

infrastructure manager

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„Clean buses“ in Hamburg City.

PSItraffic Automating Six Bus Depots

Hamburger Hochbahn AG Introducing DMS

A city with over one million residents and millions of tourists needs public transport capable of meeting extraordinary requirements. It is unimaginable for an organization to be a leader in multiple technologies without outside IT support. And this must begin at the depots, for example with a modern Depot Management System (DMS).

Since 1912, the Hamburger Hochbahn AG (HOCHBAHN) – founded the year before by Siemens & Halske and AEG – has operated the then recently constructed elevated rail. In 1965, HOCHBAHN was a founding member of the Hamburger Verkehrsverbund, the first transportation network in the world. Today, Hochbahn is wholly owned by the Free and Hansea-

tic City of Hamburg. It is the sole operator of the four subway lines and the majority of Hamburg's bus network. With over 4,500 employees, HOCHBAHN transports around 1.2 million passengers every day, making it the second-largest public transport company in Germany.

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Newsticker

PSIPENTA wins important rollout order from CSR Sifang in China +++ Successful launch at Hamburger Hochbahn – PSITraffic depot management system automates bus depots +++ User meeting of DMS customers in Hamburg +++ New sales manager public transport at PSI Transcom GmbH – Kay Tewes reinforcing the sales team +++ PSI researches real-time risk management for logistic-networks – research project „Smart Logistics Grid“ presents first results +++ Industry 4.0: PSIPenta controls the production of the future +++ PSI delivers system for the first automatically controlled depot in Poland – Municipal Transportation Company in Poznan optimises tram depot with PSITraffic

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Editorial

Dear Reader,

do you already have your ticket for the InnoTrans exhibition? Do you have your train ticket to Berlin yet? In just a few weeks the International Trade Fair for Transport Technology will open its doors for the tenth time in Berlin.

Of course we will be there again! We are looking forward seeing you at our booth 309 in hall 2.1!

But before that we would like to give you an overview of our projects and developments with the latest edition of our infrastructure manager.



Rising numbers of passengers – especially in big cities – urge companies to rethink their existing methods of operation.

Public payments for transport companies are declining while costs are constantly rising. Higher fares are no solution to solve the problem. It is rather important that companies look at their own processes, critically questioning the „things that have always been done like that“. They should not ask if things have been done „right“ or „wrong“ but they should look at the changed constraints. How do they appear? How will they develop? How do processes have to be changed according to these new constraints? Sometimes the software systems give us the transparency to show new perspectives.

Read in our latest infrastructure manager edition about our project at Hamburger Hochbahn AG. Read about how the Rostocker Straßenbahn AG strengthens its competitiveness with our PSITraffic depot management system and how the Swiss Aare Seeland mobil AG improves reliability and quality of railway operations with up-to-date passenger information.

Enjoy reading this issue.

Torsten Vogel
General Manager PSI Transcom GmbH



XXL-Bus of the HOCHBAHN at the ventral bus station.

◀ Page 1

The bus network has a length of over 920 kilometres, with 112 lines and over 1,300 stops. The approximately 800 vehicles include standard articulated, city and express buses, as well as the most modern diesel hybrid and fuel cell hybrid buses. These buses are at home in five depots, where they are refuelled, cleaned, maintained and prepared for their next deployment. This is the responsibility of the Hochbahn subsidiary FFG Fahrzeugwerkstätten Falkenried GmbH and the TEREK Gebäudedienste GmbH, of which Hochbahn is the majority shareholder.

Dr. Heinrich Böse, responsible for system planning and technology in the Bus Operations department of HOCHBAHN reports: „Until recently, dispatchers were required to create plans by hand for the smooth operation of the buses. That was not only time-consuming, but also error-prone.“ Routes and assigned vehicles were recorded by hand in schedule tables, including the scheduled departure of the bus and the driver, its return time, and whether one driver will be relieved

by another. To document this, all schedule tables had to be archived.

