



RAIL TRAFFIC MANAGEMENT

High-level full-scale solutions for
centralised traffic management

PROVEN RAILWAY SAFETY EXPERTISE

Mipro is a Finnish railway system specialist with nearly 30 years of experience in developing and supplying interlocking and traffic control solutions. Mipro's systems are based on advanced technologies, railway safety standards and close co-operation with end users.

CENTRALISED TRAFFIC MANAGEMENT SYSTEM

Mipro's highly scalable traffic management system helps ensure reliable and efficient rail traffic in all situations. It integrates seamlessly to various types of interlocking systems and provides a unified operational environment, data transmission connections and interfaces for their control.

The system is developed in close co-operation with the end users and the Finnish Transport Agency to provide the high availability and flexibility required for various rail network environments.

The traffic management system architecture is modular and suits small and large installations, from a single stand-alone workplace to a fully-integrated control centre.

It can be operated via unified user interface functions displayed on centrally, remotely or locally located workstations.

The system properties and functions are designed to support remote control of track sections operated by the dispatcher but also to prevent human errors in traffic controlling operations.

The controlling operations are based on the commands issued by the dispatcher and on automatic functions provided by the traffic management system. Indications of the system are designed according to customer and national requirements and in the required language.

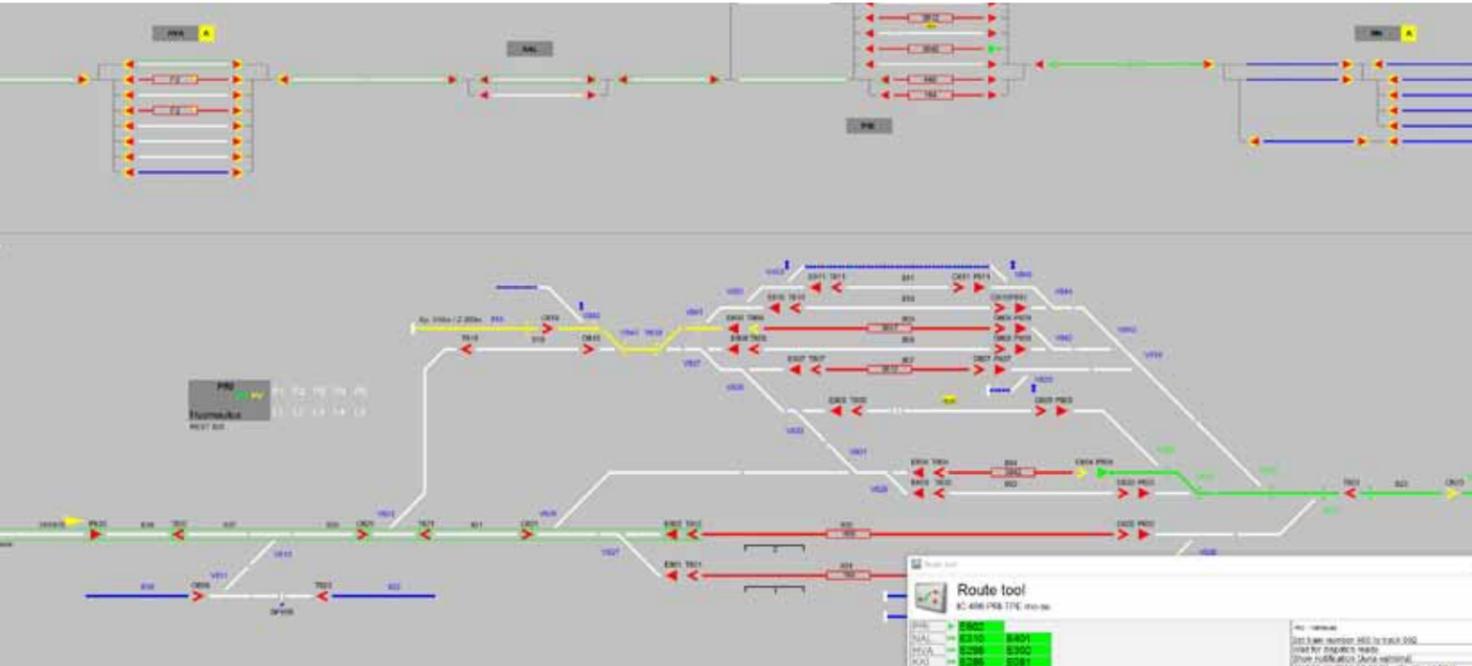


KEY FEATURES

- > Modular system architecture - you can build the system in stages and extend its scope and features.
- > Easy adaptation - the system connects seamlessly with existing systems, processes and equipment.
- > Flexible configuration - you can control the system centrally from a traffic control centre or via remote control sites.
- > Ease of use - the system provides unified user interface functions regardless of the interlocking technology.
- > Availability - you can rely on proven technologies and redundant platform features.



