

# InnoTrans 2020 Report



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IN FOCUS

■ PUBLIC  
TRANSPORT

■ INTERIORS

Mobility for  
the future

A rise in customer numbers, a change in the approach to mobility and a greater environmental awareness are challenging the operators of public transport.



## MES Expo – trade fair for electronics suppliers

Digitisation and automation are the catchwords that illustrate a profound change in the mobility industry. From 5 to 7 November, electronics suppliers in this industry will present their product portfolio in Berlin. With a Procurement Center, the MES Expo will offer buyers of transport companies and vehicle manufacturers their own contact point as trade visitors.

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## More passengers – cleaner transport



Today's world is increasingly interconnected – and this also applies to mobility. Digital offers will help boost the individualisation of public transport.

Photo: 123rf.com

Climate protection measures and progress in digitisation may shift traffic to more environment-friendly modes, but implementation will not be overnight.

Switching to buses and trains has been propagated for decades, mainly for particularly high-volume commuter traffic. Here it is now! Existing transport systems are reaching their capacity limits, particularly in large metropolitan areas with their rapidly increasing number of inhabitants – an evolution that leads to “growing pains” (Richard Lutz, CEO Deutsche Bahn). In view of increased funding through the German Municipal Transport Financing Law (GVFG), many expansion projects are now being driven forward. But it will take quite a few years to plan these additional rail capacities, to weigh the interests of local residents and to build them before they are finally available. And not least because of rising construction prices it is already clear that the financial resources will not be sufficient for the implementation of all planning ideas.

Hopes for capacity increases that can be implemented faster are above all concentrated on digitisation: For example, the Stuttgart S-Bahn is expected to increase its capacity by 20

percent thanks to digital control by ETCS. On a similar background, Hamburg is about to present a concept study for the digitisation and automation of the entire S-Bahn network by the middle of 2019, while the automation of a section for pilot operation is already being prepared there. In addition, the planned fully automatic metro line U5 in this city will even allow 90-second headways around the clock if necessary.

### Autonomous driving on rails and roads

In the area of light rail, first attempts for autonomous driving are also underway in Potsdam as well as in Karlsruhe while the Darmstadt University of Technology is also working on this issue. In the Greater Stockholm area, Scania is already testing a self-propelled 12-metre electric bus on a five-kilometre route with a driver to ensure safety still on board, as also in the numerous German field trials with autonomous shuttles from the island of

Sylt to Bavaria. A driving force of this automation in public transport will not least be the lack of staff. The transport policy spokesman of the Berlin SPD has recently suggested that the automation of metro lines should therefore also be considered. More personnel is of course needed to achieve the widely desired extension of the transport offering.

### Individual traffic versus sharing

The competitive situation for public transport is also changing: France wants tests with cars without drivers still in 2019, Great Britain by 2021. In the US, the first driverless vehicles are already at the transition from the test phase to regular operation. In Germany, Ride-Sharing and Ride-Pooling will become fully operational from 2019 onwards. Will new mobility services and traditional public transport really grow together to form an overall door-to-door mobility system? Furthermore, in 2019 research will be intensified, such as in the innovation laboratory “ÖPNV-Lab@HOLM”, which opened in Frankfurt in mid-February.

In the medium term, autonomous driving will change the concept of “living while driving” and thus bring about completely new demands on the interior of buses and trains. The “Train

of Ideas” of Deutsche Bahn shows some first approaches in this regard. It remains to be seen whether the purchasers of new vehicles anticipate the corresponding development and then also order such future-oriented vehicles.

Which digital platform (including payment) will finally dominate among passengers when they organise their mobility chain? In Germany, transport companies are intensively working on it, but in the United States at the beginning of the year the widespread rider service Uber already started its own platform, which covers all forms of mobility. Other providers in this field are already on the starting blocks, too. At the end of the day it will be important to know who is able to access the data gathered and at what price.

### Mobility of the future

In ticketing, the trend is towards “ticket machines in the trouser pocket”, smartphone ticketing and user-friendly check-in/be-out systems, while there will be less traditional ticket vending machines overall, although those that remain will be significantly better. Meanwhile, some of the latest models already offer the functionality of an entire booking office with video chat.

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## COMMENTARY

### Shaping mobility for sustainability and innovation

Prof. Dr. Henning Kagermann,  
Chairman of the steering committee  
of the National Platform Future  
of Mobility.



Photo: a catcity/D. Ausserhofer

Mobility affects the day-to-day life of all of us: it is part of our individual freedom and a basis for prosperity and employment. Society as a whole is therefore facing the challenge of developing mobility to make it fit for the future. Far-reaching structural changes in our mobility system are to be expected. We are currently experiencing a change in motivation, an increasing connection between the energy and transport sectors and, above all, a second wave of digitisation with a trend towards networking, autonomous systems, digital technology platforms, new business models and services. This creates a challenge for established companies, especially in the automotive sector and the supply industry, but also a great opportunity to simultaneously improve both the quality of the environment and life. If we want to exploit the potential of innovative technologies and to achieve an innovation boost for our economy, an interdisciplinary discussion between business and academic sectors and their cooperation is needed. The next generations of vehicles will require different components and infrastructures than they use today – it is therefore decisive for a joint success that car manufacturers and suppliers cooperate closely along the entire value chain. Together, reliable framework conditions can be created and innovations can be secured. With the MES Expo, a new platform has been created where electronics suppliers can obtain information on key issues of mobility across all modes of transport and where they can exchange ideas with each other as well as with vehicle manufacturers, policy makers, industry and science. I very much welcome and am delighted that the National Platform Future of Mobility will accompany MES Expo this year as a program partner.