Tracking by hand and plug

Vehicle tracking in the depot was achieved using the Steca charging station system, which supplies compressed air and electricity, etc. Upon entering the depot, the bus driver would drive to the free parking position of his choice and attach the Steca system and an air hose to the bus. At this time, the PC would register the bus. After a driver correctly connected his bus to a station, the dispatcher knew its exact location. „But that was also one of the problems with this system,“ acknowledges Böse. If a plug was not inserted correctly or did not work, the dispatcher received no information – which was also the case at the non-Stecca-supplied parking positions. For this reason, employees performing nightly vehicle maintenance manually created a parking diagram recording where the vehicles were actually located.

Even though the resulting errors and

greater effort were bearable, it was very difficult to implement other plans with these old methods. First and foremost, HOCHBAHN was seeking to improve economically and increase its competitiveness. „For example, a new refuelling strategy was required,“ explains Böse. Another primary strategic goal was becoming a leader in the development and testing of innovative drive technologies. The new technologies were not to be used freely, but were instead restricted to specific routes. „But this is where the human factor reaches its limits. If I have nine or ten different vehicle types which need to be assigned to specific routes, I cannot come an hour earlier to figure out how to organize this,“ Böse points out.

Strategic goals for the future

Another major goal was process transparency and standardization. „Three partners are working together at the depots, including HOCHBAHN itself, FFG and TEREK. To ensure that all three are working from the same basis and know what is happening at the depot, we wanted to

ensure transparency with a vehicle tracking system. We considered a depot management system as the ideal solution to implement our goals," says Böse of the decision. The company HanseCom, the responsible service provider for the entire DP operation, was commissioned as the general contractor to implement the system.

A tender for the system supplier was made based on the specifications created in 2009. In late 2010, the Berlin PSI Transcom GmbH received the order to supply, implement and commission their depot management system PSITraffic. „Money also certainly played a role in this decision. This offer was simply the most economical“, says Böse. However, he also stresses the flexibility of the Berlin company, who guaranteed a free choice of tracking system, for example.

Starting with 1000 pages

„We launched the project in the classical way," says Böse, „by creating a detailed specification with all of the steps we had defined.“ This specification grew to about 1000 pages. At the end of 2011, it was approved and the implementation phase began. To start, one depot (in Hummelsbüttel) and the control centre were equipped with the infrastructure for the new tracking system, computer hardware, and DMS software. Buses had to be equipped with a roof antenna for the tracking system Symeo LPR (Local Positioning Radar), a radio frequency sensor for determining the distance and position of moving objects. Testing of the tracking system at the pilot project depot began in mid 2012. The step-by-step commissioning began in Hummelsbüttel in early 2013. At this point, they had also begun equipping the remaining depots with hardware, and all vehicles



The colleagues praise the system because it works so well and there are no vehicle shortages. Even at times with traffic congestion, the situation was significantly improved by the DMS. It is already evident that the decision for PSITraffic has paid off and that we are much closer to achieving our goals.

Dr. Heinrich Böse
Project Manager



have now been equipped.

The DMS and several subsystems were integrated into the existing IT environment, for example, with the ITCS (Intermodal Transport Control System). All logins and logouts from routes are collected there, as are delays, position tracking en route, and disruptions and messages. These data are also transmitted to the DMS, along with re-registrations and mileage, together with the delay forecast when returning to the depot.

ITCS feeds the DMS

Before departure, the driver logs into the ETP (Electronic Ticket Printer). This system has an interface to the ITCS, which means that the login is sent from the on-board computer to the control computer and the control centre. While the driver travels his route, his position is tracked by the ITCS system. Upon completion, he transmits his delay forecast to the DMS from his final stop. If the vehicle is reserved, this enables the garage to know, for example: he will arrive late, a different task can be done instead. Upon entering the depot, he receives a signal telling him where to park his vehicle.

At the beginning and the end of every trip, the DMS receives an update from

the control computer, including the mileage, for example. If the driver notices a disturbance during his route, he sends a communication request to the control centre. There, he reports the type of disturbance. In a separate system, the control centre then creates a fault report, which is sent directly to the ERP system in the garage, where it is also dealt with, thus circumventing the DMS. The control centre blocks the vehicle for further use with a fault report in the DMS. Thereafter, only the garage can release the vehicle in the DMS.

