



INTELLIGENT OPERATIONS CONTROL SYSTEMS FROM SIEMENS MOBILITY

# Controlguide OCS

**SIEMENS**

## THE INTELLIGENT RESPONSE TO YOUR CHALLENGES

# Controlguide OCS

## Increasing challenges

One of the greatest tasks of modern times is to ensure cost-effective, sustainable mobility while providing attractive offers for passengers.

Rail operators face major challenges:

- Increasing line capacity without additional infrastructure
- Improving the quality and attractiveness of transport services
- Optimizing the usage of all resources
- Minimizing energy consumption
- Optimizing life-cycle costs
- Securing long-term investments

As an operator of rail transport systems, there is a need to meet the ever-increasing demand for transportation and the growing process of urbanization. Passengers are becoming more demanding in their requirements. Today, they expect safety and punctuality, as well as traveling comfort and environmental awareness.

On the other hand, restricted resources and investment funds are available. These resources and funds must be deployed efficiently to operate with economic success.

Controlguide OCS\* is the leading brand for operations control technology for mass transit and mainline rail applications, as well as freight, industrial, and mine railways. Controlguide OCS is a state-of-the-art platform that, due to its modularity and scalability, offers high-level flexibility in application.

The functions to be implemented can be individually expanded or adjusted, depending on customer needs. Furthermore, individual functional upgrades and extensions can be performed in further steps. In this way, existing investments are secured, and required expansions can be made based on actual needs.

In addition to the control of day-to-day operations, Controlguide OCS offers high-performance automation functions and intelligent dispatching functions to optimize operating sequences for efficient and cost-effective rail services. Controlguide OCS is the smart response to challenges.



\* Controlguide OCS is the family name of Siemens Mobility's operations control system solutions including the solutions which are already successfully established on the market.

# Controlguide OCS

## The simple formula for your success

### No. 1

Your operations automated!

### No. 2

Your investment secured!

### No. 3

Your infrastructure usage optimized!



## THE SOLUTION FOR ALL LEVELS OF OPERATIONS

# Controlguide OCS

Controlguide OCS provides functions for all levels of rail traffic control and operations management. Thus, it offers special support in the efficient handling of rail transport.

## Fully integrated control of operations

Controlguide OCS enables the planning and execution of operations. In the event of deviations in planned operating sequences, Controlguide OCS utilizes advanced dispatching functions to minimize any resulting disruptions. Thanks to an intuitive user interface, interventions in day-to-day operations can be made effectively and efficiently, particularly in difficult situations.

## Centralized monitoring

Different types of interlocking systems and train control systems can be monitored and controlled by Controlguide OCS. These functions can be centralized for even more effective operations management for individual lines, regions, or complete networks.