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Propulsion systems are also to become cleaner: 60 percent of the tracks of the German railway network are electrified. In addition to efforts to electrify further lines, on-board solutions are also being sought: the first trains with hydrogen fuel-cell technology are operating, and more trains with hybrid or electric drives are being tendered. Britain is aiming at doing without diesel trains in regional traffic by 2040. The Chinese manufacturer BYD claims to have already put 50,000 all-electric buses into operation by January 2019. The first series-produced e-buses have now been ordered in Germany. Critical factors remain the long-term costs as well as the corresponding range capabilities. Therefore, in the near future, the further development of diesel buses will remain on the agenda.



Frank Muth, M.A., has been working as a freelance journalist and author of non-fiction books for many years. He has studied political science, media studies and English at the University of Mannheim.

## IMPRINT

## Publisher

Messe Berlin GmbH  
MS Mobility & Services  
Messedamm 22, 14055 Berlin  
GERMANY  
T +49 30 3038 2376  
F +49 30 3038 2190  
innotrans@messe-berlin.de  
www.innotrans.com

## Concept, Advertising

DVV Media Group / Eurailpress, Hamburg  
Advertisements  
tim.feindt@dvvmedia.com

## Editors

Messe Berlin GmbH, Berlin  
britta.wolters@messe-berlin.de  
and tim.wegner@messe-berlin.de  
in cooperation with  
jennifer.schacha@dvvmedia.com  
and mechthild.seiler@dvvmedia.com

## Layout and dtp

GrafoService GmbH, Norderstedt  
info@grafoservice-gmbh.de

## Translation

reinhard@christeller.net

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## InnoTrans 2020: Unique market coverage at the international mobility fair



High demand for exhibition space.

The next InnoTrans will take place from 22 to 25 September 2020 and around 90 percent of the area is already booked.

There is a continued high demand, especially from international markets. Two-thirds of the exhibitors come from abroad, with France, Italy and China particularly well represented. "InnoTrans will once again be the hub for all those who deal with the subject of mobility – be it bus, train or multimodal means of transport," says InnoTrans Director Kerstin Schulz. The registration deadline for exhibitors ends on 20 September 2019.

With the hub27 Berlin, InnoTrans will for the first time have a new mul-

ti-functional, column-free hall with 10,000 square metres available. Direct connection transitions to Halls 1 and 25 allow a seamless passage to the other exhibition segments.

In the heart of the exhibition grounds, in the Sommergarten, the Bus Display again offers vehicle manufacturers an ideal presentation area for buses in the Static Display. On the directly connected Demonstration Course, an approximately 500 metre round circuit, exhibitors can show their electric buses in action. The independent thematic

area Travel Catering & Comfort Services unites products and services related to catering equipment and services in rail travel since on-board comfort is an important criterion for attracting (business) travellers to the railway in competition with car, bus and air travel. Passengers should be able to enjoy each single part of their train journey. InnoTrans 2020 offers special conditions for first-time exhibitors in the field of Travel Catering & Comfort Services.

### New: InnoTrans Campus with RecruitingLAB and Talent Stage

The career theme at InnoTrans adapts to the zeitgeist of international spotting of new talents and sets the

search for future employees on a new footing with the new "InnoTrans Campus". Newly located in Hall 21e, the InnoTrans Campus offers an area where exhibitors can present themselves on turnkey modules at the so-called "RecruitingLAB" that is directly connected to the new "Talent Stage", where exhibitors can inform about perspectives in their companies. The Career Point marking at the exhibitor booths has proven its worth. On the basis of this mark young talents can recognise which companies are currently looking for professionals. The guided Career Tours to the participating exhibitors were completely booked out and will be expanded at InnoTrans 2020 to match the strong demand. Students from other countries in particular are increasingly discovering the opportunities offered by the comprehensive industry overview at InnoTrans. The 2018 event was attended by over 3,500 students, among others from Sweden, Russia, Australia, the USA, Italy, Japan, China or the Czech Republic. In order to offer international students the opportunity of a close-up experience at InnoTrans in Berlin, some associations have conferred the Career Award. The winners will enjoy a trip to InnoTrans 2020 with all the trimmings.

### meet. network. change.

At the last InnoTrans, the rush to the "Women in Mobility Luncheon" was overwhelming. The Women in Mobility Team welcomed almost 500 women in the CityCube of Messe Berlin. In the framework of the coming InnoTrans, female specialists and executives in the transport industry (with a focus on sustainable mobility) will be invited to the fourth women managers, influencers and general managers summit in September – the Women in Mobility InnoTrans Luncheon.

## Mobility Cleaning Circle

25 September 2019 as part of CMS Berlin.

Cleanliness is an essential quality feature and an important image factor of the services offered by transport companies. InnoTrans features a "Cleaning" exhibition sector that already shows specialised cleaning services for rail transport. But the entire spectrum of the cleaning industry's range of products can be seen at the leading European marketing platform for cleaning and hygiene, the CMS Berlin – Cleaning.Management.Services. CMS Berlin 2019 (24 – 27 September) is this year's globally most important event for the cleaning industry. Following the successful launch of the exclusive Mobility Cleaning Circle at CMS

Berlin in 2017, InnoTrans and CMS Berlin are inviting visitors to its second edition that will take place on 25 September 2019. The tailor-made B2B event is the ideal platform to promote the necessary dialogue between transport companies, railways and the cleaning industry.

A business lunch will open the networking event and offer the opportunity to establish initial contacts between top-level managers of the cleaning industry and transport companies. It will be followed by a guided tour of selected companies and institutions at CMS Berlin. NEW: The format is extended by a subject-specific framework program.

