

INFRASTRUCTURE manager

Magazine for Public Transport and Safety

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PSIttraffic/DMS and PSIcontrol: Intelligent charge management for Public Transport 4.0

Depot Management and Smart Grids

Product Report

DMS for medium-sized companies
 Scalable solution for multiple depots

Product Report

Leap into the digital world of customer service
 Swiss companies count on PSIttraffic/TMS

Product Report

An AVMS for Vorpommern and Rügen
 The migration of three existing systems

EDITORIAL

Dear readers,

e-mobility is the mobility concept of the future. This was the conclusion reached by a recent study by the Fraunhofer Institute for Industrial Engineering IAO. It is true that alternative powertrains have a long history – also and especially in public transport. Nevertheless, misgivings regarding specific aspects of the new technologies persist. At the same time, there has never been as much implementation pressure as there is today, which is forcing companies to eventually break new ground. However, with the switch to these new technologies comes not only the refitting of vehicles, but also a restructuring of operational processes, which in turn necessitates investments in new systems, tools and software solutions. PSI already has a number of solutions for this on hand and can, for example, transfer experience and techniques from the energy sector. Learn more about this in our title story.

In our report, which begins on page 5, we demonstrate the fact that inte-



grating a complete depot management solution with all of its functions is also very cost-effective, even for small companies.

Only recently, a survey by a Swiss opinion research center certified the Rhätische Bahn excellent results with its customer information system – supplied by PSI. The Matterhorn Gotthard Bahn and the Aare Seeland mobil AG also chose the system from PSI, and for good reason. You can read how these Swiss companies succeeded in entering the world of digital customer service with their PSI solution in our detailed article starting on page 8.

As part of a company merger in 2014, the Verkehrsgesellschaft Vorpommern-Rügen faced the difficult task of migrating three existing AVMS systems to a modern overall system and introducing a uniform fare system. In the article on page 12, you will learn about the challenges the company faced and how these were successfully overcome.

Last but not least, we would like to cordially invite you to our user forum in late April in Berlin. We have once again assembled a comprehensive program for you.

See for yourself and visit us. We look forward to meeting you.

Torsten Vogel
General Manager
PSI Transcom GmbH

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Depot management and smart grids

Worldwide, public transport is recording growing passenger numbers. More and more people are using bus, TRAM and underground – especially in cities. At the same time, air and noise pollution is increasing in cities around the world. This is forcing public transport companies to retrofit in the long term and to switch to alternative drive technologies. As a result, in many locations, test vehicles and new technologies are being tested for their suitability on innovation lines. In a few cities, the first concrete plans for a consistent transition to electric or hydrogen have already been decided. In addition to the use of reliable vehicles, this project also means a shift in operational procedures and, in turn, the use of new technologies in order to make vehicles available for operation at the depot the next morning.

Electromobility – an alternative with history

In light of the current debate, anyone who has never studied the history of electromobility could quickly get the impression that a completely new technology is being promoted. But this impression is deceptive.

As early as the turn of the 20th century, tens of thousands of electronically driven vehicles were whizzing through the world's cities. Here, public transport companies were early adopters of electrical drive. Before the beginning of the First World War, there were eleven large taxi companies in Berlin, whose more than 550 vehicles were powered only by electricity.

However, although there was even a small electric car boom in the USA around 1900, the „clean“ vehicles were unable to hold their ground against gasoline engines, mainly due to the problems of unsatisfactory battery technology and the associated problems of range and charging, which have persisted into the 21st century.

Clean technologies put to the test

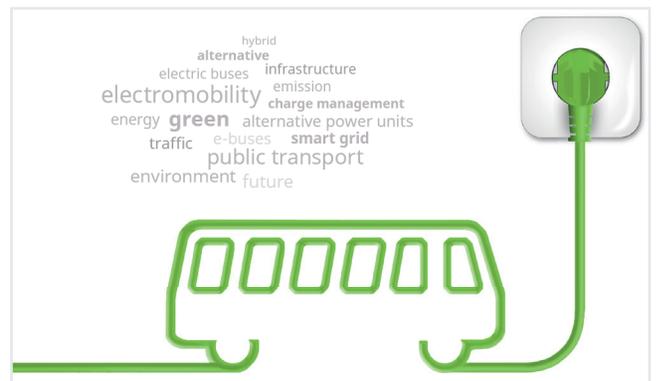
Today, alternative drives, including electromobility, have once again moved into the focus of interest. Both air and noise pollution, especially in large cities, has triggered a new development boom in the automotive industry towards emission-free drives, forcing the operators of public transport companies to orient on sustainable technologies in the medium term.