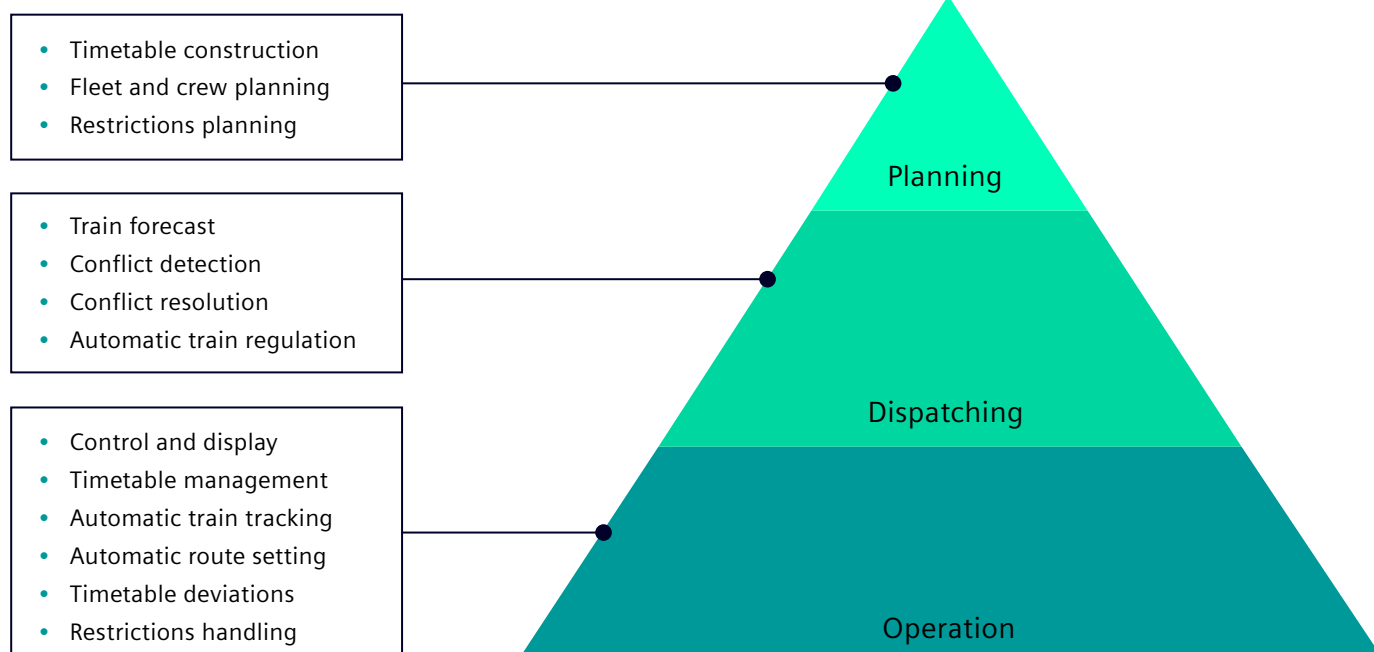
## Automation on demand

With its high-performance automation functions, Controlguide OCS offers ideal conditions for centralizing operations management. Staff will be relieved of routine work and can fully concentrate on ensuring smooth traffic flows.

Whatever is required of system performance and functionality, Controlguide OCS supports different solutions, including fully automatic unattended train operation (UTO) with extended automation functions for handling emergency situations.

## Advanced dispatching functions

With the increasing complexity and centralization of operations management, deviations during operations may entail considerable consequences. That is why Controlguide OCS provides advanced dispatching functions. Even in exceptional situations, these functions guarantee a high level of performance and reliability in rail services.





TOMORROW'S OPERATIONS CONTROL TECHNOLOGY AVAILABLE ALREADY TODAY

# Controlguide OCS

Already today, Controlguide OCS provides tomorrow's operations control technology.

Controlguide OCS helps cope with the growing complexity of centralized systems at any time. It allows the detection of any disruptions in operations at an early point in time and, thanks

to its advanced functions, intervention in the course of operations. This minimizes any unfavorable operational impact.

Since Siemens Mobility solutions can be adjusted to changed tasks and the requirements of the system, investments can be focused on current needs, equipping today for tomorrow's demands.

## Benefits at a glance:

- Increased performance through optimized usage of existing resources and capacities as well as high-performance automation functions
- Guaranteed high-level operative availability, even in exceptional situations, due to advanced dispatching functions
- Improved quality and customer satisfaction through optimum support in handling deviations during planned operations
- Lower implementation and life-cycle costs thanks to the product platform as a basis for customer-specific adjustments
- Flexible organization through adjustable allocation of monitoring areas and functions to workplaces and handling of different tasks by mobile equipment, irrespective of the actual location
- High-level usability due to the user-friendly HMI and intuitive operations control workflows
- Expandability and increased performance as required; low-risk integrability into an existing infrastructure due to the modular and scalable system architecture with open interfaces
- Support of safety-critical commands through procedure-protected control and display

**OPTIMUM SUPPORT FOR COST-EFFECTIVE OPERATIONS MANAGEMENT**

# Controlguide OCS

**Controlguide OCS focuses on specific needs.**

Controlguide OCS provides all the necessary resources and information required for efficient, cost-effective operations management. These can be individually adjusted to specific requirements.

**Controlguide OCS helps keep track of the rail traffic situation.**

The user interface and the operating sequences are consistently geared to the tasks and targets of different users and roles. The consistent interaction concept ensures intuitive, efficient operator control.