### For cleanliness to be proud of:

For the first time, exhibitors at CMS Berlin can be identified by means of the Mobility Cleaning Point. The Mobility Cleaning Point mark will enable trade visitors to the CMS Berlin who are targeting specific cleaning solutions for the mobility sector to very quickly identify the right contact partners in the CMS Virtual Market Place®, the CMS Guide, the exhibition hall plan, the CMS Berlin App and at the trade fair booth thanks to the Mobility Cleaning Point marking.



Dialogue between transport companies, railways and the cleaning industry.

## German railway industry: significant growth of the home market



The German railway industry can look back on a successful 2018.

Graphic: VDB

The German Railway Industry Association (VDB) can look back on a successful financial year 2018: "The rail industry in Germany is on a robust growth path," says its President Volker Schenk.

With sales of 12 billion euros, the German railway industry has achieved the highest turnover of the last three years. But it has to be understood that the major challenges of our society can only be effectively addressed by railways, and, despite this positive underlying trend there should be a much higher order volume to reflect them, Schenk says.

### Strong home market boosts sales

With a share of around 72 percent, the vehicle business has the highest turnover, while infrastructure accounts for 28 percent. Domestic sales are particularly strong: 7.6 billion euros, a 20.6 percent increase. By contrast, export revenues fell by 6.4 percent to 4.4 billion euros. "A clear symptom of the growing barriers on international markets due to high obligations for local production and excessive customs duties," says Schenk. Nevertheless, new orders in 2018 are at a high level. The order volume of 14.3 billion euros exceeds that of 2017 by about 9 percent. Here, too, demand in the domestic market predominates with 58 percent of the total volume (8.3 billion euros), but new orders also increased from

abroad to 6.0 billion euros (+ 9.1 percent).

### Digitisation for the future

The VDB further emphasised that investments in research and development, in testing as well as in the promotion of alternative traction systems are needed to meet the objective of increasing rail traffic. It is therefore essential to quickly develop the digital rail network as a basic framework. ETCS will now have to be rolled out, interlocking systems must be digitised and trains are to be converted to ETCS to ensure that the vehicles can interact digitally with the infrastructure. The budget planning for 2020 has made available a mere additional 570 million euros while the railway associations see a need for 1.5 billion euros per year as a perspective. Funding for rolling stock equipment has already been dismissed: "Basically, the State does not finance infrastructure and vehicles. The operator has to pay for rolling stock, which is why the Minister of Finance has refused to promote the conversion of vehicles to the European Train Control System (ETCS)," said Parliamentary Secretary of State at the Federal Ministry of Transport, Enak Ferlemann, MdB.

## Door and access systems: Hübner takes over the GWU group

Hübner GmbH & Co. KG, based in Kassel, has taken over the GWU group, headquartered in Neu-Ulm. This will strengthen the division Material Solutions, says the company.

Founded in 1946, Gummi-Welz GmbH & Co. KG (GWU) was managed as a family business until mid-2006. In the context of a company succession, Tobias Lexhaller and Horst Grein took over the company as managing directors and gradually developed it into a modern supplier with international customers.

### A wide product portfolio for a strong market position

As an example, GWU supplies innovative anti-trap protection systems for public transport vehicles. In recent years, finger protection profiles with light curtains have also been developed as non-contact safety systems for the protection of passengers. The systems can also be retrofitted to existing vehicles, thus reducing the risk of accidents for the carriers. In addition, GWU produces insulation materials for

vehicles, locomotives and wagons. In the product area of glass fibre reinforced plastic (GRP), the company also offers individually customised lining systems and soundproofing components.

GWU employs more than 500 people throughout Europe and has five locations in Germany, Poland and Turkey. After the integration of GWU, its two managing directors Tobias Lexhaller and Horst Grein will assume leading positions in the newly formed corporate group – Lexhaller will thus take over the management of the Hübner Material Solutions division. While Hübner is strong in the area of elastomer sealing systems for rail vehicle doors and windows, GWU has developed a similar position in the bus industry in recent years.

A strong supplier for the rail vehicle and bus industry.



Photo: Hübner

## NEWS

### Stadler Rail AG: going public extremely successful

From time to time there were rumours about a possible IPO, then it suddenly happened very quickly: on 12 April, shares of the rolling stock manufacturer Stadler Rail AG from Bussnang (Switzerland) were traded for the first time. The Stadler shares (ticker symbol SRAIL) recorded a solid price gain of 13 percent on the first trading day on the SIX Swiss Exchange. The issue price per share was 38 Swiss francs, rising to 42 francs directly after the start of trading and ending the first day of trading at 43.20 francs per share. Thus, the stock market value amounted to 4.2 billion francs. The offer was oversubscribed several times due to strong demand from Swiss and international institutional investors as well as Swiss private investors. The basic offering comprised 35 million shares from direct and indirect ownership (via PCS Holding AG) of the Chairman of the Board Peter Spuhler. The lead banks were also granted an over-allotment option of up to 5,250 million existing shares. This was fully exercised on 16 April at the offer price of 38 francs per share. Including the over-allotment option, this share corresponds to 40.25 percent of the share capital. Peter Spuhler directly or indirectly holds 39.70 percent of the share capital of Stadler. The very good order situation of the company, founded in 1942, which claims to have more than 8,500 employees worldwide and generates annual sales of 2 billion francs (status 2018), has certainly contributed to the success. Only at the end of March did Stadler Rail AG receive a contract from the Metropolitan Atlanta Rapid Transit Authority (Marta) for a delivery of 127 metro trains with two options for 25 additional trains each. The value of the order is over 600 million US dollars. This is the largest order for rolling stock units the company ever booked. At the end of February of this year, Stadler already won a contract for 71 Citylink tram-trains and Flirt trainsets from Wales & Borders Rail Services, but the contracting parties are keeping the order value confidential.