For example, in Stuttgart, where several times a year measurements exceed the limits for fine dust pollution, there are already plans for the creation of a comprehensive concept for alternative drive public transport. Hamburg is one of the cities where, besides the need resulting from environmental pollution, the government has already promised its necessary support in order to consistently work toward emission-free vehicles and in this way to serve as a model throughout both

Germany and Europe. Irrespective of concrete implementation plans, in many cities, electric and hydrogen vehicles from various manufacturers are now being used in trials, albeit primarily on single lines or routes.

The challenge of charge management and energy supply

Here, it has been shown that charging electric vehicles is still an issue, the solution to which currently has various approaches. Some well-known manufacturers and transport companies are



counting on charging at stops along the route or at the final stops. In light of the number of stops in the network and the resulting infrastructure and administrative costs that would be required, it soon becomes clear that this solution cannot be the right approach for regular operation across an entire fleet. In addition, current tests have shown that, with the battery technology now available, more than 50% of existing routes can already be driven in most public transport companies – for which depot charging alone is sufficient. Considering that battery technology is developing rapidly, more

range improvements can be expected in the short to medium term.

Charge management in depots – and controlling the power supply, where it can quickly come to power feeds of 10-110KV – plays a central role in this context, for which proven solutions already exist. For example, with practice-tested refueling optimisation in conjunction with the Smart Grid module for grid feed-in from the PSI division electrical energy, the depot management system PSITraffic/DMS meets the essential requirements for solving these task without complicated interfaces.

It is not yet clear whether a single technology, such as electric or hydrogen, can be successful in the public transport sector and determine the future market, or whether the parallel use of various technologies will prove itself in the way that this is already common in electricity generation.

Here, conventional power plants, wind farms and solar power systems exist side-by-side – with PSI Smart Grid as a demand-oriented control tool. Combining this with depot management is therefore in no way new territory, but rather only the transfer to another industry.

the enormous infrastructure construction, to develop the necessary expertise for maintenance and repairs of the new technologies, and to make investments in new systems and tools in economically feasible „bites“.

Anyone familiar with alternative drive technologies knows that they were playing an important role long before the triumph of the gasoline engine. Today, all stakeholders face the challenge of consistently developing these technologies and boldly implementing them to protect the environment and our finite energy resources. Concerns regarding range or charging problems



Battery bus at Hamburger Hochbahn AG.

While PSITraffic ensures that all journeys can be carried out with vehicles, the energy module acquires the necessary power at the required time and at the best conditions. In this way, the two technologies combine expertise in public transport processes and knowledge of the processes relating to the supply of energy, and can thus make a decisive contribution to transitioning the test phase with electric vehicles into regular operation.

Refitting in stages

There is no doubt that a transition to alternative drives is also – or perhaps especially – unavoidable for public transport. In light of the great efforts and investments which must be made to enable the comprehensive use of such vehicles, successive conversion of the fleets using existing optimisation tools makes sense. The step-by-step refitting in particular creates room to manoeuvre and to manage

have long been eliminated, and practical software systems have been brought to market that help to solve and optimise the issues associated with using „clean“ fleets. As it did so many years ago, public transport can play a decisive role in the world's cities in the use of alternative drive vehicles. ☺

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Depot management system for medium-sized companies

PSItraffic/DMS at the MVG: Scalable solution for multiple depots



Bus fleet of MVG Märkische Verkehrsgesellschaft GmbH.

The use of a depot management system (DMS) is not economical for a small depot – a conviction that is hard to eliminate from the industry. That it is well worth it is demonstrated by MVG Märkische Verkehrsgesellschaft GmbH (MVG). By introducing the PSItraffic/DMS first in its Depot Plettenberg, MVG significantly improved its disposition, including refueling optimisation, optimised resource use, and harmonised workflows.

