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Smart networking of background systems

Cross-border e-ticketing is to become simple and straightforward with easyConnect.

Photo: © AVV GmbH

The Aachen transport association is working on a new ID based type of ticketing system: easyConnect allows passengers to use different mobility services via their regional smartphone app – across the border into the Netherlands. In the long term, the new ticket system will merge with the eezy.nrw sales channel launched for North Rhine-Westphalia (NRW) in December. The first test route is Aachen – Maastricht.

■ EasyConnect emerged from the "European Travellers Club" (ETC) project. As part of the European Union's funding programme for research and innovation, Aachener Verkehrsverbund GmbH (AVV) has already been working as part of the ETC on how ticketing can work across borders. "Through the funding, the EU wanted to avoid the development of nationally isolated E-ticketing systems that could not be connected across borders," explains Dominik Elsmann, head of the Euregional Coordination Office at Aachener Verkehrsverbund. The neighbouring countries Belgium, the Netherlands and Germany use different and incompatible e-ticketing systems. Belgium uses the Calypso standard for its MoBiB Card, the Netherlands the MIFARE standard for its OV-chipkaart, and the e-ticket Germany is based on the VDV core application. The different technologies do not alllow passengers to pay in the neighbouring countries with their own chipcard. Within the ETC, the Aacheners developed a cloud-based identification number for a chip card that everyone has access to. This was well received in the pilot region, in the triangle between Aachen and the Dutch cities of Maastricht and Heerlen. However, the survey also revealed that the test persons would prefer an app on the smartphone instead of the chip card for additional convenience. In addition, they would welcome a check-in/check-out app, which already exists in the Netherlands.

In the joint project easyConnect, the German side took over the development of a secure barcode for the smartphone. The Dutch transport enterprise Arriva, the foreign subsidiary of Deutsche Bahn, dealt in parallel with a Mobility-as-a-Service (MaaS) concept to be able to query different mobility offers via an app.

"To develop easyConnect, we combine the best of both worlds. With the smartphone-based ticketing variant, it will in future be much easier to buy a multimodal ticket from A to B, even across the border," Elsmann describes the status of the project with the neighbouring country, which began in October 2020. The first pilot phase is planned for June 2022. In North Rhine-Westphalia, easyConnect is not the only project dealing with standardisation. However, cross-border e-ticketing is its unique feature.

From Aachen to Maastricht using the regional app

In the first test phase, the technology is being examined. On the Aachen – Maastricht route, the experts are testing whether the copy-protected Motics barcode is issued correctly and can be checked flawlessly on both sides of the border.

In the second phase, the focus will be on being able to charge distance-based fares across borders via a check-in/check-out system. "For this, we have to consistently think further about what eezy.nrw can already represent today in NRW," Elsmann explains.

Eezy.nrw is a sales channel to which the Ministry of Transport, various transport companies and special-purpose associations as well as transport associations and communities have committed themselves in North Rhine-Westphalia. It was launched on 1 December 2021. The idea behind the joint action is to achieve a nationwide, linear distance-based eTariff for bus and rail throughout North Rhine-Westphalia, bookable via the existing app of the regional transport association. "Instead of one app for the whole of NRW or for the entire country, we want to intelligently network mobility in the respective sub-areas," Elsmann explains. In the interest of the environment, access to multimodality for potential public transport users should be barrier-free and as simple as possible. Elsmann gives an example to illustrate this: "With a ticket booked via the AVV app, the journey could go through Aachen by bike-sharing, continue with the eTarif through North Rhine-Westphalia to Cologne and end there with public transport in the city centre at the desired station." Billing is based on the check-in/check-out procedure.

ID-based Ticketing

The core of easyConnect is ID-based or account-based ticketing. The customer opens an account through which he can use all services. "With our system concept, we make sure that everything runs smoothly," explains Elsmann. "For the passenger, it is mobility from a single source." For cross-border journeys, only the creditworthiness of the ID is confirmed to the respective neighbouring country. The Dutch back end calculates and prices the Dutch leg of the journey. Settlement takes place in the national systems. With ID ticketing, other mobility providers can also be integrated. "This is easier than with the previous standards, behind which there is an elaborate security architecture. For smaller providers, for example bike-sharers, this is often too complex," explains Elsmann.

Through easyConnect, e-ticketing should become simple and straightforward. "In the end, it is a piece of the puzzle of the central distribution platform in the AVV, where all threads come together, from public transport ticketing to subscription management to the integration of other mobility services, brought interoperably across borders," says Elsmann. "In this way, we want to make a very significant contribution to making people wish to use public transport." (MF)

Check-in at the CiCo terminal of the Dutch transport company Arriva in front of the entrances to the tracks at Aachen Central Station.

Photo: © AVV GmbH

Mobility+

offers solutions for the mobility mix of the future

Digitisation and the desire for individual mobility are opening up new opportunities for complements to public transport. For the first time, providers of mobility services which enhance public transport will be presenting their offerings in the new Mobility+ exhibition area at InnoTrans.

The new mobility is flexible, networked and cross-modal. Would you prefer to travel by rail, e-bike or rather by a private transport service? In the future, travellers will be using and combining various modes of transport to their individual preferences, all via an app.

To achieve this, providers of complementary mobility services are developing solutions which enhance public transport services and close gaps in mobility chains. InnoTrans is picking up on this development and offers providers of complementary mobility services a novelty in the form of a thematically focussed exhibition area in the existing Public Transport segment: Mobility+.

"It is here that exhibitors of new mobility services will meet national and international transport companies, transport associations and administrations, and where they will be able to show the industry their cross-modal concepts and systems," emphasises Kerstin Schulz, Director of InnoTrans. There will be exhibitors from the areas of shared mobility – from cars to e-scooters – mobility apps (such as information, booking and payment with a single application), technology (like on-demand driving systems, VTOLs or drones) and first/last mile services (such as ride brokering and ride pooling).

Mobility+ to provide smarter journeys

Mobility+ exhibitors are integrated into the Public Transport segment in Hall 7.1 c. For the first time, they can present their products and services in the Mobility+ Corner, with streaming services at their disposal. Axon Vibe, for example, will be represented at Mobility+. The Swiss company develops smart travel assistants for public transport providers which enable passengers to travel seamlessly from door to door while using several modes of transport. To find the optimal mobility mix, artificial intelligence evaluates users' needs, habits and context.

Door2door from Berlin offers technologies with which, for example, journeys can be bundled and booked via apps. Ridepooling combines journeys with similar routes. Instead of being transported one by one, passengers cover part of the route together. This saves costs and reduces traffic volumes.