The production of the Giruno / SMILE in Bussnang.

Photo: Jürg Lüthard

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# Mobility for the future

Customer numbers in public transport have been rising over many years, and more and more people are commuting increasingly longer distances to reach their workplace. The mobility industry is driven by a focus on customers and by environmental awareness, while lower planning and operating costs are aimed at.

## A mobility platform for public transport – the Patris® product family



Patris® was tested at the booth of Lufthansa Industry Solutions.

Photo: Lufthansa Industry Solutions

To cope with increasing urbanisation, population growth and greater environmental awareness public transport is the primary means of transport, especially in cities and urban areas.

■ Lufthansa Industry Solutions, a regular exhibitor at InnoTrans in Berlin demonstrates how public transport can cope with the digital future through smart IT solutions.

With the mobility platform Patris® Office (Passenger Transport Integrated Sales System), local public transport companies are given a customer overview, can offer them a multi-modal range of products and ensure the audit-proof mapping of all of their own processes. Furthermore, the EBE offence tracking system, customer communication software, customer data and contract data (season tickets) as well as other support processes are also integrated. Patris® Office has been established on the market for 25 years as a data management and multi-client-capable customer system for transport companies, fulfilling the requirements

of the General Data Protection Regulation (EU GDPR).

The POS solution Patris® Ticketing is available for stationary use in the customer centre or as a mobile terminal. It provides all necessary functions around ticket sales and is able to accept different available payment methods. It can also issue chip cards that are compliant with the German VDV core application electronic ticketing system (VDV KA).

The range of services offered by Lufthansa Industry Solutions is supplemented by extensive knowledge and a high level of experience in the field of intermodal mobility/mobility 4.0 as well as by smart data analyses such as forecasting methods for passenger volumes or the impact of external influencing factors such as weather conditions or incidents on customer behaviour.

## Unique carpets for train interiors

While individuality is important for everyone it also helps to strengthen a brand. Manufacturing costs of exclusive products have been very high and customisation has therefore been difficult in some areas.

■ Lantal Textiles AG has now expanded its product range of railway carpets to meet the needs of customers and travellers.

A collection of printed carpets for trains is the latest addition to their product family. A special digital printing process makes it possible to print exceptional patterns and individual pictures directly on the train carpets. It is even possible to print photorealistic image concepts on the carpets. This enables each customer to bring in his creative ideas and to design a highly individualised product for a train interior that is tailored to his brand.

This technology has the enormous advantage of very short sampling and production times

and makes it possible to order high-quality carpets even in small minimum quantities.

### Advantages over conventional methods

The printed polyamide carpets are available in three different qualities: as hard-wearing loop carpets, velours carpets with a velvety appeal or premium velours carpets with a sophisticated look and a high underfoot comfort.

They are characterised by a high abrasion resistance, good lightfastness, easy care and an outstanding longevity. The carpets are permanently flame-retardant and fulfil the fire stand-

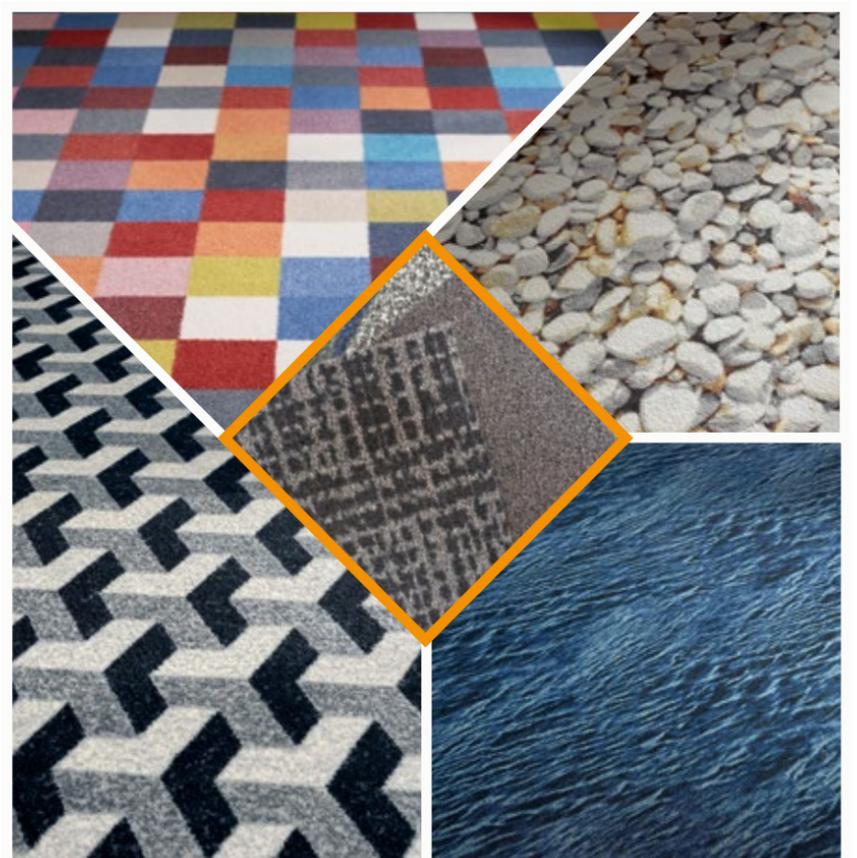
ards and requirements pursuant to EN 45545-2.