As a municipal service provider for public transport in the Märkische Kreis, MVG is responsible for 15 cities and municipalities, areas of the cities of Hagen and Schwerte, as well as for the outskirts of other districts. The company transports over 146,000 passengers each workday on 138 bus lines. In addition to contractor services, around 150 of its own vehicles are used, which are dispatched and sup-

plied at three depots in Lüdenscheid, Iserlohn and Plettenberg.

These will be successively equipped with a DMS. Scheduling using Excel tables had simply reached its limits: for real-time presentation, response time, displaying specific vehicle occupancy and vehicle operations, reliability of parking space occupancy and compliance with noise protection requirements, and had also become uneconomical. Requirements for the sys-

tem were determined in particular by the need for vehicle refueling optimisation and the special consideration of the intensive use of subsidised new vehicles. In addition, the new system should provide an intuitive interface, meet all existing requirements with the state-of-the-art functionalities of a DMS, and be easily integrated into the existing IT landscape. In the end, a comprehensive dispatching system for all three depots, in which all data are stored centrally, and vehicles, routes, as well as garages and supply contracts are dispatched, should ultimately ensure maximum transparency.

Convincing reference visit

MVG, together with its external consultant, created a rating system to provide the most objective assessment of the solution concepts submitted by a number of applicants, which were drawn up based on a prepared performance specification. This took into account functionality, ease of use, ease of implementation in the existing IT and system infrastructure, and the cost of the system offered. In addition, visits to reference customers of the suppliers served as a basis for the selection process.

The depot management system PSItraffic from PSI Transcom not only scored the highest in the rating system, but also convinced the project team in practice during an on-site visit to the Hamburger Hochbahn AG.

Route disposition, fueling optimisation, intensive vehicle use

One central task of the DMS is the optimal disposition of routes and vehicles, taking into account maintenance and repair work. To efficiently allocate vehicles to the upcoming routes, the system must, for example, consider factors such as mileage, necessary re-supply and use as a school bus.

A vehicle location system based on wireless location technology (WLS) is used to identify and track vehicles when entering and leaving the depot, as well as at the depot, and for vehicle resupply. Additionally, there are interfaces to the personnel dispatching and fleet management system, as well as to the existing automatic vehicle management system (AVMS).

A special requirement for the DMS at MVG is ensuring that designated vehicles are used intensively. The background: The purchase of new low-pollution vehicles is supported by the regional government. The use of these vehicles also leads to a reduction in overall pollution emissions. For economic reasons, one important job for the system is therefore ensuring a maximum tour intensity for these vehicles.

Another, particular focus at MVG is on refueling optimisation. “For public transport companies, daily refueling is an enormous cost factor,” explains the DMS project manager at MVG, Björn Schöenberg. “In practice, refueling is usually carried out after each vehi-



We benefit from enormous transparency about the entirety of operations at the depot and can already see an improvement in the depot’s cost-effectiveness, thanks to the automation and optimisation of processes. This gives us a positive and confident feeling for the upcoming introduction of the system at the depots in Lüdenschheid and Iserlohn.

Björn Schöenberg

Project Manager at MVG Märkische Verkehrsgesellschaft GmbH



cle tour. This requires significant staff resources. As it turns out, with a good route disposition, refueling would not actually necessary every time,” continues Schöenberg. “This is exactly where the new system will begin leveraging potential savings.” The technology for solving this problem has already been successfully implemented many times, but also requires excel-

elled, but also consumption-relevant information about the route profile. For this, there are interfaces to the depot management system and fuel station used in the depot. In this way, PSITraffic/DMS automatically receives precise information about when, where, what, and how much fuel was pumped. This information makes it possible to calculate the remaining

vehicle range, taking into account risks, and is a central decision-making criterion for route disposition. While assuring that no vehicle is stranded because a lack of fuel, the aim is to achieve the greatest possible savings through the minimum possible number of refueling operations. The optimisation of fueling with the additive Ad-Blue, which is re-

quired for diesel vehicles every three to five thousand kilometres, is done in parallel – with the help of calculated minimum thresholds.