BestMile wants to exploit the potential of autonomous vehicles with a platform for autonomous fleets. The Mobility+ exhibitor is marketing the first fleet automation platform which enables the intelligent operation and optimisation of autonomous vehicle fleets, regardless of their make or type, and manages both fixed routes and on-demand services.

For complex and large-scale transport operators, Optibus offers a software-as-a-service platform which plans and schedules the missions and deployment of both the drivers and the vehicles. It provides detailed insight into the impact on operations, on time performance and costs. The Optibus software is already used by more than 300 cities worldwide. The aim is to increase service quality and efficiency, reduce costs, optimise operations and reduce traffic disruptions and emissions.

InnoTrans: well booked into the new year

Popular with exhibitors and visitors: the Outdoor Display with its tracks. Photo: Messe Berlin GmbH

At the beginning of 2022, the year of the trade fair, 108,000 square metres of exhibition space have already been booked, exceeding the level of the previous event. With the additional use of Hub27, a modern multifunctional hall, Messe Berlin has increased the total area of InnoTrans. Hub27 will make its debut at InnoTrans in 2022. The hall is located directly adjacent to the Outdoor Display and tracks and offers a total of 10,000 square metres of additional exhibition space, which is already fully booked. The track and Outdoor Display is also fully booked with 3,500 running metres of track.

With 64 per cent international exhibitors from 57 countries, the level of international participation is also high. "Everyone is very eager to finally come together again in September 2022 on the global industry platform," says InnoTrans Director Kerstin Schulz. The 13th edition of the world's leading trade fair will take place from 20 to 23 September 2022 at the Berlin Exhibition Grounds. Exhibitors from all over the world will present their innovations in the segments Railway Technology, Railway Infrastructure, Public Transport, Interiors and Tunnel Construction. The Mobility+ exhibition space in the Public Transport segment is new. This is where suppliers of complementary mobility services will present their offerings in the areas of shared mobility, mobility apps and first/last mile services. The Speakers' Corners provide a further presentation opportunity in addition to the booth spaces. This is where exhibitors will present their company, their products or industry news in 60-minute slots. Due to the high demand, there are now five Speakers' Corners - one for each product segment.

The personal face-to-face exchange at the fair is complemented by a wide range of digital add-on services. In addition to live streaming of the entire supporting programme and the Speakers' Corners, as well as the availability of on-demand videos after the trade fair, exhibitors can present themselves 365 days a year on the new InnoTrans PLUS digital industry platform. The platform now offers extended services such as chats, matchmaking and appointment booking.

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PUBLISHER
MESSE BERLIN GMBH
MS Mobility & Services
Messedamm 22, 14055 Berlin
GERMANY
T +49 30 3038 2376
innotrans@messe-berlin.de
www.innotrans.com

CONCEPT, ADVERTISING
DVV Media Group / Eurailpress, Hamburg

ADVERTISEMENTS
tim.feindt@dvvmedia.com

EDITORIAL MANAGEMENT
Messe Berlin GmbH, Berlin
Ingrid.Mardo@messe-berlin.de
and jennifer.schacha@dvvmedia.com
IN COOPERATION WITH
mechthild.seiler@dvvmedia.com
webmaster@marionfrahm.de

LAYOUT AND DTP
GrafoService GmbH, Norderstedt
info@grafoservice-gmbh.de

TRANSLATION
reinhard@christeller.net

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Plasser & Theurer: Change in the Management Board

The previous Managing Director Daniel Siedl left the company Plasser & Theurer, Export von Bahnbaumaschinen, Gesellschaft m.b.H. on 31 December 2021. As of 1 January 2022, Dr. Stefan Peiker has become the new Chief Operating Officer (COO, Managing Director Production).

Managing Director Production Dr. Stefan Peiker
Photo: Plasser & Theurer

Daniel Siedl wished to change his career path and therefore decided to terminate his employment. In the future, his duties will be taken over by Dr. Stefan Peiker. After his studies in mechanical engineering, he gained 32 years of experience in various management positions at MAN Nutzfahrzeuge. Peiker joined Plasser & Theurer as a consultant and took over as operations manager in mid-August 2019.

CEO and owner Johannes Max-Theurer: "I regret this step by Mr. Siedl, both from a professional and a personal point of view. I wish him all the best for his further professional and private life.

At the same time, I am pleased that Stefan Peiker has joined us as the new Managing Director for Production. I wish him all the best for his future tasks."

NEWS

RFI calls for tenders for EUR 2.7 billion ERTMS contract

In the Official Journal of the European Union, the Italian infrastructure manager Rete Ferroviaria Italiana (RFI) has published a European tender worth 2.7 billion euros for the design and implementation of the European Rail Traffic Management System (ERTMS) on the entire national network. The publication is linked to the National Deployment and Resilience Plan PNRR, according to which 3,400 kilometres of the network are to be equipped with ERTMS technology as soon as in 2026. The introduction complements the technological investments already underway for the renewal of digital station equipment, with the existing signalling systems gradually being fully replaced by digital and interoperable technologies by 2036. Once the implementations are completed, the national network will comprise approximately 16,800 route kilometres equipped with the most advanced technology for rail transport, thereby renewing the entire control and signalling system of which ERTMS is a part.

Women in Mobility – ready for InnoTrans

The Women in Mobility are already planning their InnoTrans activities. Photo: IPM AG

During the Corona pandemic, networking becomes even more vital than ever. Professional networks offer up-to-date industry information, the opportunity to make new contacts, share experiences and, what is particularly helpful at the moment, a platform to empower each other.

This mutual encouragement - also called empowerment - is one of the goals which the organisation **Women in Mobility (WiM)** has set for itself. The network for women working in the mobility industry was founded in 2015 and is now active with so-called hubs not only in seven German cities or metropolitan regions, but also in Vienna, Berne and London. The offer is explicitly not aimed at leaders or a specific sector only, but is intended to promote the "better visibility of women in the mobility industry in leadership positions and project management, as speakers at conferences or as experts in specialised media". "Whether you are a decision-maker or a PhD student, a leader or a founder, a scientist, a student or an employee – Women in Mobility offers a platform for networking to women from companies and start-ups, organisations and associations, media and politics, joint projects, cooperation and exchange."

Special WiM events

Of course, the major events of the sector, above all InnoTrans, are also important for the visibility of WiM. This is especially true for the upcoming leading trade fair for transport technology from 20 to 23 September 2022 in Berlin. After all, due to the pandemic, it will be the first time since 2018 that industry experts from all over the world will meet. Planning for the trade fair programme is already in full swing.

Larissa Zeichhardt (WiM Hub Berlin) comments, "Together with our partners, we are currently working on an exciting hybrid concept, with strong support from BerlinPartner." Sophia von Berg (WiM co-founder) adds, "Thanks to the online events of the hubs, our members are well connected even in times of the pandemic, it will nevertheless be something special when we see each other again at InnoTrans!"