### Sustainable product

Polyamide Econyl® is used for the production of loop carpets. Econyl® consists of 100 percent recycled raw materials such as fishing nets, yarn waste and fabrics. The use of Econyl® reduces the consumption of oil, water and energy during the fibre production process.

*The uniform look is over – trains can feature colours and patterns instead.*

Graphics: Lantal Textiles AG



## Cost-effective protection for smooth surfaces



The applied foil protects the underlying glass from vandalism.

Photos: Saint Gobain

Vehicles and stations are particularly exposed and rarely safe against vandalism or graffiti that also produce a poor image. Operators suffer from huge cleaning or repair costs – and it is therefore easy to understand that they search for cost-effective and sustainable solutions.

■ Saint-Gobain Innovative Materials Belgium SA-Solar Gard offers a variety of different film solutions for different surface types. The Graffiti-

gard™ and Graffitigard™ 4PLUS product families protect surfaces from future soiling, Mirror Shield and Metal Shield can restore mirror and

metal surfaces to their original state and protect them from new damage.

### Graffitigard™ and Graffitigard™ 4PLUS

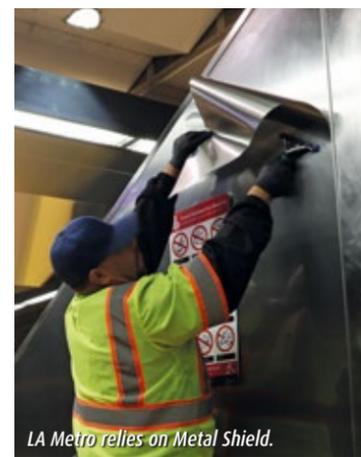
Both products are suitable for use on glass and other smooth, non-porous surfaces in public transport vehicles and stations. The durable and transparent polyester films protect against permanent markers, scratches as well as acids. Appropri-

ately trained employees can apply them within a very short time. They are resistant to cleaning agents. The 4PLUS system where four layers of film are applied, provides an even greater protection.

Mirror Shield film has reflective properties like real mirrors but also a scratch-resistant coating that effectively resists acids and routine cleaning. The 140 micrometres thick polyester-based product protects the underlying surface and covers existing scratches effectively. It can also be used instead of a mirror that would be too bulky or heavy to install.

### Metal shield to protect large areas

The 150 micrometre thick Metal Shield film can protect large metal surfaces from new damage, such as escalator or wall panels. It can also reliably cover existing damages. Thanks to the fact that it has the same appearance as a stainless steel surface, it looks as such to the viewer.



LA Metro relies on Metal Shield.

### NEWS

#### ■ New partnership: Kapsch CarrierCom expands its offer

Kapsch CarrierCom AG is the new distribution partner and system integrator for the asset management system INFRALIFE®. The solution developed by 3B infra Infrastructure and Management Systems GmbH is a tried-and-tested system that provides functions such as master data management, condition monitoring and maintenance. With this partnership, Kapsch CarrierCom can complement its portfolio with additional products and services. This should help railway operators save costs and increase operational efficiency. The new joint offer has already been successfully implemented for the Luxembourg Railways. Kapsch acts as a preferred distribution partner and system integrator. Asset management is considered to be an essential prerequisite for the implementation of any form of predictive maintenance and analysis based on Artificial Intelligence. Asset management systems are particularly important for rail operators, as they allow to keep track of all facilities, such as turnouts, power poles, signals but also ticket vending machines. The highly configurable INFRALIFE® system is tailored to the needs of railway operators. It offers the possibility to relate any kind of system information to the facilities, such as errors and documents.

## Bathrooms to enjoy

As a leading tier 1 supplier for major railway companies all over the world, the German company EVAC GmbH is the only supplier on the market to offer entire, fully integrated toilet cabin modules including all subsystems from a single, one-stop source.

■ EVAC universal and standard toilet cabin modules are covered by an integrated supply chain from initial project planning through to implementation and maintenance.

This also applies to the high-end facilities for all eligible materials such as aluminium sandwich or plywood/high density fibreboards HDF – depending on requirements and specifications – and includes the in-house production of glass fibre reinforced plastics (GRP). Thus, a good level of efficiency and reliability is achieved by a high degree of standardisation and combined with the flexibility of individually tailored solutions. Straight and curved versions of electric door drives that

are easy to adapt are available. Wear-resistant materials and up-to-date technology ensure long service intervals and great customer satisfaction.

### Precisely matching accessory solutions

The toilet modules can also be supplemented with space-saving, flexible and vandalism-proof urinals. The use of urinals increases the availability of a toilet cabin and reduces the water consumption significantly without any negative impact on hygiene.

The advantages of this comprehensive solution for customers are obvious: there is no need to coordi-

nate suppliers, interface problems between the individual components are solved, and a uniform level of quality down to the least detail is achieved – together with significantly shorter project cycles.