Targeted heating and refilling

Schedule and roster planning is done by the so-called performance planners. Using a separate IT system, they determine the vehicle routes and the driver duty schedule. The assignment of driver shifts is made using the personnel planning system, and vehicle dispositions are made via the so-called data market. The route data generated are stored in a central database. All backend systems retrieve this data from here. The DMS queries schedule data once for the next seven days, and shift data every 15 minutes. In this way, the system can be updated daily, even in case of changes.

In the past, preheaters were required to manually preheat vehicles, or the Steca

system activated the heaters on a strand-by-strand basis. Today, the DMS automatically activates preheaters in the buses according to a predetermined algorithm based upon the outside temperature and the starting time of the route. This avoids unnecessary heating and pollution. An additional goal was improving the cost-effectiveness through a new refueling strategy. Here, a separate tank data system collects tank data from all vehicles, making them available to the DMS. Whereas previously vehicles were refuelled every day, regardless of their mileage, now an effort is made to only refuel buses when the fuel is not sufficient for the next disposition. „The DMS should plan so that we do not need to refuel during the day. Instead, it should decide in the evening which vehicle is refuelled and which is not,“ explains Böse.

Visible successes

The simultaneous introduction of a personnel disposition system and the DMB also lead to process changes. Vehicles are announced to the drivers on monitors 15 minutes before departure. This makes it possible to communicate changes on short notice. According to Böse, process transparency has already improved noticeably: „Everyone now has the same view of the depot. Everyone knows where the vehicles are parked and what condition they are in.“ This has drawn the three companies involved closer together. Böse adds: „The result so far is that we have not had any vehicle shortage in Humelsbüttel.“ Time savings are also expected because the DMS automatically replaces many previously manual lists with automatic

processes. After more depots have been added, a significant reduction in the vehicle reserve is planned through improved disposition. The faster disposition speaks for itself: attributes like requesting a disposition, requesting a parking position, driver and vehicle, as well as fuel and maintenance data are automatically accounted for by the DMS, which quickly handles the operations of an entire depot. ☉

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Municipal Transport Company in Poznan Optimizes Tram Depot with PSITraffic

First Automatically Controlled Depot in Poland



The new tram depot of the MPK.

The PSITraffic DMS delivered by PSI Transcom and the PSI Polska was commissioned as part of the dedication ceremony of the new tram depot of the municipal transport companies MPK in Poznan (Poland) in early May 2014.

With the introduction of the PSITraffic DMS, vehicle disposition at the tram depot will be automated. This includes the optimized control and execution of vehicle supply, comprehensive vehicle tracking and route assignment.

At the same time, the system automatically collect all relevant data to create analyses and statistics. Operational improvements will also be achieved for drivers through departure tables and access displays with parking positions, and the consideration of individual vehicle requirements in operations.

The depot is one of the largest and most modern vehicle depots in Europe. With an area of 17 hectares, it provides a roofed area for 150 trams. ☉

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Rostocker Straßenbahn AG Performs System Upgrade

DMS Ensures Cost-Effectiveness

In 1999, the Rostocker Straßenbahn AG used the modernization of the tram depot and the new construction of a bus depot as an opportunity to improve their cost-effectiveness and competitiveness by introducing more modern IT. Now an upgrade has been performed to further update the system.

The significance of a high-performance public transport system for the Regiopole Rostock is obvious. One important component for serving the population and visitors is the Rostocker Straßenbahn AG. It has six tram lines and 30 bus lines. In 2013, the RSAG transported over 39.4 million passengers earning revenue of almost 25.8 million.

Old technology and a shortage of space

In 1999, a decision was made to build a new bus depot outside of the existing grounds and to convert the old depot in the Hamburger Straße to a depot exclusively for the tram. Kristina Rectenwald from the business organization of the RSAG states the reasons: „Our old depot was bursting at the seams, and the technology no longer fit the times.“ They also wanted to use this opportunity to opti-

mize operational procedures to improve efficiency and use their staff more effectively. All of these measure were also intended to improve competitiveness as part of a new company strategy.