The industry needs women

There is a consensus, not only in Germany, but throughout Europe, that the potential of women is absolutely needed for the job market of the mobility or railway industry. Therefore, the Community of European Railways (CER) and the European Transport Workers' Federation (ETF) have decided within the framework of comprehensive negotiations to intensify the promotion of women's employment in the railway sector.

The "Women in Rail - WiR" agreements, which came into force in November 2021, aim at creating more attractive working conditions for women across the entire EU. Women are under-represented in the rail sector, they account for around 20 per cent of the workforce across Europe, compared to around 50 percent of the population.

Andreas Matthä, President of the CER and CEO of the Austrian Federal Railway (ÖBB), said that the European railways were looking for thousands of new employees every year in a wide variety of fields and occupational groups. According to Matthä, it has been proven that mixed teams are more successful and that one cannot afford to miss out on 50 per cent of the potential on the labour market.

Safe track crossing for all

Bodan track covering system at the railway station in Bad Goisern, Upper Austria . Photo: © Jürgen Mairhuber, Gmundner Fertigteile

Level crossings must be safe for persons using the railways as well as for participants in road traffic. For this reason, the Austrian company Gmundner Fertigteile designed the Bodan track covering more than 50 years ago. Since then, Gmundner has continued to develop the system according to the technical requirements of international railway undertakings

As a modular bridge system, Bodan is suitable for all types of rails, sleepers and rail fastenings. Made of polymer concrete, the particularly rugged and long-lasting panels can be installed very quickly. Different rubber profiles for S49, S54, UIC54, UIC60, SBB I, SBB IV and 50N (Japan) rails guarantee a secure hold of the inner and outer plates. The elastic support of the plates transfers the loads of road traffic in a controlled manner to the rail sleeper grating and into the ballast bed. In this way, they ensure an undisturbed bedding of the track.

Production according to customer requirements

In order to guarantee the safety of all road users that are passing over a level crossing - from pedestrians to cyclists, from people with prams to those with disabilities and those who rely on wheelchairs or wheel walkers, Gmundner developed a rail groove filler that enables them to cross without any problems. At the same time, it guarantees safety in rail traffic. In Austria, the rail groove filler has already been used in several places, and in Germany it is currently undergoing a pilot project. One of these Bodan pedestrian crossings with rail groove fillers is located near the company's headquarters. To increase attention, the crossing consists of a combination of red-coloured Bodan panels.

In 2021, Gmundner delivered many projects with special turnout plates to Japan, Germany and Austria. Like the track plough plates, these are manufactured according to the respective customer requirements, balise protection plates are adapted to the customer's wishes.

International certification

The Bodan plates, manufactured with a grain-rough surface, are approved in various countries and are installed by the respective state and private railways. Gmundner delivers within Austria as well as to Germany, Ireland, Japan, Malaysia, Norway, Romania, Switzerland, Taiwan, Thailand, the Czech Republic, Hungary and Australia.

The Bo-Track track slabs, also manufactured by Gmundner Fertigteile, have a slip-resistant, washed surface with hard chippings. They are used especially in the industrial sector and for heavy traffic. Bo-Track slabs are designed for high road traffic loads and prove to be utterly robust under extreme loads. The elements are supplied with the Edilon Corkelast ERS (Embedded Rail System) rail fastening system.

Avatar for HS2 high speed rail

Virtual reality and real-time monitoring are components of HS2's reliability. Photo: © HS2

A digital twin and real-time monitoring by sensors are to help the new British high-speed network HS2 become one of the most reliable railway lines in the world.

Work on HS2 is in full swing: Gigantic boring machines are digging the first tunnels between London and the West Midlands. In December 2021, the joint venture of Alstom and Hitachi Rail was awarded the contract to build the new generation of British high-speed trains. HS2 is due to enter service in 2029, creating faster, easier and more reliable transport links between cities in the South, Midlands and North.

One of the measures to ensure reliability is a digital twin of the HS2. The basis for the programming of this avatar are the designs for the construction of the line created using state-of-the-art computer design programmes. The virtual 3D replica will be just as detailed as the original. It will be fed by data from thousands of remote monitoring sensors to be installed in the line's infrastructure during construction. These sensors will monitor the performance of the railway equipment and components to predict and prevent failures, ensuring the reliability of the line and ultimately the timeliness of passenger services.

Live data to monitor performance trends

The live information captured by the sensors on board the high-speed trains will be transmitted directly to HS2's Birmingham-based Network Integrated Control Centre (NICC) at Washwood Heath. There, engineers and maintenance teams will analyse the data using artificial intelligence to monitor asset performance trends across the network. A drop in performance levels will trigger HS2's maintenance programme for prediction and prevention.

At the NICC, engineers will use virtual reality headsets to investigate the problems. With this technology, maintenance teams can understand and, in some cases, fix problems without having to go to the site. Another benefit of the predictive and preventative system at HS2 is its ability to have parts repaired and replaced when the system signals a need rather than relying on a pre-established maintenance and renewal programme. David White, Head of Strategic Planning and Asset Management, commented: "By harnessing the power of the digital twin and its capability to predict, the life of an asset can be extended by months or even years. This allows us to reduce costs, cut waste, reduce the environmental footprint of HS2 maintenance operations and maintain a consistently high level of customer service."

Virtual reality technology will play an important role in familiarising teams with the railway. Even without the digital twin-based maintenance operations, HS2 is set to become one of the most reliable railways in the world.

FOCUS ON

PUBLIC TRANSPORT

In transition

The transport industry is on its way into a new age of climate friendliness. This is not only reflected in the development of electric, hydrogen and hybrid traction drives, but also in the ongoing digitisation of regional and local transport with the aim of increasing capacities and encouraging people to switch to public transport.

Energy kit for electric buses

Ebusco 2.2 and charging column Photo: © Ebusco

Ebusco considers buses, their charging system, charging infrastructure and energy storage to be a single ecosystem. For this system, the Dutch bus manufacturer offers a single-source service.

"We are not just a manufacturer of electric buses," emphasises Peter Bijvelds, founder and CEO of Ebusco B.V. In his eyes, the production of buses is only one part of the overall ecosystem. He considers buses, charging systems, charging infrastructure and energy storage to belong together. It also makes most sense for transport companies to receive everything from a single source. "Control over the entire ecosystem allows for additional customisation," explains the CEO as he gives an example: "When a bus is fully charged, the standard protocols for restarting the charging circuit require it to be reconnected. This means that the battery capacity already begins to decrease when the heating of a fully charged bus is started in cold weather, for example. If the charging point has been properly preconditioned, the battery will remain at 100 per cent until the bus leaves." Apart from the technical advantages, a contact person for the entire system would offer transport companies more security. "This way, they are no longer sent from one provider to the next when, for example, a bus is not charging," explains Bijvelds.