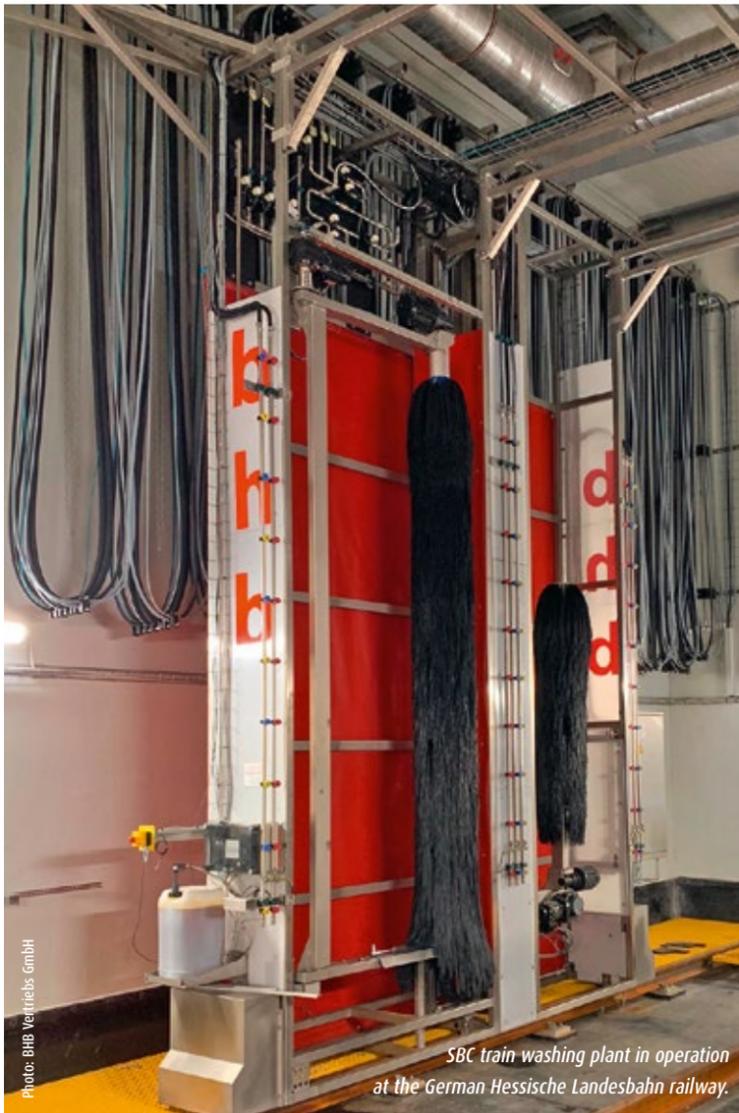
### All-in-one solution as an advantage for customers

All manufacturing and test steps are certified according to the relevant standards for rail vehicle construction. After-sales services including maintenance, tutorials and training as well as consultancy for a cost-efficient modernisation and optimisation of existing systems complete the offer.



Individual customer solutions for toilet modules can come from a single source.

Photo: EVAC GmbH



## A washing plant for everyone

The SBC washing plant is built as a self-driving washing portal with a side brush and two 3D brushes each per washing carriage.

■ On the washing portal of their SBC (tram, bus, compact) washing plant, BHB Vertriebs GmbH, located in Holzmaden (Germany), has installed the switching and control elements in a moving sub-distributor. All structural steel parts are made of stainless steel, while components such as the gear motors are powder-coated (corrosion protection class C4/C5). Moving parts such as bearings located in the direct wash water area, chains and the like, as well as the spray systems are also made of stainless steel.

### The structure

The chassis frames are built as torsionally rigid tubular stainless steel framework constructions and rest on the tilt-protected running gear. They are connected to each other at the top.

Contactless proximity switches are installed on the running gear and activated by floor-mounted switch lugs. They are used for positioning the washing portal as well as for limiting its maximum travel path. A rotary encod-

er is mounted on the non-driven wheel of the running gear. It is connected to the controls in order to determine the current position of the washing portal. The unit is powered by a directly flanged gear motor with a torque support.

The progression speed of the washing portal can be adjusted by means of a frequency converter between one and 25 metres per minute. This allows for an extraordinarily smooth progression as well as for a soft acceleration and deceleration of the washing portal and ensures a gentle cleaning of the vehicle with an accurate match of its contour.

### The side brushes

Each brush unit is mounted on a torsionally stiff, welded stainless steel frame construction with the brush shaft being supported by a ball bearing on either side. The unit is driven by a gear motor with 140 revolutions per minute and the control system allows for its rotation in both forward and backward direction. The brush is cov-

ered with a splash guard, the frame of which is covered with a PVC tarp.

The brushes are made of polyamide; each brush segment is 300 millimetres long. In order to easily adapt to the side contours of the train, the brushes are profiled. The brush half shells that are mounted on round shafts can be changed with standard tools.

### The 3D brushes

3D brushes are used to wash the front and rear areas as well as the gaps and the roof edge. They can be continuously tilted at an angle of up to 90 degrees, continuously raised and lowered, and continuously tilted horizontally by +/- 35 degrees. This additional degree of freedom permits optimum adaptation of the brush feed to streamlined front end contours, such as for example the lateral fairings. The contact pressure of the brushes is controlled by detecting the effective power of the rotary motor.

This opens the way for a thorough and precise cleaning of the most varied types of rail vehicles.

## NEWS

### ■ DC/DC converters for railway applications

The primary switched DC/DC converters of the PMDS/PCMD530 series from MTM Power® GmbH have been developed as decentralised power supplies for rail vehicles and industrial applications. The converters use current-fed push-pull technology and operate at a switching frequency of 70/140 kilohertz. The advantages of this circuit concept are wide input voltage ranges with constant efficiency, transformers with good coupling and low stray inductance. The converters can also be used for direct control of secondary-side synchronous rectification. The PMDS/PCMD530 cover an input voltage range of 14.4 ... 154 Volt DC with only two variants (24 Volt DC, 110 Volt DC). Available output voltages are 5.1 Volt DC, 12 Volt DC, 15 Volt DC, 24 Volt DC or 48 Volt DC with a power of 30 Watt. The devices are protected against idle running and short circuits. They have a reverse polarity protection at the input in conjunction with an active input current limitation. The maintenance-free transducers are encapsulated in a vacuum and prepared for use in devices of protection class II.