For this reason, after a public tender offer, PSI Transcom GmbH received an order for the delivery of a Depot Management System (DMS) designed to integrate the existing infrastructure. The requirements included central control of the depots from a control centre, a visualisation of the depots, control over barriers and gates, vehicle identification and location visualisation, as well as control of vehicle movements. The systems for buses and trams were to have the same basic functions, and the tram system was to include special requirements for traffic and switch control.

The DMS was accepted in 2001 and full operation began in 2003.

Always knowing where

Vehicles in the tram system are located using track signalling equipment and additional induction loops. Tracking is therefore based on information from the traffic and switch control. For buses, there is both exact parking position tracking in the parking hall using the compressed air supply hose, and open area zone-level tracking using active transponders under the vehicles and tracking loops in the ground. Vehicle deployment is then visualised by the DMS in the appropriate zones: storage, garage, fuelling system, washing bay, outside fuel station or track section. One special feature: Garage vehicles and company cars are tracked on the grounds and visualised in the



Tram Depot Hamburger Straße.



Control Centre.

operational picture.

In the tram area, the structure is somewhat more complex due to the multiple switches and branches. Bus drivers park buses in parking positions after returning to the depot where, depending on the disposition, they can be picked up and taken to the garage or for washing, for example. By contrast, for the tram, the DMS must request appropriate routes from traffic and switch control, which then either confirms the route and sets the signals and switches accordingly, or denies it. In case of a denial, the DMS automatically requests the route again later, suggests a different route, or cancels the movement order. „This ensures that several trams can move simultaneously in the depot without interfering with each other,“ explains Rectenwald. Naturally, in case of emergency, barriers and gates can also be operated manually from within the DMS operational picture.

Information terminal for drivers

Driver integration is extensive in both systems. When beginning a shift at a depot, every driver must identify himself with his card at the Driver Information Terminal. From this moment on, the dispatcher in the control centre also knows that the driver is present. When present, the driver first receives staff notes on construction or detours. Then the DMS displays his current duty and the assigned vehicle and its location. In the vehicle, the driver identifies himself by inserting his driver card into the card reader on the IBIS on-board computer in which he can now enter the line and route. Via an interface, the Intermodal Transport Control System (ITCS) now reports the vehicle position and mileage every 15 minutes to the DMS. At the end of his route, the driver reports the status of his vehicle to the ITCS using the on-board computer. This includes de-

fects, garage or washing bay requests, as well as the report that the vehicle is in good working order. These maintenance messages are sent by the ITCS to the DMS, which creates a maintenance request and calculates the necessary parking positions for repairs and sanding. The active barrier and gate control of the DMS also ensures that the entrance gate only opens automatically after this message



With the upgrade of PSI Transcom, we have significantly expanded our ability to analyze and log. We are functionally and technically up to date. That strengthens our competitiveness and gives us security for the future.

Kristina Rectenwald
Information Management



has been sent and the buses can enter the depot. At the tram depot, the driver is not assigned a parking position without a message, and must therefore stop and complete his message. Vehicle dispatching is usually performed around 01:00 a.m., when almost all vehicles are at the depot. Route planning is done in the scheduling system, however, no vehicle assignment is made there. Instead, only the vehicle type per disposition is defined. The route disposition is made manually by dispatchers or semi-automatically in the DMS. The DMS provides a dispatch list for manual vehicle assignment. It also indicates conflicts, e.g. when a route is assigned to a vehicle with insufficient remaining range or an incorrect vehicle type. The aim is ultimately a fully-automatic disposition. However, this would require that all periodic actions and deadlines such as general inspections, maintenance and cleaning, be entered into the DMS.

Fit for the future

Using the DMS significantly lowers operating costs for the RSAG while noticeably increasing the company's efficiency. For example, enormous savings potential has been demonstrated by active barrier and gate control through the registration requirement, and the resulting reliable planning and realisation of vehicle or-

ders for the garage and vehicle cleaning.