Electric buses as a mobile energy storage system

According to Bijvelds, the public transport system in the Netherlands is well on its way to becoming a real fully fledged ecosystem thanks to its far-reaching electrification. Furthermore, in that country, electric buses are a travelling energy storage system which is embedded in a larger system. "Because we have control over the whole chain, we can react much better. More and more solar and wind energy is generated, while coal-fired power plants are progressively shut down. This has to be compensated for," says Bijvelds.

Ebusco therefore also focuses on energy storage. The first container developed for this purpose was installed on the company's premises in Deurne in 2020. The container is a very large battery. Such containers can be used to balance the energy grid, but they are also suitable for bus depots. During daytime, while the buses are doing their work shifts, the containers are charged in a bus depot. At night, the fully charged battery containers can be used to charge the buses. In this way, the electricity grid, which is increasingly struggling with capacity problems, is relieved.

Ebusco brought Europe's first electric bus onto Helsinki's streets in 2013 – at that time, there was no associated charging standard. So the manufacturer developed its own charging points right from the start. Later, these were converted to the Combined Charging System-(CCS-) Combo-2 standard.

Fully automated passenger information systems

Despite increasing automation of rail operations, it is essential to ensure safe operations and keep passengers informed at all times. With the help of remote passenger information systems (PIS), it is possible to take over or even fully automate on-board staff tasks by the operation control centre (OCC). Televic GSP, a company of the Belgian Televic Group, has decades of experience in the development, production and maintenance of communication and control systems for the railway market. Televic GSP's remote control of PIS bundles several on-board functions and makes them available via interfaces so that they can be managed from the operations control centre rather than by on-board staff as has been the case hitherto.

Thanks to the four core functionalities of remote trip selection, live remote announcements, timed remote announcements and historical overview, it is possible to accurately select the vehicles to be addressed based on real-time information. The combination of audio and visual messages through a single system ensures that the information is accessible to a wide audience and can also be sent to a selection of the vehicle fleet with just one action. Full interoperability with existing public address systems is enabled through the ease of creating announcements and routing them through a user console or interface.

Fully informed Photo: Televic GSP

www.innotrans.de

Smart journeys benefit from end-to-end connectivity

Nomad Digital puts the passenger at the centre: powerful connectivity and a comprehensive range of services for both passenger devices and on-board displays. Photo: © Nomad Digital

Passengers can enjoy a high-quality travel experience through internet, varied media entertainment options and practical real-time travel information. Intelligent connectivity solutions from Nomad Digital connect passengers, vehicles and businesses.

UK-based Nomad Digital designs, builds, implements and maintains on-board passenger WiFi and passenger information systems. Furthermore, the company offers remote online solutions for condition-based monitoring and maintenance which support operational efficiency and optimisation of fleet management. Nomad Digital's portfolio provides intelligent technologies for the maintenance and servicing of rolling stock and ensures a fully connected passenger experience, all in a secure cyber environment. Nomad Digital's solutions provide visibility into both the current and past connectivity usage and fleet performance. The use of these data supports the monitoring and management of operational fleet problems in a proactive and intelligent manner.

Train-to-ground network for high-speed WIFI

"We live in a world of increased expectations with regard to digital, sustainability or mobility developments," says Xavier Champaud, CEO of Nomad Digital. He is thinking of both passengers who want a pleasant journey with seamless transitions from one mobility mode to another, and operators and maintainers who use real-time tools to make their decisions and improve their service.

Nomad Digital supports this transformation through innovations and investment in research on artificial intelligence and data.

In 2019, Nomad Digital launched Trackside Railway, a dedicated wireless network laid along the tracks. The trackside communication technology enables high-bandwidth and low latency network connectivity for connections to high-speed, long-distance and dense traffic trains. Similarly, it is suitable for seamless, single sign-on and wireless roaming connectivity in railway stations and platforms, as well as on trains and metros.

Ramp, step or gap filler? The RF3+ entrance step decides automatically

Sensors detect the conditions at the platform, the algorithm decides how RF3+ is deployed Photo: Masats

The new step system from the Spanish manufacturer Masats uses sensors and an intelligent algorithm to determine which interface is required between the platform and the train.

Once the train has entered a destination station and has taken up its stopping position, the contactless sensors of the RF3+ entrance step detect the position and shape of the platform. The intelligent algorithm then decides whether the new step system from Masats S.A. must bridge the gap between the platform and the train as a ramp, step or gap filler. RF3+ ensures universal and inclusive access to trains, offers maximum safety when boarding and alighting, and meets or even exceeds European accessibility standards.

Project partners from RENFE, Stadler and CAF

RF3+ has already been integrated into two projects of the Spanish railway undertaking RENFE. For these, Masats also supplied the automatic sliding doors and the manual cabin doors that are equipped with an electronic lock as security access control. Masats is also participating in projects of Stadler and CAF for the cities of Barcelona, Madrid and Stuttgart. The Spanish company also equipped Line 11 of the Barcelona metro with platform screen doors (PSD). This system was integrated into the grade 3 accompanied driverless train operation system (GoA3 automation level). It fulfils the safety integrity levels SIL2 and SIL3 and also meets high availability requirements. The modular state-of-the-art concept of the PSD platform screen doors includes a lighting system which reduces boarding times. The modular design of the full-height doors facilitates their quick installation in stations and at the same time allows for the integration of other additional systems – such as information boards, video surveillance or waste bins – into the station façade.

More offerings for the railway sector

The new platform concept is specially designed for use in metros, regional trains but also high-speed lines.

Masats will present this new concept as well as the second generation of its Thyralink communication system at InnoTrans. Thyralink is a direct communication system between platform and train doors that triggers the opening process when requested and thus improves sustainable climate control in stations and on trains. The system is also able to replicate the status of the doors between each other.

Masats is one of the pioneers in access systems for public transport in general. The new offering expands the company's portfolio for the railway sector.

Latest technologies on the top of the train

The new fan system for condenser cooling in roof-mounted air conditioners from Ziehl-Abegg is made of special synthetic materials and is therefore more efficient than previous metal systems. Moreover, it complies with the fire protection standard EN 45545 and is significantly more cost-effective over the entire life cycle compared to conventional fans.