## Metro with modern condition monitoring



Tokyo Metro 2000 series train on the Marunouchi line.

### Mitsubishi Electric delivers its train information monitoring and analysis system for the new Tokyo Metro 2000 series trains of the Marunouchi line.

■ TIMA, short for Train Information Monitoring and Analysis, provides faster responses to

repairs. The new system takes advantage of IoT (Internet of Things) capabilities, along with big-data visualisations and the analysis of information from operating trains to achieve particularly safe and reliable train operations.

TIMA will assist the Tokyo Metro with IoT-based train data monitoring and analysis services to optimise the timing of scheduled and condition-based maintenance. Furthermore, Tokyo Metro is considering releasing selected information collected by TIMA for value-added third-party services that may be made available via smartphone applications or other technologies.

### Visualisation of the operating status

The Train-Control Information Management System (TIS) collects information about trains in operation, such as location, interior temperature and occupancy rate, and transmits this information over a wireless high-speed data link to a data centre for the visualisation of the current train status providing a comparison with historical data, if required. TIS monitors the connected vehicle components and constantly alerts

the operations control centre and the depots of any abnormalities, such as the fault status and the respective train location. The driver cab monitors can be mirrored in the operations control centre and the depots, thus enabling a fast and precise information exchange to initiate corrective action and thus to minimise the downtime of the train.

### Optimised maintenance cycles and minimised repair effort

By analysing the data of each train component, such as power consumption and voltage, recorded with TIS, it is possible to determine the optimum inspection time and the time interval for the replacement of wear components. The Marunouchi line operates 336 railcars on a 24.2 kilometre route with 28 stations. It runs between the Ogikubo Station in the east of Tokyo and the Ikebukuro station in Tokyo's north and leads through Tokyo's centre and the business district Marunouchi, that provided its name. According to Tokyo Metro, in 2017 a daily average of around 1.6 million passengers were transported.

# Tunnel refurbishment – clean air for health and safety at work in complex projects

In railway and road tunnel refurbishment projects there are tight construction time windows that frequently limit the periods during which routes can be closed. Diesel exhaust gas and dust emissions must be kept within the occupational exposure limit values to avoid work interruptions and delays.



Ventilation of a temporary tunnel construction site in Frankfurt.

Photo: CFT GmbH

■ CFT GmbH, a company based in Gladbeck, Germany, has established itself as a flexible and innovative provider of solutions and as an operator of ventilation and dust extraction systems. In more than 100 projects implemented since 2006, CFT has ventilated and partially dedusted railway and road tunnels. Mainline railway tunnels of up to ten kilometres, some of which are located on high-speed lines of Deutsche Bahn AG, have been equipped with the facilities, as well as urban metro and suburban railway tunnels of regional transport associations.

In accordance with current regulatory provisions, CFT plans ventila-

tion systems to remove the polluted air from workplaces. The dedusting filter systems remove hazardous particles from the exhaust air and protect the local population outside the construction site. The continuous cooperation of CFT in a working group with the trade association BG BAU, the German Federal Railway Authority and the federal and railway accident insurance company guarantees the highest level of safety.

## Remote access to control the ventilation

Stationary ventilation systems of CFT GmbH including their complete electrical installation are the best choice for projects. If structural conditions prevent a stationary construction, mobile ventilation units can be implemented at any time. The systems include CFT's newly developed data transmission system, enabling CFT GmbH to access the current measurement data in the tunnels at all times. A competent ventilation expert can intervene at any time and take over the control of the fans to match the requirements of the work in the tunnel.



tronics are switched to a straight-line running regime and doses the CHFC material in line with the vehicle speed. When the next curve is reached, the system automatically switches back to curve operation.

The basic factory settings can be customised to match customer needs or the specific configuration of a route.

The twin dosing nozzle allows different dosing amounts for the top of the rail and the gauge face of the rail, which is important for optimising the function under certain operating conditions – for example the reduction of curve squealing (so-called high frequency noise).

Furthermore, only a small fraction of lubricant reaches the bogie frame where it is not desired. Thus, the low-energy lubrication system reduces the lifecycle costs of both wheels and rails.

## The secret of solids

The CHFC lubricants used contain up to 40 percent of solid components and are sprayed directly onto the wheel flanges or additionally onto the rail. The same material is used for the application to the running surface of rails and wheels.

The solids content is decisive for the desired effect, because it does not lead to unwanted drip losses and associated impurities compared to highly lubricating light liquids. In addition, the lubricants contain neither solvents nor heavy metals and can be used all year round.

The Slovenian company ELPA doo has developed i-ROCK, an on-board lubrication system for locomotives, trams and metros.

■ The system achieves a double objective: on the one hand to reduce the noise and wear of wheels and rails, and on the other hand to maintain the safety of rail traffic with a lubricating equipment that does not affect the physical conditions of the driving parameters. Therefore the adhesion coefficient and thus the traction parameters are not affected.

i-ROCK enables the controlled distribution of adjusted doses of CHFC materials (Composite Heavily-Fluid Compounds) with a balanced coefficient of sliding friction.

## Operating principle

i-ROCK is a fully automatic lubrication device that switches to stand-

by mode when the rail vehicle reaches a minimum set speed (for example, 6 kilometres per hour). When the curve sensor detects a curve, it triggers the actuation mechanism of the pump unit as well as an electromagnet that blows out the CHFC lubricant.