That is why last year, PSI was brought in to perform a system upgrade which, in addition to taking new vehicle lengths into account in track assignment, also achieved a comprehensive adaptation to modern operating systems, databases and technologies. ☉



Rostock City

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Seamless Information for Passengers in the Swiss Mittelland Region

Aare Seeland mobil AG Introduces Dynamic Passenger Information



Modern asm train at Aarwangen.

Public transport services have long involved more than simply carrying passengers. Reliable information on delays, cancellations or endangered connections are part of the clear customer requirements – which is why the Aare Seeland mobil AG (asm) decided to equip their stations and stops with a modern passenger information system.

Through a public tender, PSI Transcom GmbH was selected to implement a Customer Information System (CIS) to provide optical and audible information at stations and stops through a system based on their PSITraffic technology. The hardware – modern pillars with TFT monitors, loudspeakers and various function keys from the manufacturer EAO – and overhead LCD displays will be provided by PSI Transcom together with their long-term partner ib datentechnik, from Constance. The development of a new on-board computer posed an additional challenge.

The contract signing in February 2013 was followed by the creation of a specification sheet, solution development and

configuration, and in November, the factory acceptance test. Here, asm was able to test all software components of the new system and introduce possible changes or additions. Hardware installation at the stations and stops was also completed in November, so that after a brief post-development period, the phased commissioning could already begin at the end of the year.

The first stage included 26 stations of the network in Oberaargau. The remaining stations and the Seeland stations followed in the second stages until the end of 2014. The most noticeable change for passengers was the newly erected information pillars. In addition to the usual poster displays, they also have a 32" TFT

monitor to display current information on the trains and the operational status on the lines. A small computer controls both the customer information and the centrally-located keyboard. Customers can use this to perform three functions. One key makes a train stop request at request stops. Another launches the text-to-speech function, which at the press of a button causes the monitor contents to be read aloud. A third key allows the customer to contact the control centre. At some stations, there are also overhead displays and loudspeakers providing the usual arrival and departure information.

New development in use

Schedule data stored in PSITraffic says where trains should be at a particular time according to the schedule, but not where they actually are. „But we need to know this, for example to announce delays,“ says Daniel Fankhauser, head of Rolling Stock and Technology at asm. This information

usually comes from rail traffic management systems like ILTIS. Although asm has the system, it is not fully developed, e.g. only for controlling gates. The control centre does not yet receive real-time information about the exact location of a train. For this, the Berliners had to design the new on-board computer required by the tender offer.

They developed an app for a commercially available android mobile phone that continuously broadcasts the train's location data. Now, a mobile phone mounted as the on-board computer in every control stand sends the location and direction of travel every five seconds to the CIS control centre, where the data are processed and displayed. This gives the control centre a transparent view of operations in real-time, and deviations from the schedule can be seen on the time-distance diagram. „This allows our dispatchers to recognize conflict situations and quickly initiate the necessary measures to ensure optimal operations,“ explains Fankhauser. Passenger information can also be updated constantly – from delays, to partial or

complete train cancellations, to the closure of sections of the line.

Modern and powerful

To ensure connections, it is now also planned to transfer the dynamic passenger information and data via a VDV-453 standard interface. This interface will carry data between a computer-controlled Intermodal Transport Control System (ITCS) and another ITCS or a data hub to inform transport partners if and which train is delayed.

In the future, asm will transfer its data to the data hub Bern from which they can be accessed from the mobile real-time platform MEZI using a mobile phone via an app.

„PSItraffic enables dispatchers in the control centre to directly provide customers with information on all operational events. With this, we are presenting ourselves as a modern transport company that reliably and quickly informs its passengers about all operational events,“ summarizes Daniel Fankhauser. 

Mobile in the Swiss Mittelland



The Aare Seeland mobil AG (asm), headquartered in Langenthal in the Canton Bern, was formed in 1999 by the merger of the four Swiss transport companies Regionalverkehr Oberaargau, Solothurn-Niederbipp-Bahn, Biel-Täuffelen-Ins-Bahn and the Oberaargauischen Automobilkurse.

The company transports almost six million passengers annually with both train and bus, primarily commuters and school children.

