At the end of November 2019, the European Parliament declared a climate emergency for Europe. The declaration of intent from Strasbourg implies an urgent need for action, also in the field of mobility. In urban areas, electric buses offer an opportunity to make city transport more sustainable. At the InnoTrans Bus Display 2020, international bus manufacturers will be presenting their emission-free vehicles in the unique exhibition area in the centrally located Summer Garden. The 500-metre long test track offers visitors the opportunity to experience the innovations of electric mobility in their element. InnoTrans Director Kerstin Schulz: “The Bus Display offers our trade visitors exciting insights into the technological progress of electromobility in buses. The development potential of alternative drive systems is clearly demonstrated by rail transport. At the Bus Display, international exhibitors will present how bus transport can also be systematically made more sustainable.

Big rush

Exhibitors already registered for InnoTrans 2020 include EvoBus, Eibusco, Deltabus, Ferrovie dello Stato, Solaris and the Chinese manufacturer BAIC. The range of big players is completed by Chinese manufacturers as well as transport companies from China, as well as Great Britain, Spain and Russia. A detailed overview of the exhibitors already registered can be found online at www.innotrans.com. There you will also find a list of exhibitors in the new Mobility+ theme area, which has attracted a great deal of international interest. The new area focuses on transport solutions for the first and last mile as well as on combined mobility and digital support approaches.

The technological progress is impressive: a realistic medium-term scenario shows area-wide hydrogen bus operations while e-buses operate in cities. German transport companies are currently converting primarily to battery-powered buses, despite the high additional costs per vehicle and – often forgotten – for the e-infrastructure. The conversion is expensive. Numbers would increase more quickly if the federal and state governments were to provide more support. New drives are one thing. But even a modern diesel bus is part of the solution: only a few transport politicians seem to notice that the bus is tied up in chains that limit its attractiveness.

InnoTrans becomes more international

The international interest in InnoTrans 2020 has increased compared to InnoTrans 2018. For the first time a Malaysian joint booth will be presenting the technological innovations of the Southeast Asian state. Alongside Malaysia, Indonesia, Serbia and Israel are recording the strongest growth in the number of exhibitors. With their companies they offer trade visitors to InnoTrans exciting technical achievements and some ground-breaking world premiers. The Kingdom of Saudi Arabia is also experiencing a premiere. SAR is the first company from the Arab Kingdom in history that exhibits at InnoTrans. Saudi Arabia thus joins the long list of international exhibitors at InnoTrans, which impressively underlines InnoTrans’ reputation as the world’s leading trade fair for transport technology. This is also confirmed by the steady rising number of exhibitors from foreign transport companies. Most of the exhibitors at the coming InnoTrans are from China, as well as Great Britain, Spain and Russia. A detailed overview of the exhibitors already registered can be found online at www.innotrans.com. There you will also find a list of exhibitors in the new Mobility+ theme area, which has attracted a great deal of international interest. The new area focuses on transport solutions for the first and last mile as well as on combined mobility and digital support approaches.

It is not only Mobility+ that will be celebrating its premiere at InnoTrans 2020, but also the new hub27 exhibition hall, which was completed in 2019 and where exhibitors at InnoTrans 2020 will be presenting their innovations in signalling technology. From March onwards, anyone wishing to experience the innovations in mobility can purchase tickets for InnoTrans online in the Ticket Shop. At the end of November Alena Conrads was already delighted to receive her first ticket for the world’s leading Trade Fair for Transport Technology. She won the InnoTrans Career Award presented by STUVA and will be travelling to Berlin at the end of September.
The progress of digitisation and electrification opens up numerous new and dynamic design options for future mobility systems. 54 exhibitors from 11 nations showed how these can be used effectively at the premiere of the MES Expo from 5 to 7 November 2019 in Berlin.

The trade fair concept covers all transport systems and is aimed at the electronics supply industry. For the first time it offered a platform for interdisciplinary exchange to exhibitors and trade visitors from the railway, commercial vehicle and automotive sectors.

The exhibitor portfolio of the first event offered trade visitors a wide range of products and services that covered all sectors of the industry. In addition to world market leaders such as Knorr-Bremse or CRRC, numerous medium-sized companies such as KUKA or INOV A Semiconductors presented how their products are actively contributing to the transformation of mobility. The fair was also enriched by creative impulses from up-and-coming start-ups. For Andreas Wagner, President of the German branch of Mitsubishi Electric Europe, MES Expo offered added value, especially with regard to intermodal transport solutions: “When we think about mobility, we believe that it should be seamless and intermodal in the future, and in particular that it must offer added value for users. The MES Expo reflects this trend very well and clearly illustrates the change in mobility”.