Axial fans on train roofs have hitherto always been made of metal to ensure fire protection; the same applied to their suspension. Ziehl-Abegg SE is revolutionising the fan systems thanks to its thermoplastic fibre composite material. Since 2011, the fan experts from the South German city of Künzelsau have been using the so-called ZAmid in numerous applications for customers. Now Ziehl-Abegg is also introducing this material to railway applications. This reduces the weight of the fan by up to 40 per cent - a weight which neither has to be moved during operation of the device nor permanently carried around by train.

Since both the fan blades and the nozzle – which is made from one shot and has an integrated motor suspension – are made from the high-performance composite material, the aerodynamic design of these elements can be optimised. This increases the overall efficiency of the fan system and furthermore saves energy during operation. Air conditioning systems are among the largest energy consumers in a train.

ZAplus rectifier nozzles are made entirely of the high-performance composite material. This means they are free of corrosion. As they are injection-moulded from a single shot, there are no screws in the suspension which can come loose, either.

EC motors for the Industrial Internet of Things

Ziehl-Abegg offers the new ZAplus system for railway technology with both classic alternating current (AC) motors and energy-saving direct current (EC) motors. The advantage of EC motors is their ability to continuously regulate the speed depending on the required cooling capacity or, for example, when entering a station. In addition to energy savings, this also results in an audible noise reduction for residents and railway customers alike. EC motors are network-compatible so that they can be used in future applications. The latest technology EC motors are devices with capability for the Industrial Internet of Things (IIOT), which can be connected to an in-house cloud, the ZAbluegalaxy. This connection enables the next step in the life cycle of the fans. It allows predictions to be made about the likelihood of failure. The more accurately such failures can be predicted, the easier it is to switch from traditional preventive to predictive maintenance cycles. The utilisation of the fans can be adapted optimally to the actual life cycle.

EC motors can be combined with axial and radial fans and are available for all application areas (traction motor, cooling of electronic equipment, supply air or condenser fans for air-conditioning units).

Less weight and safe fire protection: the ZAplus fan unit for condenser cooling in train roof air-conditioning units. Photo: ©Ziehl-Abegg

Seating concept for tomorrow's urban mobility

The new "Ubility One" product family for bus and train seats from Grammer AG addresses all market participants. The "Light", "Air" and "Shift" models are comfortable for passengers and efficient and flexible for vehicle manufacturers and public transport operators. They are made from durable and recyclable materials. Production is scheduled to start in 2023.

Ubility One – a neologism that combines "Urban" and "Mobility" – is based on current studies of passenger flows and the corresponding zones in the interior where passengers stay. Grammer has developed a particular seat model for each zone. Ubility Shift has been designed for standing and leaning in the entrance and exit areas. The leaning and sitting island is a combination of upholstered, body-high supports for leaning on with handles which are arranged in an ergonomic way. A special kinematic system in the support cushions allows the passenger to deploy a seat. Ubility Light creates a flexible use of space for areas with high passenger turnover frequencies. The aluminium seat frame consists of five components. Being covered with a high-tech textile, it can be configured in various ways and allows sitting in both directions of travel. Ubility Air is designed for longer stays - a lightweight seat in so-called twin-sheet technology. The seat consists of both an outer and inner shell, which are connected to form a comfortable and at the same time stable air-cushion structure. Grammer strives to become a green company and therefore sustainability in new developments is a must. The product design, choice of materials and service life of Ubility One comply with this commitment. The ultra-light seat Ubility Light has a weight advantage of 60 percent compared to current seat shells.

Developed to be sustainable and recyclable - Ubility One bus and train seats from Grammer. Graphic: Grammer AG

Keeping an eye on the environment

The company claims that equipping urban trains in Europe with the Ubility Light could help to avoid around 130,000 tonnes of CO_2 per year. Ubility Light's product life cycle is designed to be recyclable and could be extended considerably through refit and refurbishment programmes. Grammer uses only one material for the double shell of the Ubility Air, which is made from recycled raw materials, and does not use any material mixtures. The twin-sheet structure with air cushioning can be recycled up to 100 percent and can be easily cleaned. Its closed surface offers a high degree of protection against vandalism.

The production of the first models is scheduled to start at a European Grammer location in 2023.

INTERVIEW WITH ...

MIRKO ROSS

Co-Founder & CEO asvin GmbH, Stuttgart

E-Ticketing – an exciting and irreversible process

A ticketing app for all public transport journeys – across transport associations and countries – sounds convenient. But what about security when the most diverse players open their systems and share data? InnoTrans Report spoke to cyber security expert Mirko Ross.

Mirko Ross
Photo: ASVIN GMBH

? InnoTrans Report: ***Mr. Ross, as an expert in cyber security, what is the first thing that comes to your mind when you think of e-ticketing?***

Mirko Ross: First of all, I believe that the user wants everything to work more simply and consistently. Even I, as a cyber security expert, would like that. At the same time, I ask myself the question of how data are transferred in such systems, how they are used and how they are secured in the long data supply chains.

? As a user, what causes you a headache?

Mirko Ross: The lack of transparency. We are dealing with ticketing, i.e., with personal data. It is necessary to identify the owner of the ticket. We are dealing here with sensitive data, and if I lose them, I cannot find out where they are. After a successful hacking attack, my data may become freely available for sale on the darknet. And then, they can be used by criminal organisations for the purpose of optimising their cyber-attacks. We are also dealing with financial data - tickets have to be paid for. And this means that sensitive payment information and payment systems are involved. As a horror scenario, I may simply lose my credit card details or transactions will be carried out and damage me financially.

? Intermodality requires a high degree of interconnection between the different actors. What vulnerabilities are created by data sharing?

Mirko Ross: It is necessary to network, to provide technical access to other participants in the system and to provide interfaces. This increases the vulnerable area. Potential attackers simply have more opportunities to penetrate such systems or to retrieve data from them.

? On what security standards will intermodal networks be based?

Mirko Ross: We are dealing with various large players. Deutsche Bahn would be a very large player. But there are also regional transport companies as well as smaller bus companies. They all have different backgrounds. In some cases, the CERT (Computer Emergency Response Team, editor's note) actively takes care of cyber security. This team can monitor and has almost unlimited resources. In other cases, it is difficult to even identify a staff member who is dedicated to cyber security, let alone a support team. Such different actors agree on minimal technical standards. However, the problem is always how to comply with these standards. Agreeing on them is easier than actually implementing them permanently in a company.

? What does cyber security depend on?

Mirko Ross: In most cases, there are minor flaws. Standards exist, but they cannot be permanently maintained by all actors. Somewhere there is always this weakest link. A small player is just not in a position to quickly patch up, upgrade and close a security gap. This does not mean that the big players are so excellent. The same thing can also happen there, through human error or because some processes are too slow. Companies should therefore invest heavily in securing their systems. This raises the question of which companies within the chain still find it worthwhile as a business model when some participants already have high deficits and difficulties. Can they find the funds to invest at all to keep their data and their IT infrastructure secure?