Clear and graphically appealing driver information is another component of



Operational view for the Iserlohn depot and driver information in Plettenberg.

lent and extensive data. The necessary information includes, for example, the tank volume and average vehicle consumption, the tours trav-



MVG bus in regular service.

the DMS. It contributes to a smooth operation through its high user acceptance. On a modern display in their lounge, drivers are provided with information “at a glance” about their next journey, their assigned vehicle and its location. A separate column on the driver display panel also provides information on route detours or delays caused by construction sites, for example.

Smooth system start

„The implementation and commissioning in October went smoothly and was on time,” summarises Schönenberg, satisfied with the implementation process of PSITraffic/DMS. The system has also been operating prob-

lem-free until today. And after just a short time, the desired results of the system implementation can be seen. “We benefit from enormous transparency about the entirety of operations at the depot and can already see an improvement in the depot’s cost-effectiveness, thanks to the automation and optimisation of processes. This gives us a positive and confident feeling for the upcoming introduction of the system at the depots in Lüdenscheid and Iserlohn.”

Optimised processes and resources

At MVG, the use of PSITraffic/DMS ensures the optimisation of all processes and resources.

Last but not least, the project shows that a DMS is also worthwhile in smaller depots. Because integrating a complete solution with all of its functions is also very cost-effective, even for small companies. Here, it is important that adjustments are easy to configure and that commissioning is easy to manage. In this way, even with a low financial expenditure, a maximum effect in the interest of the company can be achieved. ☺

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Successful leap into the digital world of customer service

PSItraffic – Integrating passenger information and train management for Swiss transport companies

Whether leisure, commuter traffic or freight transport: More than ever, transport companies need to ensure route utilisation, efficient operations and a seamless information system for passengers. In particular, public companies suffer from steadily growing cost pressure, but at the same time are required to meet the expectations customers place on a modern transport company. They can only overcome this contradiction if their processes are optimally positioned and when daily operations are based on a modern passenger information concept.

The three well-known Swiss transport companies, Rhätische Bahn, Matterhorn Gotthardbahn and Aare Seeland mobil have succeeded in this by using a modular train management system. This has been invaluable for providing passenger information and for the planning and control of train and bus traffic. Together, the routes of these three transport companies cover large parts of Switzerland. They connect both commuter routes and regions with unique, breathtaking landscapes, which are therefore particu-

larly attractive for tourism. Transport company employees have their hands full ensuring that everything functions smoothly. Behind this service, which is often taken for granted by passengers, is a considerable administrative and logistical effort, which binds resources. As a result, all three companies opted for a new passenger information system to support their dispatchers in their daily work – particularly to provide them with current data and to make this available to passengers in a prepared form. In each case, the choice was made for the train

management system PSItraffic/TMS from PSI Transcom, which is based on the platform PSItraffic and includes modules such as vehicle tracking, conflict detection, dispatching, passenger information and ensuring connections, and which can be configured individually. ib datentechnik GmbH from Constance was responsible providing the required hardware.

The Rhätische Bahn – A riding experience with tradition

With its unique mountain ranges, its UNESCO World Heritage status, the Glacier Express and the Bernina Express, the Rhätische Bahn – the largest Swiss alpine railway – has been well-known since 1889 for providing a unique rail experience through Graubünden. The company now provides service on a 384 km network that leads directly through the high mountains of Switzerland. Each year,



Control room at Rhätische Bahn.

approximately 1.500 employees ensure the transport of more than two million commuters, eight million tourists and 550.000 tons of goods. In order to increase the attractiveness of the offering for passengers, those responsible decided to replace the analogue split-flap displays with a digital passenger information system, which ensures passengers are informed seamlessly and reliably, supports dispatchers in their day-to-day work and contributes to reliable network traffic. In addition to the usual standard functions, a number of special requirements needed to be implemented for passenger information. These included both the integration of additional tourism services and ensuring the suitability of the equipment for the extreme weather conditions in the Swiss Alps. Furthermore, passenger information systems today are now an integral part of a transport company's service – especially when used by tourists unfamiliar with the area.