AUTOMATIC FUNCTIONS FOR EFFICIENT TRAFFIC MANAGEMENT



Traffic controllers must manage even larger amounts of data in their work as areas to be controlled have become wider. Today a traffic controller's work also requires constant attention and interaction with rail maintenance supervisors, train drivers and shunting work personnel. Consequently, they have to be able to notice abnormal situations and elements immediately and react to them without delay.

DYNAMIC CONTROL ENVIRONMENT TO ENHANCE DAILY WORK

Traffic controllers play a key role in ensuring a great number of different functions in the railway network. Mipro's traffic management system takes the challenges involved in traffic controllers' work into account. Two key features of the system are flexibility and adaptability. The system provides tools for users to adapt their workspace to support their work.

The automation level of the system is high, which means that traffic controllers can focus on problem solving instead of on simple operational tasks.

The illustrative windows and layers with different information are designed in co-operation with train traffic controllers - this ensures that they are best suited to their needs.

ADAPTATION TO VARIOUS TRAFFIC SITUATIONS

The traffic management system windows and displays are designed to be easy to operate and to support automatic functions. One of the main features of the system is its easy adaptation to different traffic situations.

Features to support dispatchers' work:

- > Country-specific and interlocking system specific requirements are considered in control displays.
- > The scope of control displays is designed case by case.
- > Users can modify and save their own views for various operational situations: for example, the amount of information and the location of control displays and windows can be defined by the user.
- > Control areas and user rights are freely definable.
- > Control views are highly scalable.



As the automation level of the system is high, users can focus on problem solving instead of on simple operational tasks.

Traffic controllers can use the tools and the system in a manner that best suits their needs.

AUTOMATIC OPERATION BASED ON TRAIN NUMBERS

The traffic management system includes several automatic functions that facilitate the dispatcher's daily work and prevent human errors. These functions include automatic route setting, graphical train data from train movements and timetables, automatic or manual train number function, and data from various other sources e.g. video surveillance, fire detection.

The automatic train number function is based on the timetable and route defined for the train.

- > The system identifies various types of conflict situations and suggests a solution based on route and train priorities.
- > The routes of automatic route setting are visually shown in the control display. The user can change the route directly from the control display.
- > Different types of scheduled or event-based functions and sequences can be defined as part of the automatic operation.