? What basic rules do transport operators have to follow to make e-ticketing as secure and trustworthy as possible?

Mirko Ross: The first basic rule of data protection is a minimal use of data. Even this is where the departments in a company sometimes conflict with each other. While some want to collect as many data as possible in order to optimise operations, others say that collecting so many data means having to protect a lot of data. In general, it has always to be expected that data can be lost. All those involved in this system would do well to write the credo of minimal use of data right at the top of their banners. When data leaks occur, this is the worst case and the trust in such a system also decreases.

? The transport infrastructure is part of the critical infrastructure. E-ticketing, as you said, creates a larger vulnerable surface for potential hacker attacks. How can these be avoided?

Mirko Ross: The hacker attack is the new "normal" situation. Any company of any class or category will be attacked. This is a result of the way cyber-attacks are structured. Predominantly, cyber-attacks start through automated scans for known vulnerabilities or through phishing via email. The basic technical protection is to configure all systems properly and to keep them up to date. In fact, if we look at ransomware, this would prevent a majority of attacks. Attacks simply occur because the systems are not patched properly. And it's about people. The last line of defence is the people who work in a company. If they are properly aware, they can also take the right measures and decisions. That's why it is important to work with people and make sure that cyber security is maintained at a high level, that there is awareness and that people are properly trained.

? What is your forecast for the years to come?

Mirko Ross: There is no alternative if we don't want to keep the stripe card which is absolutely cyber-secure but also extremely inconvenient. The fact that we are digitising ticketing is an irreversible process. There is no doubt that it will happen and we have to be prepared for it. The fact that cyber-attacks are increasing is also an irreversible process. We have to adapt to that as well. So, the next few years will be extremely exciting.

Photo: Gerd Altmann, Pixabay

Major contract for Fehmarn Belt tunnel: imminent award

The route of the longest trans-European transport corridor, of which the Fehmarn Belt tunnel is a component. Graphic: Femern A/S& Co. KG

The major contract for the supply and installation of the Fehmarn Belt tunnel's electrical and mechanical systems is expected to be awarded by Femern A/S to one of three bidding consortia in spring 2022.

Pioneering sustainability

On 16 November 2021, Femern A/S received the bids for the competitively tendered contracts for the electrical and mechanical installations of Northern Europe's largest tunnel project. The tendering process was started in spring 2021 with a pre-qualification. The three consortia BraVeCo (Sweden, France, Denmark, Norway), Femern Technical Contractors (Austria, Germany, Netherlands, Switzerland) and SICE-Cobra (Spain, USA, Sweden, New Zealand) submitted their negotiation offers in November 2021. The comprehensive contract to equip the combined road and rail tunnel through the Fehmarn Belt with state-of-the-art technology is worth the equivalent of at least 670 million euros. It is not only a significant order because of the estimated volume – the technical solutions for implementing the order will make a decisive contribution to making the Fehmarn Belt tunnel a pioneering project in terms of sustainability. The aim for the electrical and mechanical systems is to be as climate-friendly and energy-saving as possible.

Contributing to traffic turnaround

The Fehmarn Belt tunnel is intended to make travelling between Germany and Denmark and between Scandinavia and Central Europe more comfortable and faster. In future, two and a half hours will be all it will take to travel from Hamburg to Copenhagen by train, while it currently takes around five hours. This will make travelling by train more attractive, especially compared to short-haul flights on this route. The Fehmarn Belt tunnel is located on the Scandinavia – Mediterranean transit corridor (TEN-T 5 Scan-Med), the longest trans-European transport corridor, and will thus make an important contribution to the shift in transport. The construction of the Fehmarn Belt tunnel will create a green transport corridor with electric rail lines and an uninterrupted road link. With the tunnel, a diversion of 160 kilometres will be spared for transit traffic between Hamburg and Copenhagen – and thus not only will time be saved, but also fuel and CO_2 emissions. In addition, the new direct rail link across the Fehmarn Belt will boost environmentally friendly rail freight transport. It will also free up road and rail capacities on the Jutland route.

Commuters will also benefit

The tunnel will also expand the rail connections on the Danish and German sides. In future, modern electric trains will be able to travel at speeds of up to 200 kilometres per hour. Commuters in the region will also profit from the faster and better connections – regardless of whether they use the tunnel or not. They will be able to travel from the city of Burg on Fehmarn island to Lübeck by regional train in 49 minutes only, instead of the current around one and a half hours.

Jobs and educational opportunities for the region

The construction of the Fehmarn Belt Tunnel, which is scheduled to open in 2029, will create several thousand direct jobs at the two construction sites and at subcontractors. The construction companies to be contracted by Femern A/S have furthermore made commitments to create at least 500 apprenticeship positions during the entire project. As with the other major contracts, it can be assumed that the contracted consortium will engage a larger number of subcontractors.

Semmering base tunnel achieves a milestone

At the end of December a further important milestone on the way to completing structural work at the Semmering base tunnel was reached. The first tunnel boring machine (TBM) reached the construction section limit.

The Semmering base tunnel is to cut travel times between Lower Austria and Styria, meaning that a train journey from Vienna to Graz will then take less than two hours. From 2028, the tunnel will connect Gloggnitz in Lower Austria with Mürzzuschlag in Styria and relieve the historic Semmering railway.

The tunnel boring machine (TBM) called "Ghega" has covered more than 8,100 metres at the construction lot Fröschnitzgraben and there are still just under 500 metres to go in the second tube.

Strengthening freight traffic

This work is estimated to be concluded in the first quarter of 2022 as well. According to ÖBB, more than 80 percent of the entire tunnel has already been dug. Arge Swietelsky/Implenia is responsible for the Fröschnitzgraben construction lot. The Semmering base tunnel is a sustainable investment in the future of rail transport. As part of the new south route, it will strengthen the Baltic-Adriatic Corridor and make rail freight transport on this route more attractive, since even heavy locomotive-hauled freight trains will be able to use the tunnel. Each tonne of freight transported by rail generates around 15 times less CO_2 emissions than truck transport.

The TBM Ghega has successfully completed its work. Photo: ÖBB

Hydrogen traction goes to California

In San Bernardino, California, Stadler's first low-floor multiple unit FLIRT will be operating with hydrogen traction for the first time in the US. Graphic: Stadler

Stadler is developing and building the first hydrogen-powered train for passenger transport in the USA, ordered by the San Bernardino County Transportation Authority (SBCTA). At InnoTrans 2022, Stadler will present the FLIRT H2 to the international public.