No fear of heights – An exceptional passenger information system

The project began by equipping all stations with state-of-the-art information pillars. These are unique in several ways. For example, in addition to the usual poster case, the pillars have a monitor and keys, each of which has an assigned function. With these, passengers can make a stop request, directly contact the information desk through voice-over-IP technology, or activate a digital text-to-speech function for train information in several languages. Additionally, each pillar includes an integrated PC, which sends data transmitted by the control centre to the integrated pillar monitors or other station displays. A user

interface designer was responsible for creating the intuitive and visually appealing layout of the TFT displays, which provide passengers with real-time train information.

Since some pillars are also exposed to

loud speakers to automatically announce arrivals, departures and connections. Besides delays, the displays also show special information on construction or closed routes.

PSItraffic records all relevant operat-



Rhätische Bahn Bernina line.

extreme weather conditions at stops as high as 2.300 meters, a temperature control system maintains functionality even in extreme cold, and high brightness ensures readability in bright light, such as the low sun during the winter.

Passenger information system with special functions

The marketing module in PSItraffic also enables the Rhätische Bahn to integrate video, messaging and tourist information into the passenger information provided using a web connection. This additional information is controlled by the control centre and adapted to different stations and times of day. For example, at stops that serve both commuters and tourists, in the morning, information is displayed that is particularly relevant to commuters, while for midmorning, tourist information, and in the evening, event information is displayed. In addition to the pillars, the comprehensive information system also includes track and overview displays, as well as an audible passenger information and

ing data in the control centre and processes it there for dispatchers or passenger information. The system draws data on the current locations of trains from the rail traffic management system ILTIS, which it compares with the timetable. Using a simulation algorithm, PSItraffic forecasts the arrival time and sends the results to the stop computers in information pillars. Operational and train information from other local transport companies also flows into the system through the online interface using the VDV-453/454 standard. In this way, the Rhätische Bahn continuously ensures connections.

Today, the Rhätische Bahn has a seamless train management system with integrated passenger information, which together with its need-based customer orientation, has become a pioneer for other transport companies.

The Matterhorn Gotthard Bahn – Crossing the Swiss Alps

Another company is the Matterhorn Gotthard Bahn (MGBahn).

It also represents an important link between the different regions of the Swiss Alps. With its network of over 144 km of rails, it connects towns in the heart of the Alps located around the Gotthard: Disentis, Andermatt, Göschenen, Brig, Visp and Zermatt. The shining star of the company, the Glacier Express, which is jointly operated with the Rhätische Bahn, runs from Zermatt to Chur, and from Davos and St. Moritz.

Prior to the introduction of the new system, the Matterhorn Gotthard Bahn had no integrated passenger information system. Centrally controlled displays for providing passengers with visual information were only installed at four operation points. The remaining stops either had loudspeakers operated by



Glacier Express at Stalden.

the control centre or an intercom for connecting to the control centre. Overall, there was a heterogeneous landscape which included solutions from different manufacturers and which did not completely cover the network.

For the MGBahn, the most important requirements included central control and the real-time display of operational changes, e.g. delays or train cancellations and automatic playback of announcements of train arrivals, departures and connections, etc. In addition, existing split-flap displays and loudspeakers were integrated into the new CIS to provide customer information. In this way, it was possible to develop a

seamless customer information system at all stations, while also reducing hardware investment costs.

A train information system sets a precedent

Following a public tender, the contract was awarded to Schweizer Ruf Multimedia AG. As part of the project, PSI Transcom was granted the contract to supply the central control software based on PSItraffic, as well as the software for controlling the information pillars at the stations and the real-time displays. The company ib datentechnik was responsible for providing the hardware. It supplied both the loudspeaker technology and the pillars.

The MGBahn uses state-of-the-art

pillars, which combine classic glass cases with a monitor and push buttons (for contacting the control centre, making a stop request and text-to-speech function). Here, too, the system controls the station computers integrated into the pillars and from the central server in Brig provides them at short intervals with all necessary data. The system uses a standard interface to the rail traffic management system ILTIS to transmit cur-

rent train locations and to calculate arrival times. The monitor displays at the MGBahn stations and stops are based on the recommendations of the CIS-Commun. CIS-Commun is a project for a uniform Swiss system for passenger information and defines the minimum requirements for displays at stations.

