Train Planning System TPS
Network Capacity Management
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TPS helps railway infrastructure managers as well as train operating companies to significantly improve their work and business processes regarding operative timetable planning. As a modular toolbox and high-performance software solution, HaCon’s train planning system combines infrastructure, timetable and train path management as well as all interaction. Whether for managing network capacities, identifying route conflicts or finding solutions – TPS creates reliable timetables from strategic long-term planning to real-time train disposition.

TPS facilitates the process of managing network capacities according to the regulations of the European Union. Multi-user operation is a central element in the software architecture. As a result, trains can be processed by various planners from different organisations on different locations at the same time. Rights, roles, groups and users can be precisely defined.

TPS provides several automated interfaces (e.g. web services) and thus optimally interacts with other systems. Customer-specific functions can be easily integrated as well. This way, the software perfectly adapts to existing IT infrastructures. The requirements for non-discriminating train path inquiries and order processes are met according to the corresponding European communication standards such as TAF TSI.

Timetable Management in Europe
TPS was first put into operation by the Danish National Railways (DSB) in 2002. Since then, the HaCon system has become increasingly popular all across Europe: In addition to national railway infrastructure managers like the British Network Rail, SNCF Réseau in France, Banedanmark in Denmark and the Norwegian Jernbaneverket (JBV), also major train operating companies such as the French SNCF are using HaCon’s timetable technology.

Individually Configurable
Infrastructure managers, transport providers and private rail freight companies at industrial locations benefit from flexible
TPS at a Glance

- Highly flexible and configurable solution for railway networks of any size
- Timetable management
  » Runtime calculation
  » Seamless integration of closed tracks and speed limitations
  » Automated search for conflict-free train paths and synchronization with the current timetable
  » State-of-the-art graphical features: track infrastructure, graphical timetable, track occupation plan and various output options
- Sophisticated data integration via various interfaces
- Static or dynamic access to occupation data
- End-to-end bid-offer process for infrastructure managers and train operating companies
- Real-time module for conflict detection and resolution with comprehensive review and preview functionality
- Integrated simulation functionality
- Capacity analysis according to UIC 406
- European Communication Standard TAF TSI
- railML-certified

User-Friendly and Results-Oriented

Train planners appreciate the one-stop solution from HaCon: TPS supports the daily work processes with various innovative features such as automated data completion, exact runtime calculation and search for conflict resolutions. The intelligent FindSlot service, for instance, recognizes path conflicts and automatically provides alternatives for the affected trains. TPS users can then easily select the best possible option. Another highlight is the integrated management of track work activities that immediately reacts to current inquiries and changes in the construction process.

References

Abellio
Public transport provider, Great Britain and Sweden

Banedanmark
National infrastructure manager, Denmark

Danske Statsbaner (DSB)
State railways, Denmark

Fortescue Metals Group (FMG)
Iron ore company, Australia

Jernbaneverket (JBV)
National railway authority, Norway

Network Rail
Infrastructure manager, Great Britain

SNCF Réseau (formerly RFF)
National infrastructure manager, France

SNCF
Public and freight transport provider, France

TP Ferro
Infrastructure manager, Spain and France

Trafikstyrelsen
Rail regulatory authority, Denmark

“TPS significantly improves our work and business processes.”

Hans Erik Wiig, Jernbaneverket
Train Planning with TPS

Train Path Inquiry and Order Process

TPS monitors and controls the entire bid-offer process between network operators and railway companies using the European communication standard TAF TSI. Web-based train path inquiries generate so-called worksheets that lead through the respective planner's responsibilities in a process-controlled way. From inquiry to train path planning to making an offer to the customer (if necessary, with repeated bid-offer process) to the final order – the current status is always visible and comprehensible during the entire process. With individual user rights and roles precisely defined, TPS clearly indicates who is responsible for the next steps – regardless of the number of users. In the timetable, too, the software immediately shows the effects of path relocation and realignment – resources and schedules are adapted accordingly. For maintenance measures, there are specific worksheets to request and reserve construction areas, track possessions or temporary speed restrictions.

TPS Realtime

Real-time Train Disposition

Is the train delayed? Is a track change necessary? Do other trains have to wait in order to keep the track clear? In the control center, dispatchers face these kind of questions on a daily basis and often need to reschedule trains within a few minutes. For short-term planning periods, the TPS Realtime module facilitates adaptations in train path occupation according to the current situation until shortly before departure and even during the running operation. In case of deviations from the original schedule, train dispatchers are not only able to precisely predict possible conflicts, but also resort to various solution scenarios. Especially smaller
infrastructure managers benefit from increased efficiency in operations. For instance, the Australian iron ore company Fortescue Metals Group (FMG) schedules its freight transport from and to their mining locations with TPS Realtime.