Of all transport modes, rail is the most sustainable mobility solution. Shifting the transport of people and goods to rail plays a crucial role in the fight against climate change. Electric trains and locomotives are the most sustainable. In many countries, however, railway networks are only partially electrified or not electrified at all. In the USA, for instance, less than one percent of the rail network is equipped with electric overhead lines. Electrification of the infrastructure is complex and costly. In order to make rail transport more sustainable in these countries, there is thus a need for alternative traction solutions. This is why the San Bernardino County Transportation Authority (SBCTA) wants to convert its passenger transport in Southern California to zero-emission technology. The American rail operator continues to rely on FLIRT low-floor multiple units from Stadler Rail Group, Bussnang, Switzerland. To date, these trains have been operated with diesel propulsion (DMU). In November 2019, SBCTA contracted Stadler to develop and build the first hydrogen-powered FLIRT.

FLIRT H2 will start operating for Arrow in 2024

The order will make a significant contribution to providing the US with zero-emission rail technology. The new FLIRT H2 is the first hydrogen-powered passenger train in the US and across the entire American continent. It is scheduled to be in passenger service for Arrow from 2024. Arrow is a 14-kilometre link between Redlands and San Bernardino's Metrolink station.

A whole day's cruising range

The first FLIRT H2 features two car bodies and a central section for the fuel cells and hydrogen tanks, the so-called PowerPack. Stadler has developed a propulsion technology which allows the FLIRT H2 to operate for a whole day without having to be refuelled. The train offers seating for 108 passengers as well as generous standing room. The maximum speed is 130 kilometres per hour. The vehicle is also designed to operate in demanding ambient temperatures of up to 49 degrees centigrade.

Stadler will present the FLIRT H2 to the public at InnoTrans 2022 in Berlin. From the Arctic Circle to Africa, the Swiss company has sold more than 2,000 FLIRT trains to date. In addition to trains with purely electric, diesel or mixed drive, Stadler also offers these low-floor multiple units with alternative drive solutions such as batteries and hydrogen. In Germany, for example, Stadler delivered 55 FLIRT Akku battery-powered trains to the local transport association Schleswig-Holstein NAH.SH and 44 FLIRT Akku units to DB Regio.

Rail vehicles for the whole world

Straightforward interior design in the ForCity Smart Ostrava. Photo: Škoda Transportation

With over 160 years of experience, the large Czech company Škoda Transportation manufactures vehicles for public transport. The Škoda Transportation Group's products include low-floor trams, electric locomotives, suburban trains, metros, electric and trolley buses, as well as control and drive systems for transport systems.

Low-floor tram

The latest developments include trams for Pilsen and Ostrava. The low-floor tram for Ostrava can accommodate 60 seated and 140 standing passengers and travels at a maximum operating speed of 80 kilometres per hour. Named Škoda ForCity Smart Ostrava, it measures 26.6 metres and is Škoda's longest two-bodied tram. The fully rotating running gear and the low axle loads reduce the impact on the track superstructure. Thanks to the redesigned front end, the passive protection of pedestrians has been significantly improved. In addition to the comfortable and modern passenger interior, with five double doors for speedy boarding and alighting, the driver's seats have been designed for maximum comfort and safety, with all controls within easy reach.

Push-pull trains

The new so-called push-pull units are unpowered trains designed to operate at a maximum speed of 160 kilometres per hour. The advantage of the three-car trains for regional transport is their flexibility and modularity; for example, they can be powered by either electric or diesel locomotives, so that they can be used on both electrified and non-electrified lines. The train has 356 seats and is partially low-floor for barrier-free access from 55 centimetre high platforms. By adding further passenger cars, the capacity of the train can be changed in a modular way and thus be effectively adapted to the actual needs of the transport company.

The microprocessor control system allows the driver to control the train from the driving trailer or from the locomotive. The new generation of double-decker trains will be used in the Moravian-Silesian region in the Czech Republic.

Modernisation, repairs and full service for rail vehicles

Škoda Transportation not only produces new vehicles, but also offers long-term services for rail vehicles to customers throughout Europe. Škoda Pars focuses primarily on regular servicing, maintenance and modernisation of rail vehicles for customers in the Czech Republic and abroad. Regular service operations and repairs for trams and metros are carried out by Škoda City Service, Škoda Transtech in Finland and Škoda Ekova.

With more than five and a half thousand employees, the Škoda Transportation Group currently has an order book of over 3 billion euros.

Rail vehicles: in good hands

This is where Go-Ahead Bavaria's fleet is maintained. Graphic: TMH Germany

All trains need regular maintenance services to keep them performing reliably. Maintenance must not necessarily be carried out directly by the manufacturers, but can also be undertaken by a service provider who offers a manufacturer-independent inspection of the rail vehicles.

TMH Germany, an enterprise belonging to the international TMH Group, offers such manufacturer-independent maintenance in the Bavarian town of Langweid am Lech. This required a willingness on the part of TMH Germany to make a long-term investment and to assume full responsibility for the construction and management of the maintenance facility. Operators usually do not have sufficient capacity themselves to do this. Therefore, one of the most modern maintenance plants in Europe was built in Langweid for more than 45 million euros. The know-how of the TMH Group from more than 100 maintenance workshops is bundled here.

Modern equipment for the digital future

The maintenance plant is equipped with state-of-the-art tools, including a measuring device for data collection to improve the intervals between reprofiling of wheels and other tools. Digital workflows are being placed at the heart of maintenance activities; central to this is the model of a true digital twin which is being introduced. Thanks to robust processes with a focus on predictive maintenance, TMH Germany not only offers the know-how or the technical possibilities which are already available on the market, but also makes it possible to think ahead for future needs.

The specially developed Amigo platform (Asset Management Integrated Global Organisation), based on Boom Rail Solutions software, which is also used by other European rail operators, supports the planning process and the introduction of a condition-based maintenance system.

Full commissioning in 2022

The first part of the maintenance facility entered into service at the beginning of December 2021 – Go-Ahead Bayern is the first client to bring its electric fleet, consisting of a total of 280 railcars, to Langweid under a twelve-year maintenance contract. A digital twin is created for each vehicle in the Go-Ahead fleet, allowing the condition of each component to be monitored and analysed before the train arrives at the depot.

Terence Watson, TMH's Senior Vice President Europe, is optimistic about the future as many well-established railway undertakings are looking for a sustainable model for their growth. They would need increased versatility, faster responsiveness to change as well as new ways of thinking. "That's where we come in with our targeted investments in maintenance assets!" TMH Germany has strengthened its European presence with a new state-of-the-art maintenance centre in Germany, he said. When fully commissioned next summer, the depot will have a capacity of 200,000 maintenance hours per year with over 70 staff and will offer other operators the opportunity to have their rolling stock maintained there.