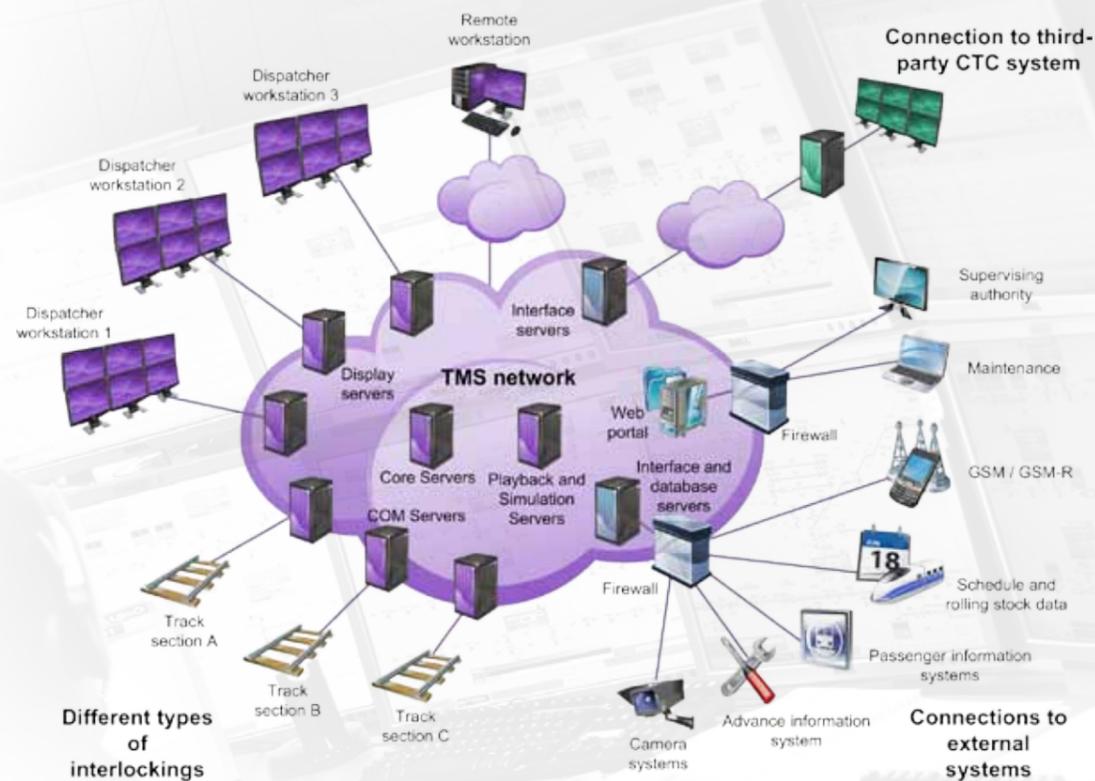
DYNAMIC USER INTERFACE

The user interface of the traffic management system has several levels from detailed dispatching views to high-level situation overviews. Multi display setups are used in most installations. Control areas are dynamic, and any track section can be controlled from any workstation according to the user rights. End users can freely change the control areas according to their needs.

SIMULATOR AND PLAYBACK ARE PART OF SYSTEM CONFIGURATION

The simulator and playback are basic features of Mipro's system concept. The simulator is specially designed for training dispatchers and testing and defining automatic functionalities. Furthermore, it can be used to simulate various signalling and interlocking systems to enable their accuracy and functionality to be tested in a real traffic control environment prior to commissioning.

MODULAR SYSTEM ARCHITECTURE



FLEXIBILITY FOR CONFIGURATIONS AND FEATURES

Mipro's traffic management system is composed of modules and functional layers that form a highly scalable solution for different traffic environments and installations of various sizes. The system can be implemented and commissioned in stages, which means that you can include a desired part of the rail network or marshalling yard in the system scope when needed.

The system platform utilises commonly obtainable hardware components and software that have been proven for their reliability and functionality in numerous different environments and sites. In this way, we can guarantee a constant and cost-effective system development.

AVAILABILITY THROUGH REDUNDANCY

The system's availability and reliability are based on redundant platform features. The system is designed to tolerate unexpected computer and component failures. This is achieved by using hot-standby redundant and real-time system servers which back-up each other in a failure situation and ensure uninterrupted use of the system.

The system software is cross-platform and various operating systems are supported. For installations and overall scalability virtualisation technologies and thin clients are favoured.

REFERENCES

Mipro's traffic management system manages over 4000 rail track kilometres in Finland when the TAKO traffic control system is commissioned on Western Finland's track sections.

The TAKO project, Modernisation of Western Finland's remote control, covers the existing and new track sections in the area covering about a quarter of the Finnish railway network - that is about 1400 track kilometres (875 miles). The operating area under the new system includes over 10 000 elements to be controlled and monitored; for example 1900 signals and 1250 points.



INTERFACES WITH EXTERNAL SYSTEMS

To increase automation and data transparency, the system supports interfaces to several other traffic and maintenance management systems, for example nationwide information systems for maintenance, track work, telephone and timetable management. The following interfaces are supported, for example:

- > Power control centres
- > ERP systems for marshalling yards
- > Operative timetable systems
- > Timetable planning systems (e.g. RaiIML)
- > SMS (Short Message Service) and IVR (Interactive Voice Response) systems
- > Train number transfer interfaces to other suppliers' remote controls
- > Passenger information systems.

INTERFACES WITH VARIOUS INTERLOCKING SYSTEMS

Mipro has implemented interfaces with interlocking systems of various suppliers including:

- > Ebilock 850, Bombardier
- > Simis C, Westrace, Siemens
- > Mikrolok, Ansaldo
- > MiSO TCS, Mipro
- > various relay interlocking systems, such as Domino 55 Ganz, Spurplan Siemens.

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