## Intelligent dosing in different driving situations

There is a cyclical blowing out in relation to the length of the curve. At the end of the curve, the elec-

## NEWS

### ■ Tunnel inspection 4.0

The German AKG group of companies, Swiss Amberg Technologies AG, and Spanish Elaborarium SL are partnering with Fraunhofer IPM in a research project for the development of an integrated inspection process for tunnel structures. The compact multi-sensor system to be developed will be designed to provide precise and objective measurement data with the aim of capturing geometry, surface structure and water penetration in tunnels in a single measurement run. The measurement data will then be digitally accessible and will comply with BIM (Building Information Modelling) requirements. A high-speed scanner will capture the entire tunnel wall using multiple lasers of different wavelengths. A fast and efficient detection of the complete surface will be possible thanks to a completely new deflection unit that is currently under development. The laser will deliver photorealistic 2D images that also show small objects or cracks less than a millimetre in size. The system is eye-safe and works independently of the lighting. In addition, a multispectral measuring unit will also detect water infiltrations. This multi-sensor system will enable the project partners to offer inspection services as a fully integrated, objective process for the first time. The project »OpOrTunlty« (Operation Oriented Tunnel Inspection System), that started in October 2018, is funded by the Eurostars program of the German Federal Ministry of Education and Research (BMBF) with financial participation by the European Union.



## New specialised trade fair for electronics suppliers

Messe Berlin is organising a trade fair for the electronics suppliers of the mobility industry from 5 to 7 November 2019 in Berlin.

The German Federal Ministry of Transport participates in the Framework Program with the National Platform Future of Mobility.

■ The mobility sector is facing a trendsetting phase of transition with an impact on long-standing and well established supplier structures. The market is undergoing significant changes with upcoming new ideas, concepts and requirements. The electronics suppliers are first and foremost providing the industrial base for this profound change. The MES Expo, that will be held at the Berlin Expo-Center City from 5 to 7 November 2019, will reflect this market change and will be the first event of its kind dedicated to this growing business

sector. In doing so, it attaches great importance to a multimodal concept with a focus on the car, commercial vehicle and railway mobility sectors. It sees itself as an ideal opportunity for discussions, information gathering, market observation and, of course, for establishing and furthering business contacts. The MES Expo is organised as an international trade fair every two years by the Mobility & Services Department of Messe Berlin. It is supported by the German Electrical and Electronic Manufacturers' Association (ZVEI) and the German Railway

Industry Association (VDB) as well as by the National Platform Future of Mobility (NPM), which are partners in the framework program.

The MES Expo provides the mobility industry with a unique opportunity to obtain information on developments and to exchange ideas about wider trends across the transport modes. Exhibitors and trade visitors representing vehicle manufacturers and public and private transport companies will come together and meet manufacturers and suppliers of traffic technology.

### Renowned exhibitors will present themselves at the MES Expo

"The issue of e-mobility has been the subject of rail for more than 100

years. Now it is a question of pushing forward such topics as highly automated driving or digitisation of rail and taking the next technological step in the rail system. The MES Expo is not only long overdue for the market, but it is also the ideal platform for market exploration," says Uwe Günther, Chief Procurement Officer of Deutsche Bahn AG. With a Procurement Center, MES Expo offers its own space for buyers from transport companies and vehicle manufacturers. Furthermore, special guided tours through the trade fair allow trade visitors to gain an overview of the suppliers' products and services.

On these tours, trade visitors will meet influential companies from all over the world. Some of the latest exhibitor registrations that have been received include, among others, the Chinese world market leader in the manufacture of rolling stock CRRC, the international company Mitsubishi Electric, the automotive supplier Valeo and Deutsche Bahn. In addition, the trade organisation TAITRA will be represented at the fair with a joint Taiwan booth.

MES Expo will dedicate an exhibition area to the future of mobility where young and innovative start-ups can present their portfolio.

In the start-up pavilion, young entrepreneurs can get in touch with industry experts, investors, cooperation partners and incubators as well as potential business partners.

In addition, dialogue and networking formats flank the MES Expo: The Dialog Forum, for example, under the auspices of ZVEI and VDB, is all about digitising the mobility sector. In the Speakers' Corner, on the other hand, exhibitors can present their company and their products in their own chosen format. Further information at: [www.mobility-electronics.com](http://www.mobility-electronics.com)

Your contact persons for InnoTrans

 Messe Berlin

**ORGANISER**  
MESSE BERLIN GMBH

MS Mobility & Services  
**Matthias Steckmann**,  
Senior Vice President  
Messedamm 22, 14055 Berlin,  
Germany

T +49 30 3038 2376

F +49 30 3038 2190

innotrans@messe-berlin.de

www.innotrans.com

**EXHIBITION DIRECTOR**

**Kerstin Schulz**

T +49 30 3038 2032

**VICE EXHIBITION DIRECTOR**

**Kai Mangelberger**

T +49 30 3038 2356

**PRODUCT MANAGERS**

**Lena Ritter**

T +49 30 3038 2389

**Josephine Ruhp**

T +49 30 3038 2358

**Erik Schaefer**

T +49 30 3038 2034

**PROJECT ORGANISATION**

**Anne Gütte**

T +49 30 3038 2028

**Tim Hamker**

T +49 30 3038 2376

**Vera Rappsilber**

T +49 30 3038 2331

**Manuel Ruben**

T +49 30 3038 2011

**Lisa Simon**

T +49 30 3038 2124

**PRESS**

**Tim Benedict Wegner**

T +49 30 3038 2282

**Britta Wolters**

T +49 30 3038 2279

**ADVERTISING**

**Bernhard Geradts**

T +49 30 3038 1851



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