**Controlguide OCS enables control of rail operations – even in difficult circumstances.**

High-performance automation and dispatching functions are available to provide optimum support, even when handling deviations in planned operating sequences.

**Controlguide OCS enables flexible structuring of work organization.**

Monitoring areas and functions can be allocated to different workplaces in line with specific needs. The use of mobile equipment allows different tasks to be handled irrespective of the location.

**Controlguide OCS allows expansion of existing infrastructure.**

Existing rail-specific systems and applications can be integrated into Controlguide OCS both cost-effectively and with a low level of risk. In this way, operating sequences can be structured and optimized holistically.

**Controlguide OCS grows in step with requirements.**

Responses to the needs for short-term action can be made by means of selective investments. In addition, long-term strategies for full optimization of operations management processes can be implemented.

The Maintainer performs the necessary maintenance and repair work at rail installations and equipment.



The Supervisor is responsible for dispatching in the case of incidents with cross-regional effects.

The Dispatcher coordinates train operations on a lookahead basis and in the case of any sudden incidents.

The Security Manager is responsible for ensuring security in rail operations.

The Information Manager ensures that passengers are immediately notified in the event of any irregularities.

The Maintenance Manager coordinates and monitors all necessary maintenance and repair work.

The Signal Operator is responsible for safe, on-time train running.

## FORWARD-LOOKING, CONFLICT-FREE PLANNING OF OPERATIONS

# Planning

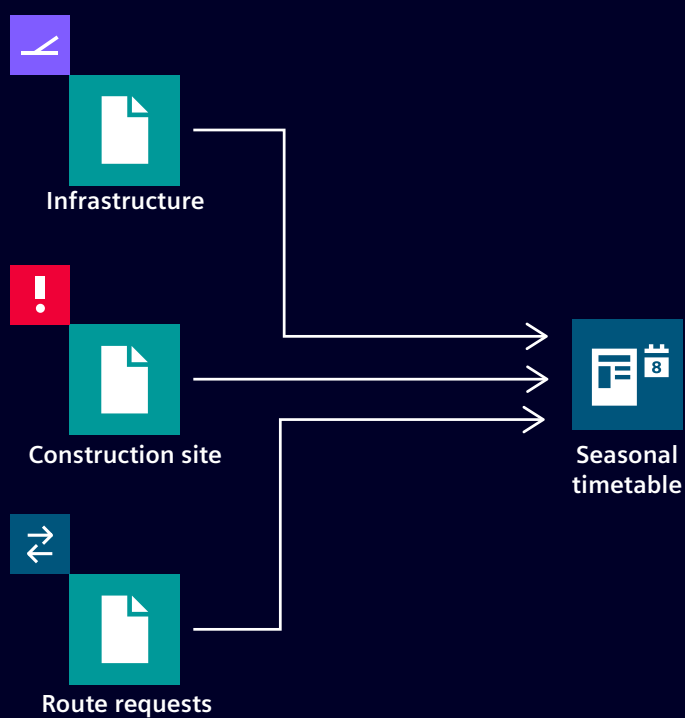
**Timetable construction**

A long-term, conflict-free, robust timetable is the basis for operating rail services.

Taking into account expected future traffic levels and all operationally relevant factors, offered train services are mapped to the existing infrastructure. This is the basis for planning fleet and crew demand and their optimum scheduling.

**Restrictions planning**

Operational restrictions due to construction work or scheduled maintenance, such as track possessions or speed restrictions, can be planned in Controlguide OCS in advance to set up track possessions.



## SCHEDULED MANUAL OR AUTOMATED HANDLING OF OPERATING SEQUENCES

# Operation

### Control and display

All information about current operations is displayed by Controlguide OCS in real time. Different types of interlockings and train control systems, such as ETCS Level 2, can thus be operated and monitored individually on site or centrally for lines and regions or even for entire networks.