The one-meter gauge rail operation is the oldest business unit. Today, two networks are served with a total length of 57 km and 49 stops. One 33.2 km line leads from St. Urban over Langenthal, Niederbipp and Oensingen to Solothurn.

The second network 50 km distant is 21.2 km long and runs from von Biel through Täuffelen and Siselen to Ins.

Since 2003, asm has also had a 1.2 km long winch train, with was reopened in 2004 with new construction under the name Vinifuni. It connects Ligerz on the Bielersee with Prêles on the Tessenberg and bridges a height difference of 383 meters.



Daniel Fankhauser, Manager Rolling Material and Technology, asm.

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International Trade Fair for Transport Technology in Berlin

Concentrated PSI Know-How at the InnoTrans

The International Trade Fair for Transport Technology will open its doors for the tenth time in September 2014. Well over 100,000 trade visitors from almost 200 countries and more than 2,500 exhibitors from around the world are expected.

For years, the InnoTrans has been an important platform for PSI Transcom to present their newest developments in operations control technology and introduce successful projects.

The focus of this year's trade fair appearance will be current advances in the

PSI*traffic* platform with components for train management, integrated processes ranging from Depot Management System (DMS) to Intermodal Transport Control System (ITCS), and operational data analysis.

The PSI business units Electrical Energy and PSIPENTA are also present this year. The power control system PSI*control* manages and monitors overhead line systems and optimizes the process chain from generation to the vehicle in the network. The maintenance system PSI*maintenance* controls the processes for vehicle maintenance. Inspection cycles

of the rolling stock and other technical facilities are monitored, and the required personnel and other resources planned accordingly.

From operations management, to electricity supply, to maintenance – PSI provides complete technological know-how for rail operations.



Information
Tickets
Appointments

Don't forget:



Bring your chip* and get an original Berlin „Currywurst“ Daily from noon—3 p.m.

*Chips will be sent with our invitation mailing. Ask for invitations at our website.

PSI Forum

September 25th 2014 · 10:00 a.m.—04:00 p.m.
Hall 2.1 · Booth 309

We will have the following presentations

- Optimisation of conflict management with PSI*traffic* train management
- Efficiency of depot operations through fully automated disposition
- Service management
- Rail project at Schweizerische Bundesbahn (SBB)

Read more at www.psitranscom.de/innotrans

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DMS Customers Meet in Hamburg

Discussion and User Forum at Hamburger Hochbahn AG

On July 26 – 27, 2014, the annual meeting took place for operators using PSI^{traffic}, the depot management system from PSI Transcom. Host of this year's event was the Hamburger Hochbahn AG, which recently began using the PSI solution to manage processes at its depot in Hummelsbüttel.

The meeting included an intensive exchange of experiences between users, discussions of current tasks and the challenges of daily operation, and the introduction of new system functions by PSI Transcom.

The event was topped off with an excursion to the bus depot of the Hamburger Hochbahn AG, where conference participants were able to get a first-hand impression of the PSI systems in operation. In sum, the user meeting in Hamburg de-

monstrated how much transport companies are focusing on depot management and the realization of transparent and uniform operational processes. 



Bus depot Hummelsbüttel.

Kay Tewes Reinforcing the Sales Team since June

New Sales Manager Public Transport at PSI Transcom

Kay Tewes has been active in the transport industry for 13 years, including working for the O-TON Call Center Services GmbH, where he was responsible for marketing and sales, as well as at the Ostdeutsche Eisenbahn GmbH.

Most recently, Mr. Tewes worked for Eckardt Software Management GmbH, a leading software provider for need-based forms of transport.

„In my previous jobs, I have gathered extensive experience in the implementa-

tion of new software systems in the public transport industry. Now I want to contribute this expertise to PSI Transcom in the area of ITCS and depot management,“ says Tewes.

Managing Director Torsten Vogel underlines the strategic significance of the new personnel: „With Mr. Tewes, we are delighted to have gained an experienced professional and expert in the public transport industry who will provide valuable help in expanding and enhancing our market position.“ 



PSI Transcom General Manager Torsten Vogel welcomes Kay Tewes (left).

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