Conflict detection and avoidance

Since only 4 km of the entire rail network is double-track, the timing of the trains plays an important role in traffic safety. This only allows for encounters between two trains at crossing points, and in the event of delays, forces the „earlier“ train to stop at the intersection. The software supports

dispatchers in case of such conflicts and displays them using a time-distance diagram. At a glance, dispatchers can recognise possible conflicts and immediately take appropriate measures. As a result, operations become

more efficient and the system provides passengers with real-time, reliably comprehensive information on their connections.

The Aare Seeland mobil AG – focused on students and commuters

The Aare Seeland mobil AG (asm), which mainly serves commuters and students, also chose the PSI system. Using bus and rail, the company transports more than 6 million passengers



Information pillar at Aare Seeland mobil platform.

every year in the regions of Oberraugau, Solothurn and Seeland, making central Switzerland mobile.

Here, too, there was no comprehensive passenger information system with real-time information until the new software was introduced. And as in the other projects, there were some specific features to consider. At asm, the development of a mobile on-board computer was also a focus, in addition to the introduction of the train management system for providing visual and acoustic information at all stations and stops. Previously, the control centre received no continuous information on the exact position of a train, since the control system in operation can only be used for line safety systems. For this, the project team installed a smartphone in all of the control stands which acts as an on-board computer and continuously transmits the GPS location data of the trains using a custom app. Here, based on the direction of travel, data is transmitted every second to the passenger information centre, where it is further processed and utilised. The time-distance

diagram makes it easy to identify deviations and also enables asm dispatchers to quickly initiate required measures.

After the successful introduction of passenger information at all rail stations, bus operations were also integrated into the system. Now, passengers at selected stops are also presented departure times calculated by PSITraffic in real-time. Furthermore, with the integrated train management and AVMS system, uniform control of the asm train and bus services is now possible.

Climate-controlled pillars provide a clear view

For passengers, the installation of the modern information pillars was the most visible of all of the changes. These were also provided by the hardware partner ib datentechnik and also required special modification. Since in central Switzerland, relatively high humidity can develop depending on the weather, all cases must be ventilated. Initially, the poster cases fogged up, much to the consternation of passengers.

Overhead displays and loudspeakers for standard arrival and departure messages round out the solution at some stations. The introduction of a cross-company system to ensure connections using the VDV standard interface is already planned in the near future.

Summary

Together with line safety, digitisation – the continuous supply of real-time information – plays a central role in the sustainability of many transport companies. With the introduction of modern train management, the Rhätische Bahn, the Matterhorn Gotthard Bahn and the Aare Seeland mobil have successfully made the leap into the world of digital customer service. At the same time, the companies benefit from more efficient processes, maximum data transparency and increased route safety. ☺

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Modern overall system for the Verkehrsgesellschaft Vorpommern-Rügen

From migrating three existing systems to restructuring sales and control technology

When, as part of district reform, three municipal bus companies merged to form the Verkehrsgesellschaft Vorpommern-Rügen (VVR) in 2014, the different vehicle management systems had to be migrated to a comprehensive modern system, and a uniform tariff had to be introduced to ensure seamless passenger service. Every year, approximately 12 million passengers benefit from the successful implementation of the project, and with this the entire company.

With one ticket from Grimmen to Königsstuhl

„Bus travel in one of the most beautiful regions of Germany“ – the VVR slogan sums things up. This is because the commuter area of the transport company is identical to the district Vorpommern-Rügen, the result of a district reform, stretching from Rügen through Hiddensee and Stralsund, and from Fischland Darß-Zingst, Ribnitz-Damgarten and Graal-Müritz to Grimmen. With this, in addition to Baltic coastal and island areas attractive for tourists, it also includes two national parks, as well as the UNESCO World Heritage site and Hanseatic city Stralsund. The merger of SWS Nahverkehr Stralsund GmbH (NVS), Rügen,

gener Personenennahverkehrs GmbH (RPNV) and the Kraftverkehrsgesellschaft mbH Ribnitz-Damgarten (KVG) to form VVR revealed numerous synergy potentials, from which not only the newly formed company could benefit, but above all the passengers. As a result, those responsible set the goal of making bus travel in the region transparent and comfortable through the migration of the different systems and the introduction of a uniform tariff. “It was our wish, in addition to seamlessly supplying customers with reliable information, to make it possible, for example, to punch a ticket once and travel from Ahrenshoop on the peninsula Fischland-Darß to Thiessow, or from Grimmen to the Königsstuhl on

Rügen,” Karsten Bööck, operational manager at the VVR, describes the company’s vision. The transport company commissioned the mammoth migration project after a careful review of the offer by PSI Transcom GmbH.