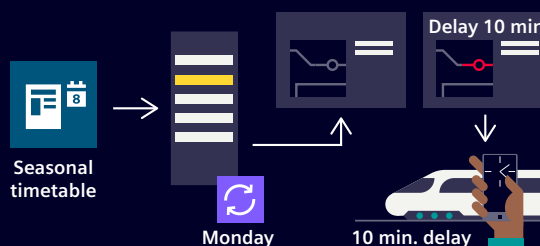


Controlguide OCS also offers support in maintaining availability in the event of technical faults in the infrastructure. If the operating rules implemented in the signaling and safety system provide for the bypassing of technical faults, the vital control and display feature of Controlguide OCS ensures maximum safety even in the case of the safety-critical operator actions.

### Timetable management

Seasonal timetables set up during timetable construction are used to derive production timetables for operations. These production timetables are then adjusted to actual day-to-day operations.

Controlguide OCS can be used to manage and modify these production timetables as with special or emergency timetables for exceptional situations. The subsystems are supplied with up-to-the-minute timetable data during runtime.

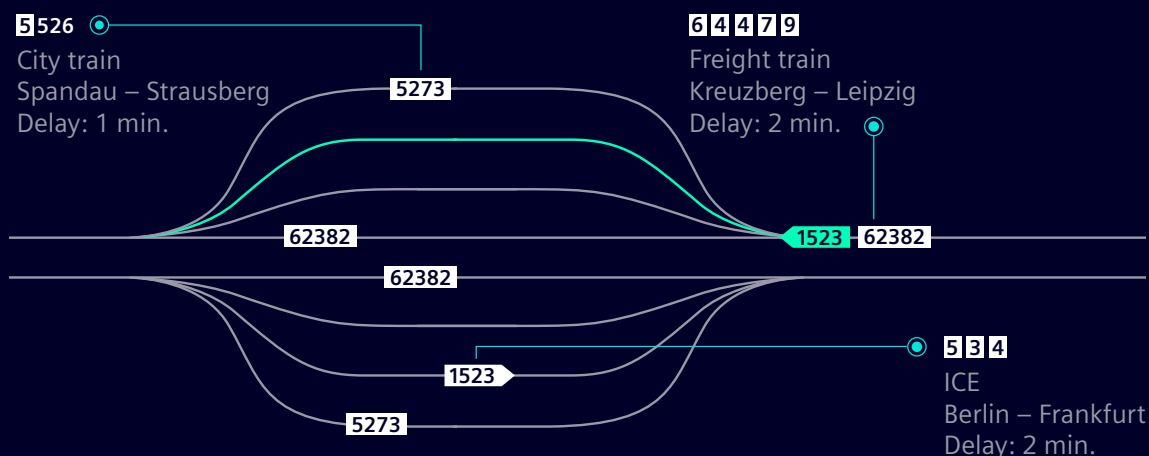


### Automatic train tracking

The tracking of individual trains with their train numbers within the network and the provision of information for train location are prerequisites for centrally operating large-sized rail traffic areas.

At all times, Controlguide OCS offers an overview of the current train locations. To do so, it uses the status changes of interlocking elements, such as clear and occupied indications from track vacancy detection equipment, stop and proceed aspects of signals, and point positions. Of course, Controlguide OCS can also use information from other systems (e.g. position indications of state-of-the-art train control systems) for train tracking.





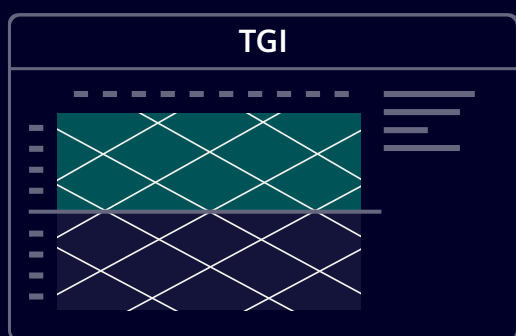
### Automatic route setting

Automatic route setting requests to the interlocking systems relieve the signalman of standard operator actions. Commands are issued on time, as late as possible to prevent tracks or points from being unnecessarily blocked and as early as necessary to prevent unnecessary decelerations or stops.