The MES Expo project manager, Lisa Hofer, was very satisfied with the premiere: “The attendance figure of 1,315 representatives of the sector more than exceeded our expectations for the debut event. Our concept of creating a strong R2B-platform with the MES Expo has been successful. 80 percent of our visitors have an advisory influence on purchasing and procurement decisions in their company. This speaks for the high quality of the trade fair.”

Great interest in the supporting programme

A further highlight of the trade fair was the supporting programme. This was particularly supported by the three partner associations VDB, ZVEI and DVE. At the Dialogue Forum and the Procurement Center, companies such as Siemens Mobility, Bombardier Transportation or Deutsche Bahn reported about their current opportunities and challenges in the mobility sector. “We have succeeded in demonstrating that the innovative strength of these industries can make a huge contribution to a more efficient mobility that is less polluting and more efficient across all modes of transport,” says Olaf Zinne, who heads the Smart Mobility platform at ZVEI. “If you look at the German electrical industry alone, it represents a highly innovative sector with up to 17,000 patent applications per year – some of these patents are the basis for digitalised and smart applications, for example in the automotive sector. And the influence of this industry is increasing from year to year – today vehicles consist of a large number of microchips or semiconductors – all of them are products of the electrical industry,” continued Zinne.

The next edition of the MES Expo will take place in Berlin from 9 to 11 November 2021.
Digitalisation, sustainability and citizen-friendliness

The digitalisation of transport will shape and change the mobility of both society and economy in the coming years. The aim is to harness the potential of all modes of transport in order to improve the mobile everyday life of all EU citizens, to strengthen sustainability and climate protection in transport and to secure the competitiveness of European industry by means of digital networking and the use of mobility data.

Europe’s declared goal is to be a global pioneer in the digital economy. The Federal Ministry of Transport and Digital Infrastructure also wants to be strengthened in order to promote a climate-friendly and efficient freight transport.

The framework for the German EU Presidencies is set by the Federal Government’s programme, which is currently being drawn up under the auspices of the Federal Foreign Office. It is closely linked to the work programme of the new EU Commission.

One of the Federal Ministry of Transport’s key objectives for 2020 is to modernise the Rotterdam (2016) and Vienna (2018) declarations at a ministerial conference in Berlin on 21 September 2020 and to achieve progress in rail freight transport in the form of a ‘Berlin Declaration 2020’.

After all, rail freight transport and modern corridors are still essential today for competitiveness and for the implementation of transport goals, especially those regarding modal shift.

A further focus of the ministerial conference will be to anchor the topic of “innovative freight transport” more firmly at European level. The aim is to take concrete measures to make the logistics sector more futureproof throughout the EU by means of innovation.

Digitalisation urban mobility and the future of European railways

Everything is going digital, why should railways be an exception?

The Federal Ministry of Transport and Digital Infrastructure wants to establish the tangible daily use of digitalisation and communication technologies that will allow them to quickly, frequently and affordably and knowledgeably use rail transport as the preferred mode of their daily travel and shipments.

This is critical as transport is the sector that currently emits second most in terms of greenhouse gas (GHG) emissions, surpassed only by energy production. It is responsible for nearly 24 percent of Europe’s emissions. Transport is also the only sector that has increased its emissions on the continent over the past 20 years. Road transport is the biggest polluter, with 40 percent of those road emissions being emitted in urban and suburban areas. However, rail does not conform to this trend.

Rail is the only mode of transport that has diminished its emissions while increasing the number of passengers. With its high capacity and limited emissions compared to road transport, rail has the potential to get millions of cars out of the urban and suburban areas in which they create significant traffic congestion that reduces mobility and drastically increases emissions that affect the health of both citizens and our planet. This inherent value makes the rail sector a crucial ally in the effort of President Ursula von der Leyen and her Commission to make Europe carbon-neutral by 2050.

Investment in digital systems

Building extensive digitised rail networks is an executable objective to that end. Using new technologies like automation, big data, artificial intelligence and next-generation telecommunications solutions, we can create an attractive mobility paradigm centred on rail and its widespread infrastructure. Digital solutions will make it possible for users to easily pay for rides, routing and planning trips and find last-mile transit solutions at stops. It will also allow Europe to efficiently plan services that can optimally synchronise urban, suburban and mainline rail to make it more convenient than other more carbon-intensive alternatives like personal vehicles. This will permit increasingly inhabited municipalities to enjoy a renewed city planning in order to benefit from greater economic growth and more social cohesiveness.