Between 2005 and 2012, all three previously independent companies had already introduced a control system from the Berlin provider, including vehicle equipment and ticket vending systems from a subcontractor. After the merger, a heterogeneous system landscape was created. It included software and hardware from various generations with functions to meet the sometimes very different requirements, and not least its own timetable system, tickets and pricing models. “Everyone responsible had enjoyed positive experiences with the PSI project team and the Automatic Vehicle Management System (AVMS). As a result, employees are already familiar with the solution. The Berliners also already know all of the unique characteristics of the three former companies and regions, which pro-



The VVR in Numbers

- 70 Lines
- 167 Buses
- 301 Employees
- 1.281 Stops
- 2.000 km line network
- 12 Mio. passengers/year

vides additional, obvious advantages,” explains Karsten Böock the most recent decision in favor of the proven software partner.

Migration in three phases

After the contract was awarded, the project team planned the implementation of the migration in three phases. In the first step, the three systems were merged into a single system and a uniform tariff was introduced as of January 1, 2017. This will be followed by the successive introduction of new functions, such as a master traffic app, dynamic connection protection, and internet timetable information. In the final phase, the on-board computers of the company’s own 167 vehicles and the approximately 23 from outside companies will be replaced by a single device type, and then be seamlessly integrated into the system.

A look at the systems previously used by the three companies reveals their differences and makes clear the challenges of the project. For example, the previous VGN used a distance-based tariff, and in Stralsund, a fixed or city tariff was in use. Data supply and retrieval was accomplished at KVG using modules, some with over ten-year-old on-board computers. The lines also serve school traffic in particular. By contrast, the RPNV used tariff zones, and data exchange took place via GPRS. Typical for this region is a high tourist volume and numerous related features such as traffic-related delays in the summer, up to interval shifts of an hour, which explains the use of dynamic connection protection. The most current system was in use at NVS, including an eTicket system and timetable and roster program used throughout Germany.

In order to create a uniform overall



MIGRATION SCOPE

- + Introduction of a joint AVMS and ticket sales system with model of the uniform tariff zone system defined by the district
- + Alignment of scheduling and service plans
- + Interchangeability of the various vehicle types between the service areas without replacing on-board computers
- + Preservation of special solutions of the previous systems: Master traffic app, dynamic connection protection, Internet timetable information

system, it was necessary that both the ticket sales system and vehicle interfaces be harmonised, and a timetable and duty roster system introduced. The system now models the new, uniform tariff system – a zone tariff that assigns a price level to each combination of start and destination zones. The system continues to model the network routing. Special interfaces enable the display of passenger information in vehicles with different vehicle peripherals. A further central criterion is providing stationary passenger information displays with actual data in order to supply passengers with current information about their departures and connections. This required the integration of the existing displays in the Rügen region into the AVMS. The introduction of a vehicle dispatching system on the basis of daily personnel deployment with driver info terminal and check-in and check-out system are also included in the project.

PSI Transcom GmbH is also a reliable partner in the implementation of student and customer data management, the integration of payment machines, and in the design of the server infrastructure.

Comprehensive planning

The realisation of the uniform control and ticket sales system means that,

in particular in connection with the introduction of the common tariff and ticket system, a significant quality improvement for the daily operation and service level of the VVR. *PSItraffic/AVMS* tracks the locations of all buses, compares these with the planned data, and gives the dispatchers a complete overview of the workflows in operations. By providing real-time data in the internet timetable information on the stationary DFI displays, passengers receive current information about their routes and connections. “The system ensures smooth and on-time operation – across the different, previously specially connected regions,” summarises Karsten Böock. “With this, our central goal – increasing customer satisfaction – has already been achieved. With the introduction of additional functions in the next phase, which will begin in summer, and with the successive replacement of the on-board computers with a current generation of devices, we are completing the picture of a modern and competitive transport company.” The next steps to improve passenger information are a stop departure indicator as an app and an interactive network map.