Controlguide OCS supports various route setting strategies. It is based on either trip destinations or lines by establishing the route by means of the train number's destination code or the timetable with full evaluation of the train number.

### Timetable deviations

Controlguide OCS determines timetable deviations resulting from current operations and indicates them, e.g. as delay minutes or time/distance diagrams. This means that, together with the current train locations, the relevant information is available for manual dispatching.



### Restrictions handling

In the event of any scheduled operational restrictions, local staff can use mobile terminals to request and release track possessions and speed restriction sections.

Controlguide OCS ensures that track possessions can only be activated when staff are on site and only released when the maintenance team has safely vacated the location. Controlguide OCS prevents any confusion in setting up and releasing track possessions by correspondence checking of the planned and actual locations.

All measures help to minimize necessary track possession times and provide maximum work safety.

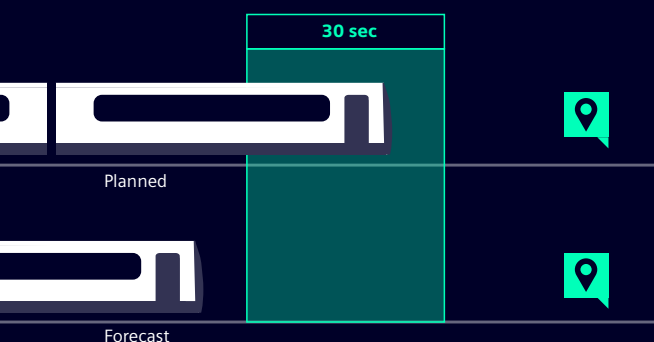


## RAPID ELIMINATION OF DISRUPTIONS IN SCHEDULED OPERATIONS

# Dispatching

## Train forecast

On the basis of current train locations and the original planning specifications, Controlguide OCS uses driving dynamics parameters, topographical line data and timetable data to make reliable train forecasts.



## Conflict detection

Controlguide OCS detects conflicts in operating sequences which evolve from current and forecast operations. These conflicts can, for example, be depicted in a time/distance diagram so that the dispatcher is notified about any necessary action on time.



## Conflict resolution

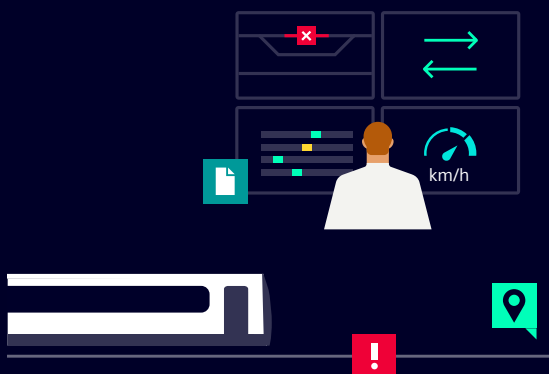
Controlguide OCS calculates suitable solutions for the detected conflicts in order to exclude or minimize the resulting disruptions, particularly due to forecast following conflicts. The objective is to restore planned operation as fast as possible.



