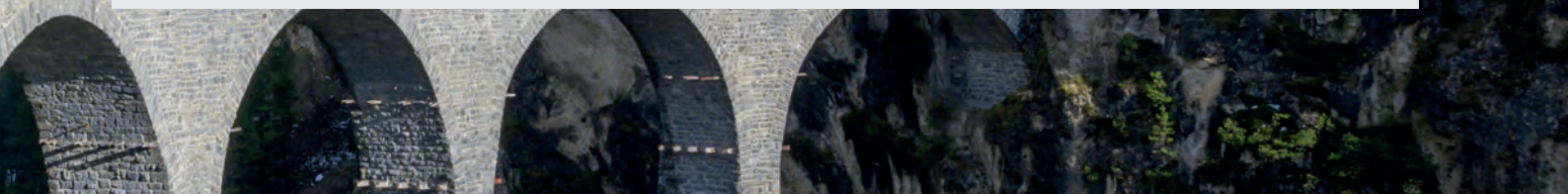
Ready for ATO/CBTC

A partially or fully automated train operation (ATO/CBTC), what has long been a reality in subways, is increasingly relevant for long-distance traffic – thanks to increasing system digitalization and networking. It is growing in importance for the future viability of railways as it reinforces important strengths of rail passenger transport such as reliability, safety, high transport capacity and sustainability.

The Train Management System PSItraffic/TMS provides an important component for all levels of automation up to fully automated operation.

PSItraffic/TMS collects all operational data and creates optimal train journey profiles which consider current conditions and dispatching decisions. These journey profiles are transmitted to the ATO/CBTC sub-systems. Depending on the configuration level, this results in trip recommendations for driver assistance systems – or even fully automatic operation of the entire network. Depending on the degree of automation, train drivers assume a supervisory function, intervening in the event of malfunctions or dangerous situations.

Benefits of this:

+ Increase in transport capacity through higher train frequency
+ Improved timetable stability and on-time performance
+ Energy saving through optimized operation
+ Greater passenger comfort due to consistent ride quality

PSItraffic/TMS

Journey Profile (route and timetable data)

ATO

CBTC

Interlocking
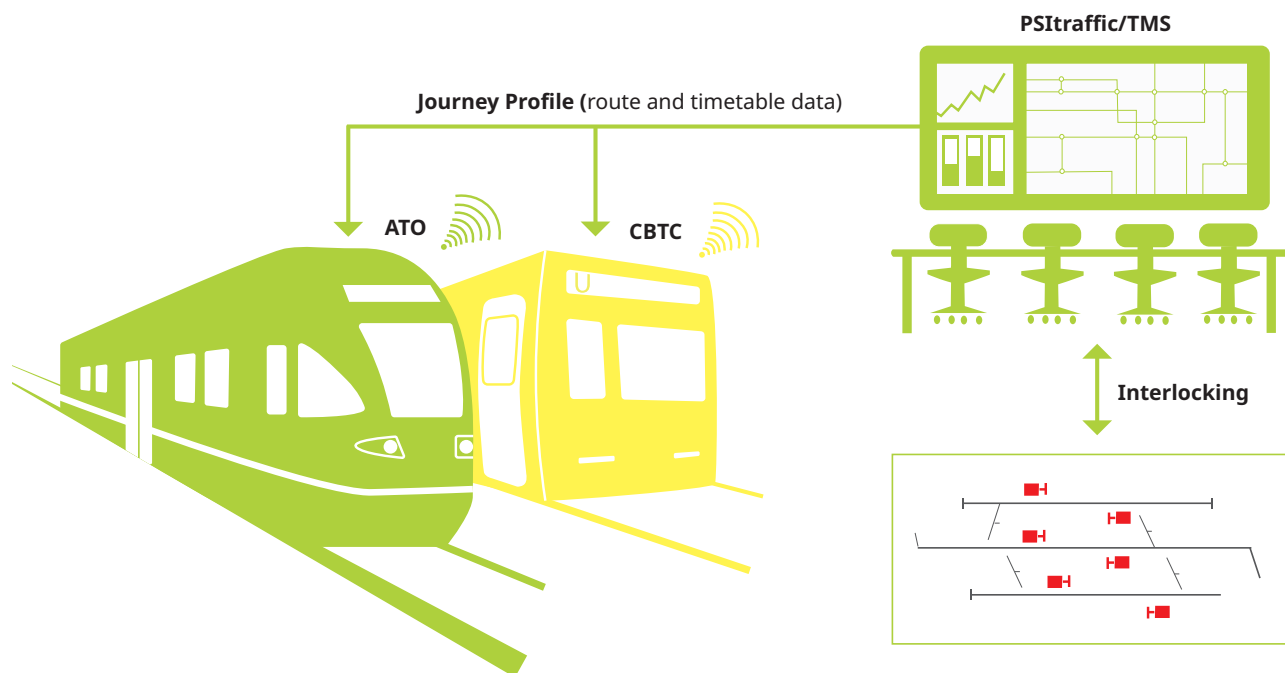
Features

Modularity and Openness

The system is based on the modular PSItraffic software platform. The platform's modules can be combined, expanded, and configured as required.
Interfaces to existing systems are based on current industry standards and are continuously adapted. They will be published for domains where standard formats have not yet been established. This makes data exchange with existing IT systems secure and stable.

+ Standard interfaces for timetable and duty scheduling
+ Remote operation for signal boxes
+ Displays, web-based information
+ Train routing
+ Quality management system
+ Passenger information system
+ Depot management system

Optimization

PSItraffic/TMS contains a powerful, fast, and flexible optimization core, the so-called Qualicision core, a unique selling point. It is specially designed for resource allocation in complex scenarios with many dynamic restrictions, as are often found in railway operations.

What distinguishes Qualicision:
+ Outstanding optimization speed with excellent solution quality thanks to modern heuristic optimization methods
+ High flexibility, e.g. expandability with new disposition criteria and restrictions without having to adjust the optimization core
+ Proven practical suitability through use by numerous customers

Simple, Intuitive Operation

Even complex processes must remain simple to control. For this reason, the design and usability of interfaces and dialogues is especially important to us. User interfaces have a uniform design and are extensively configurable. Specific views can be arranged individually, zoomed, or docked to the edge of the screen. Graphical and tabular representations include:

+ Route images: Track-specific visualization of the current traffic situation with track infrastructure
+ Lines: Representation of the traffic situation on a line (abstracted from the track structure)
+ Time-distance-line diagram: Graphical timetable with optional target-performance comparison
+ Graphical dialogue: Timetable editing for a single train or for a group including multiple trains

Process Reliability

Critical infrastructure operators (KRITIS) must demonstrate that their IT security is state-of-the-art.
While implementing a PSItraffic/TMS, all standards for the specification, design, construction, installation, acceptance, operation, maintenance and modification or expansion of data processing systems for railway applications are considered and adhered to.

For quality assurance, all processes are defined by a system of guidelines. The guidelines and the internal implementation are certified according to ISO/9001:2008 and ISO/IEC 27001:2013. In accordance with these standards, all IT risks are analyzed, reviewed, and minimized using appropriate measures.

Standardize, Automate, Benefit

Reliable operations, reliable connections, efficient incident management.
PSItraffic/TMS supports you in daily operations.

Your Benefits:
+ Real-time overview of the entire operational situation
+ Trouble-free train operation through automatic conflict management
+ Flexible and intuitive usability, customizable interfaces
+ Modularity and open interfaces
+ Real-time information on and for passengers
+ Safeguarded connections enterprise-wide
+ Integrated quality management with PSI Cockpit
+ Possibility of system operation in the cloud
+ Certified security

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