InnoTrans and Eurailpress present their job application platform.

The InnoTrans Campus fosters the career perspectives of young professionals in the mobility industry. At the Jobwall, in the RecruitingLAB and on the Talent Stage the industry will meet their future professionals.

The InnoTrans Campus brings students and young professionals together with HR experts from the exhibiting companies. On the Jobwall, interested parties will find exciting job offers and make exclusive contacts in the RecruitingLAB. At the Talent Stage, exhibitors will provide information on how to start a career and how to succeed in their companies.

Pitch for your dream job

This is also where the Eurailpress Career Boost will take place on the Wednesday of InnoTrans: In this new format, applicants will present themselves to employers in 90-second pitches. Five applicants from each of five categories (technical professions, engineers, IT experts, operational professions and commercial professions) will enter the race. After the pitch, the companies will ask the candidates three questions. Manuel Bosch, Publishing Director Technology and Transport at DVV Media GmbH, was convinced by the new concept from the very beginning: "The Eurailpress Career Boost turns the game around: It is not the companies that present their job offers, but young talents who present themselves to the companies. This is how we make next-generation talents visible for the railway industry!" This is also confirmed by InnoTrans Director Kerstin Schulz: "The unusual format puts the applicants themselves at the centre of the action, as they proactively showcase what they have to offer to the sector. For recruiters, the potential is great, as around 3,800 students from all over the world visited the past InnoTrans."

Applications to start in April 2022

From April onwards, interested parties can apply to take part in the Eurailpress Career Boost at https://www.eurailpress.de/eurailpress-career-boost-international.html. After the application deadline (20 July 2022), an internal jury will sift through the applications and select five candidates for each professional category. The 25 selected applicants will receive an acceptance letter and an invitation to InnoTrans in Berlin by the end of August, where they will enjoy free admission to InnoTrans on Wednesday 21 September and appear at the Talent Stage. Talent scouts from the companies do not have to register separately for the Eurailpress Career Boost. After the pitches, they can approach the applicants directly at the RecruitingLAB on the InnoTrans Campus in Hall 21e.

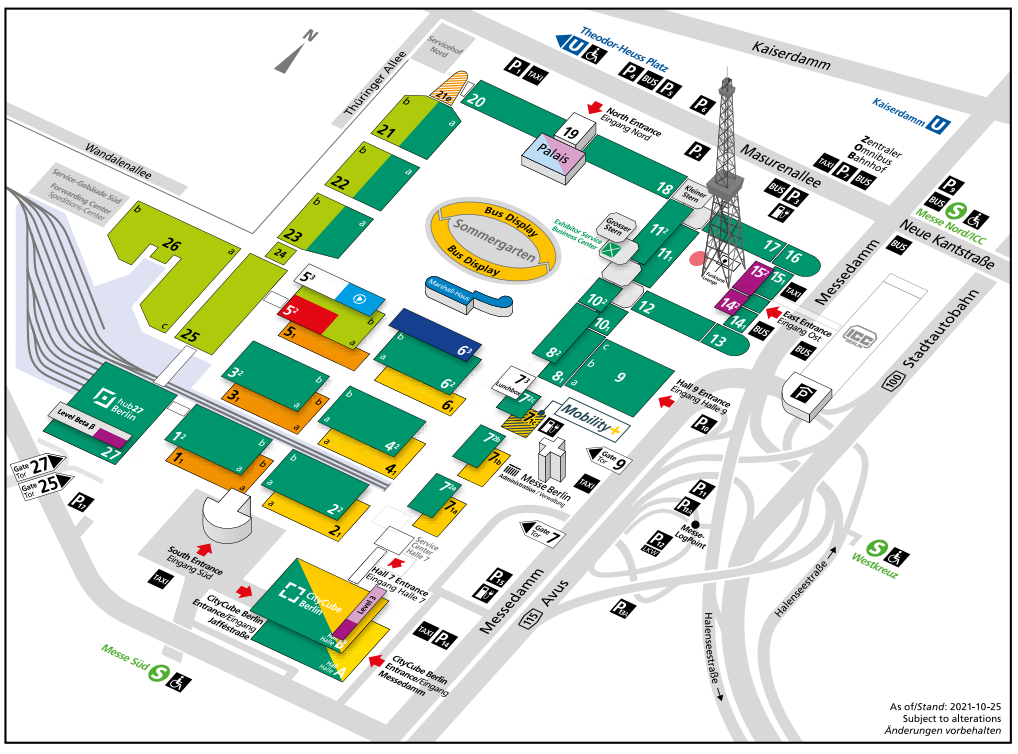
Your direct way to us: the Online Ticket Shop

The **ticket shop** for day/permanent and student tickets will be available from April 2022. The tickets are available on mobile devices and allow contactless access. They will also entitle the holder to use Berlin's public transport system (ABC) free of charge for the period of validity.

Online trade visitor pass	Online
Day ticket	50 euros
Permanent ticket	75 euros
Day ticket for students	13 euros

TICKETS ONLINE ONLY!

Ticket sales and voucher redemption will take place exclusively online. At the event, there will be no box office.



Exhibition grounds InnoTrans 2022

- Railway Technology
- Interiors incl. Travel Catering & Comfort Services
- Railway Infrastructure
- Tunnel Construction
- Public Transport incl. Mobility+ / Mobility+ Corner
- Outdoor Display
- Bus Display
- Opening Ceremony
- InnoTrans Convention
- Speakers' Corner
- Messe Berlin Studio
- InnoTrans Campus
- Business Lounge (Marshall-Haus)
- Press Center
- FoodCourt · Restaurant

Your contact persons for InnoTrans

Messe Berlin

ORGANISER MESSE BERLIN GMBH

Matthias Steckmann,
Senior Vice President
Business Unit Mobility
& Services
Messedamm 22, 14055 Berlin,
DEUTSCHLAND
T +49 30 3038 2376
innotrans@messe-berlin.de
www.innotrans.de

DIRECTOR InnoTrans

Kerstin Schulz
T +49 30 3038 2032

VICE EXHIBITION DIRECTOR

Lena Ritter
T +49 30 3038 2389

PRODUCT MANAGERS

Vera Hasche
T +49 30 3038 2331
Josephine Ruhp
T +49 30 3038 2358
Erik Schaefer
T +49 30 3038 2034

PROJECT ORGANISATION

Tim Hamker
T +49 30 3038 2376
Nesrien Rashied
T +49 30 3038 3211
Pia Tietz
T +49 30 3038 3230

PRESS

Ingrid Mardo
Press Office
T +49 30 3038 2282

ADVERTISING

Martin Eckhardt
T +49 30 3038 1862

Media partners for InnoTrans

Railway Gazette GROUP
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