## Rule-based conflict resolution

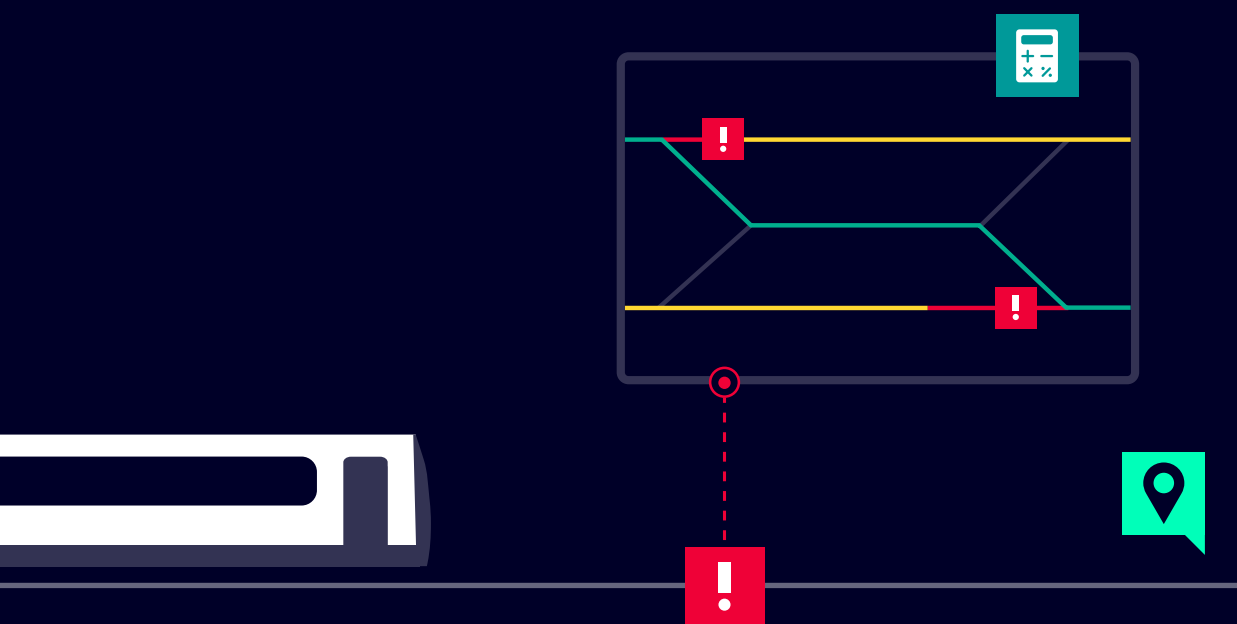
Solutions for conflicts expected during operations are established in line with specified rules and strategies which have been defined in advance and then offered for execution.

Controlguide OCS enables continuous improvement of rule-based conflict resolution by adjusting the rules on the basis of the customer's own operational experience. Changing operating sequences can be mapped by new or adjusted rules. Integrated effectiveness monitoring indicates necessary action in the revision of rules.



### Optimization-based conflict resolution

Optimization-based conflict resolution is applied particularly in extensive, complex networks with different train priorities and highly interlinked train services. An optimum conflict-specific solution is calculated in line with individually defined key performance indicators.



### Automatic train regulation

Automatic train regulation adjusts running times and dwell times or speed profiles in order to compensate any deviations from the timetable both fast and effectively. Controlguide OCS implements headways relating to stations and directions of travel and line-specific sequence controls for optimum operating sequences without manual intervention.

## MODULAR AND SCALABLE SERVICE-ORIENTED SYSTEM ARCHITECTURE

# Characteristics

As an open, user-friendly system, Controlguide OCS offers numerous benefits beyond its directly application-related functions. It thus becomes a future-oriented investment in the efficiency and optimization of rail operations. Since customer-specific adjustments are based on a broad product platform, lower implementation and life-cycle costs can also be expected.

### **Modularity and scalability**

The modular Controlguide OCS concept is geared to providing a flexible, individual solution for rail operations. Available modules can be used to combine features that exactly correspond to specific needs. The open system architecture makes the solution scalable on both the software and hardware levels and can be easily adapted to growing demands. In this way, its performance and functionality can be adjusted to requirements even years after the solution has been commissioned.

### **Integrability and migratability**

Due to open interfaces, future applications can be integrated into existing infrastructure both cost-effectively and with a low level of risk. Independence from any concrete platform allows for individual expansion of the solution as and when required. Other rail-specific applications can be easily integrated into Controlguide OCS as data can be provided for further processing and evaluation for external systems.

### **Availability and performance**

Controlguide OCS convinces users through its availability and performance. For example, due to its technically sophisticated redundancy concepts, the system is highly available and notifies about any disruptions fully automatically. In addition, the use of standard hardware enables usage of the full performance of future computer generations in the implementation of increasing needs for operations control systems.

### **Usability**

Its user-friendly, consistently integrated user interface and optimum workflows ensure that staff can work intuitively with Controlguide OCS. Even in difficult operating situations, this enables them to act calmly and effectively in handling their tasks.

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