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We introduce

Experts at PSI Transcom

Without the daily commitment and high-level technological industry expertise of our employees, we would not be where we are today. We have already introduced some of our colleagues in the last issue of **INFRASTRUCTURE manager**. Here, we continue our series. Meet our team!

Günter Tesch, Quality Management

In 2015, Günter Tesch could already look back on 30 years with the company. He began at that time as a programmer at the AEG Softwaretechnik, switching in the 1990s to quality management.



Since then, he has been a certified DGQ (German Society for Quality) and EOQ (European Organization of Quality) auditor responsible for all certifications compliance with operational guidelines.

In his capacity as an auditor, he also works throughout the group.



Günther Martinez-Dreyer, Development/Project Management

Günther Martinez-Dreyer has worked as a system programmer at PSI Transcom since 1999. He developed the online VDV interfaces (including those to passenger information and connection protection) and played a key role in the design of the software architecture of the PSITraffic depot management system.

Since 2013, he has been project manager for the DMS project at Rhein Bahn AG. Projects a.o.: Rostocker Straßenbahn AG, Essener Verkehrs-AG, Stuttgarter Straßenbahnen AG, Stadtwerke Augsburg Verkehrs-GmbH..



Milan Wölke, Development/ Project Management

Milan Wölke is a software specialist in the field of rail systems. For the past five years, he has mainly focused on the topics of passenger information, networking and connecting to external systems. Prior to joining PSI Transcom, he worked in the business unit Logistics, where he was instrumental in developing the framework for its transport management system.



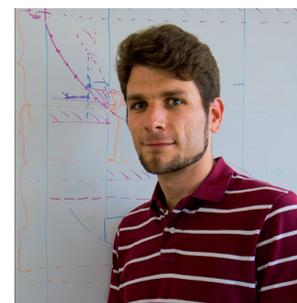
Project a.o.: KTMB and KLMR (Kuala Lumpur, Malaysia), Aare seeland mobil AG, Matterhorn Gotthard Bahn, S-Bahn Hamburg GmbH, GVB Amsterdam, Brandenburg Nordost.

Dr. Kai-Simon Goetzmann, Development

Three years ago, Kai-Simon Goetzman began as a developer with PSI Transcom. As a graduate mathematician, he is our expert for dispatching and optimisation

– first in the area of depot management, and for the past year in the project for regional transport Bern-Solothurn as well, where he is working on an improved forecasting algorithm and with the topic optimisation and delay minimisation.

Projects a.o.: Regionalverkehr Bern-Solothurn, Hamburger Hochbahn AG, Rheinbahn AG, Stuttgarter Straßenbahnen AG, Rostocker Straßenbahn AG, Stadtwerke Augsburg Verkehrs-GmbH.



Comprehensive energy management with PSiControl

Intelligent network control technology for traction current providers

The network management system based on PSiControl from PSI's Business Unit Electrical Energy features sophisticated, often non-standard functions and system properties for all network levels. This is especially true for functions that meet the requirements resulting from the energy transition.

The systems operated in the transmission and distribution unit are also suitable for use in rail power applications, and have already proven themselves there for over 10 years. PSI customers include the Deutsche Bahn, the Swiss Federal Railway, Trafikverket (Sweden), Prorail (the Netherlands) and urban railways in interconnected urban systems. The enabling technology from PSiControl provides the foundation for this. Additional features that fulfill the rail-specific requirements of both the transport network and the traction current network extend the network control system to create a railway power control system.

This includes

- taking into account railway-specific primary technical systems
- preview functions for testing the effects of switching in complex system configurations
- network simulator with the railway-specific characteristic of mobile loads (moving trains)
- switching order management



DB central control room Lehrte.

- Transmission of variable protection setting parameters

There are additional, often project-specific functions, such as

- network controllers for the railway power network, taking into account stand-alone operations
- tunnel management, with special monitoring and display functions, including video monitoring
- computer-controlled instructions to staff to support emergency management in case of operational disruptions or accidents
- integrated workforce management functions with interfaces to central IT

The user investment is safeguarded by long-term maintenance contracts and updates. Naturally, in all projects, the IT security guidelines formulated by the German Association of Energy and Water Industries (BDEW) will be implemented. 

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