

Train Management

# PSItraffic/TMS A Pioneering Solution for Rail Transport

PSI 



# Intelligent Software For The Railway Operations Of The Future

## Solid Foundation for Railway Operations

In the context of a growing global population and increasing mobility needs, as well as higher demands for safety, punctuality, and modern technical equipment, innovative, connected software systems like the PSITraffic Train Management System (TMS) are indispensable. It serves as the foundation for the digitization and automation of railway operations, enabling safe, uninterrupted, and cost-effective train services. PSITraffic/TMS integrates both subways and trains seamlessly.

## Centralized Monitoring and Control

The system continuously gathers all necessary data and presents it clearly to the dispatchers. An integrated incident management system ensures that unforeseen events, such as faulty switches, signal failures, or delays, are detected and addressed in real-time with appropriate solution suggestions. This allows dispatchers to react to disruptions as quickly as possible, ensuring the restoration of planned train operations without delay. All data captured by PSITraffic/TMS also serves as the basis for providing passengers with up-to-date travel information.



## Standardize, Automate, Benefit

Reliable operations, secure connections, efficient incident management.  
PSITraffic/TMS supports you in daily operations

Your benefits:

- + Real-time overview of the entire operational status
- + Disruption-free train operations through automatic conflict management
- + Flexible and intuitive usability, customizable interfaces
- + Modular, scalable, and open for interfaces
- + Real-time passenger information
- + Cross-company connection security
- + Potential system operation in the cloud
- + Certified security



# Complex Tasks, Simply Solved

## **Train Run Monitoring – Vehicle Monitoring During Operation**

The collected location data is continuously compared with the dynamic timetable and the predicted location data. This allows the system to determine station arrival times and automatically detect deviations, delays, or track usage conflicts. Dispatchers are alerted based on individually defined criteria.

## **Automatic Conflict Detection and Resolution**

PSIttraffic detects conflicts on single-track routes or at intersections, informs the dispatchers, and provides solution suggestions for quick, operational measures, such as adjusting crossing points or deploying additional trains.

## **Train Control**

The train control system implements the current timetable by timely requesting the setting of the appropriate routes and enabling short-term dispatching decisions. An integrated feasibility check ensures that only executable commands are sent to the signal boxes.

## **Autonomous Train Operation**

PSIttraffic/TMS calculates the optimal driving strategy and speed – taking into account short-term events and updates – and sends the data to assistance systems. These systems can intervene semi-autonomously or autonomously in the operation, supporting the driver in specific situations.

## **Connection Assurance**

The system checks in real-time whether transfer connections can be maintained. If certain thresholds are exceeded, the dispatcher is alerted and can take appropriate action. Train operators and passengers are automatically informed.

## **Splitting and Merging Trains**

PSIttraffic/TMS supports the splitting and subsequent merging of combined trains to reach different final destinations as part of dispatching and passenger information.

## **Passenger Information**

The data from the system forms the basis for real-time passenger information onboard the trains, at stations, and on mobile devices. For regular operations and potential dispatching measures, special texts can be recorded and automatically selected depending on the operational status.

## **Vehicle Management**

The vehicle management system ensures that the required vehicles are available according to operational needs. It plans and schedules the delivery of vehicles to the workshops and controls parking in the stabling area.

# Digital Route Atlas – Foundation Of The Digital Railway

To benefit from the advantages of digitalization and the integration of all systems, a comprehensive electronic documentation of the track infrastructure is essential. This includes data that is often deeply embedded in signal control planning, such as slip distances, flank protection, and resulting route exclusions. Additionally, all information from adjacent external systems must be integrated.

Transportation companies thus establish not only the foundation for current modernization projects but also a reliable base for further steps towards a digital railway.

With the graphical infrastructure editor PSI Trackplanner, all data required for a Train Management System can be collected, consolidated, and validated. It also allows for the easy extraction of data for all connecting systems, such as data hubs, which operate on less detailed network models.

## Conditions for Data Capture

For smooth network digitalization, the following conditions have proven effective:

### 1. Data Capture in Standard Formats

Data should be captured in widely accepted standard formats like railML or based on EULYNX to ensure that the data is complete and consistent in a well-documented format. This ensures reusability for future projects.

### Data Capture via Editor

A graphical editor reduces the likelihood of errors in data capture. Inconsistencies between different data sources can be quickly and reliably identified.

### Tailored Views

Early in the process, it is important to determine which data sources will be integrated during network capture, who the data recipients are, and how the data models differ. The capture of the track network should be conducted in great detail.

## PSI Trackplanner – The Central Tool For Detailed, Consolidated And Validated Infrastructure Data In Transport Companies

- Track-editing and layout definition
- Railway objects designing and management
- Trackside data preparation
- Simulation environment and control
- Testing facilities
- Run-time operation visualization



- User-friendly
- Lightweight
- Modular
- Expandable
- OS-independent
- Customizable
- Interoperable

# Features That Set New Standards

## Modularity And Openness

The system is based on the modular platform PSITraffic. The software components can be assembled, expanded, and configured according to requirements. Interfaces to existing systems are based on common industry standards and are continuously updated. This ensures that data exchange with existing IT systems is secure and stable.

- + Timetabling and service planning
- + Remote control for signal boxes
- + Display systems, web information
- + Train control
- + Quality management system
- + Passenger information system
- + Depot management system



## Simple, Intuitive Operation

The user interfaces are designed in a consistent style and are extensively configurable. Specific views can be individually arranged, zoomed, or „docked“ to the edge of the screen. Graphical and tabular representations include:

- + Track Maps: Precise visualization of the current traffic situation with track infrastructure
- + Line Bands: Representation of the traffic situation of a line (abstracted from the track structure)
- + Time-Distance Line Diagrams: Graphical timetable with optional target vs. actual comparison
- + Graphical Dialogs: Editing of the timetable for a single train or grouped editing of multiple trains.

## Process Reliability

Operators of critical infrastructures (KRITIS) must demonstrate that their IT security is up to date with the latest technology.

In PSITraffic/TMS, all standards for the specification, design, construction, installation, acceptance, operation, maintenance, and modification or extension of data processing systems for railway applications are considered and adhered to. For quality assurance, all processes are defined by a guideline system. The guidelines and internal implementation are certified according to ISO/9001:2008 and ISO/IEC 27001:2013.

Accordingly, all IT risks are analyzed, controlled, and minimized through appropriate measures.





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