TPS Operator

Efficiency in Passenger and Freight Transport

The TPS Operator edition is specifically designed for transport companies that cooperate with network operators according to common standards in order to create their timetables. It allows them to easily and quickly access the current infrastructure database and check train path inquiries for current vehicle positions, construction areas and other factors. Thanks to integrated interfaces, schedules and operational processes are readily accessible. The companies involved can thus react even more flexibly on short notice: Manual maintenance or subsequent data conversion into certain formats are no longer necessary – this saves both time and costs.

TPS Enterprise

Highest Performance, Standout Functions

TPS Enterprise is perfect for major network operators: Due to its cutting-edge performance, it guarantees quick and highly effective timetable management. The integrated dynamic data storage allows network operators to make short-term changes to the schedule and share them with the respective transport companies. The advantage: TPS Enterprise is able to edit an almost unlimited number of trains. Moreover, depending on individual requirements, the number of workplaces and users can be easily extended. In both Great Britain and France, TPS Enterprise is already in successful operation for national train planning.

TPS on the Winner’s Podium

The Olympic Timetable for Network Rail

The 2012 Olympic and Paralympic Games brought millions of visitors from every corner of the world to London – a big challenge for all providers of public transport in and around the British capital. Since 2009 already, Network Rail has been successfully managing the entire British rail infrastructure of 20,000 miles of track and 90,000 train paths with HaCon’s train planning system. 350 users manage long- and short-term planning with TPS, while 200 production systems are linked with HaCon’s powerful software solution. Before and during the Games, TPS proved its flexibility and reliability: Network Rail’s close collaboration with the Olympic Delivery Authority, Transport for London and their transport partners helped more than 8 million people to get to and from the Olympic venues.
Infrastructure maintenance is performed in the Geography Editor. Here, users can choose between a network or a line display and even view the tracks along the routes and in the train stations in microscopic detail. Line closures, construction sites etc. can be seen at a glance.

TPS’s innovative, ergonomic multi-screen ability optimally supports transport companies in their planning processes. Three side-by-side screens visualize the infrastructure network, the train paths and the schedule, respectively. Editing train paths is easy and intuitive in all three editors and planners quickly get an overview of all essential functionalities. With changes made in one editor, the main windows are automatically synchronized with each other.

Planning with Overview: The TPS Workspace

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Once the train paths have been created, the Planning Editor allows to maintain them, plan new ones and add construction activities. Each path is listed with its respective calculation, validation and publication status. By means of the integrated Service Intentions Editor, traffic offers can be defined in order to automatically generate individual train paths in a next step.

The Diagrams Editor visualizes information on track occupations and possible train path conflicts. Planners can choose between a route-independent time/path view (Graphical Timetable), a station-specific time/track view (Interactive Track Occupation Plan) and a calendar-based view.
Data Refinement with TPS Integrator

TPS Integrator, youngest member of the TPS family, closes the gap between train and journey planning and provides passenger information systems with optimized data. TPS Integrator identifies identical or similar train information from different sources and deletes or harmonizes them, respectively. This refined data can be exported if needed and fed to all output channels for passenger information systems. HaCon customers like the UIC (International Union of Railways), Deutsche Bahn (Germany), SNCB (Belgium) as well as NSB (Norway) already refine their timetable data with TPS Integrator.

Integration in HAFAS Journey Planner

By means of a standard interface, all TPS data can be seamlessly integrated in timetable information systems such as HAFAS. As the leading journey planner software, HAFAS facilitates the use of public transport for countless travelers worldwide. Various output channels are based on the HAFAS algorithm: online information, mobile applications and several forms of printed timetables. TPS pre-filters the timetable data and feeds the entire range of HAFAS channels. Thanks to the TPS-based annual timetable, journey planner users receive additional real-time information on potential delays as well as on re-routings and alternative connections. This guarantees both a consistent communication of timetable data and individual, customized information for each and every passenger.

All Trains at a Glance

Introducing an innovative feature, the HAFAS Live Map combines timetable information, real-time tracking as well as positioning data of passenger and freight trains on an interactive map. Delay minutes are displayed in real time and current prognoses are generated by comparing real-time with planned timetable data. In addition to passengers, customer services of railway companies, maintenance technicians and engineers, train planners and dispatchers benefit from the HAFAS Live Map. Among other HaCon customers, Deutsche Bahn visualizes the real-time positions of their train and bus fleets on dynamic maps, while in Great Britain both Network Rail and Arriva UK Bus use HAFAS Live Maps.