To make this vision a reality, the EU will need to craft a truly interoperable Single European Rail Area and properly invest in, and deploy, the digital systems that will enable it. The wider – but not yet universally deployed ERTMS is one solution that UNIFE has identified as a key enabler to allowing greater and more seamless rail travel across Member States. Its widespread usage will be the foundation for the adoption of upcoming ERTMS game changers like ATO, ETCS Level 3, next-generation telecommunication and satellite positioning systems being developed, or already developed, through Shift2Rail projects. This private-public partnership, led by its Executive Director Carlo Borchgrevink, has made significant strides towards these technologies and should be extended as Shift2Rail II under the EU scientific research initiative ‘Horizon Europe’. Permitting the programme’s continued operation would help fund essential research and innovation that will lead to new technologies that will make rail even more effective during the ongoing ecological transition.

UNIFE looks forward to partnering with the European Commission and the other EU institutions during this new mandate. Our sector has much to bring to the table as the Commission crafts an ambitious ‘European Green Deal’ that will also make an economy that works for people. Our association urges policy makers to work alongside the European rail supply industry to digitise the railways and bring the benefits even more into citizens’ everyday lives.

UNIFE will be present at InnoTrans 2020, please join us to learn more about the digitalisation of our sector, the future of urban rail, and much more.
ViaVan and Shell launch shared ride in Amsterdam

ViaVan Technologies B.V., Europe’s market leader for public mobility, and Shell are launching an innovative electromobility project in Amsterdam, combining ViaVan’s expertise in on-demand mobility technology with Shell’s capabilities in charging solutions. The aim is to demonstrate the feasibility of deploying electric vehicle fleets in urban environments.

The programme will integrate the on-demand technology and operation of ViaVan, Shell’s rapid charging technology and the associated charging stations into a single system. ViaVan and Shell will demonstrate that high performance electric fleets can improve their performance by optimising the transfer to available charging stations. ViaVan’s electric vehicle operating system includes a powerful routing algorithm that maximises the range and battery performance of electric vehicles. In Amsterdam, the system will monitor the real-time battery status of all vehicles in the fleet, calculate upcoming charging tasks and route vehicles intelligently to one of Shell’s rapid charging stations. This will make the electric vehicles an efficient part of the public transport network. Passengers can book their ride in an electric vehicle in the ViaVan mobile app via an eVia request.

Electric mobility complementing public transport

The use of such an operating system for electric vehicles offers municipalities considerable potential for a better overview of the electricity network in the urban area. ViaVan works closely with cities and public transport companies and offers ride-sharing and electric mobility services that complement the existing transport infrastructure.

In Berlin, ViaVan supports and operates a fleet of on-demand shuttles, most of which are electrically powered, in partnership with Berliner Verkehrsbetriebe (BVG) – the largest public use of shared shuttles worldwide. In Milton Keynes, UK, ViaVan’s on-demand service will be fully electric by 2020. ViaVan’s comprehensive solution offers its partners the opportunity to introduce zero-emission public transport using e-shuttles.

Information displays: A single product for all applications

Displays for customer information and entertainment are indispensable for transport providers, not only to display current operational events, but also as advertising and entertainment platforms.

The Finnish Teleste Corporation offers a broad portfolio of product and service solutions for this purpose, including RGB LED information displays. They are suitable for outdoor applications, including central, platform, hall and even timetable displays.

Technology for high expectations

These Teleste RGB LED displays are designed for permanent use: around the clock and all year round; their IP65 protection protects the displays against dust, rain and even snow. The integrated thermal management system ensures that the operating temperature is within the range of –35 degrees Celsius to +55 degrees Celsius. In addition to low energy consumption and a service life of 100,000 hours, the information displays offer a wide range of pixel pitch options from 2.5 millimetres to 10 millimetres and a luminance of up to 6000 candela per square metre. This ensures an excellent full colour readability from all viewing angles for symbols, scrolling texts and even videos. The brightness is automatically adjusted according to ambient light. The RGB LED displays are equipped with an industrial quad-core PC, there is a front access for maintenance. They can be operated with either 115 or 230 volts alternating current. Together with iqu Systems, its German subsidiary, Teleste will supply 462 RGB LED information displays to Köln Verkehrsbetriebe AG (KVhB) this year. They will be used throughout the city of Cologne’s light rail network; the installation of the displays at KVhB’s stations and platforms will be carried out by teams from the German Teleste service company Cableway.

Experienced project partners

ViaVan is a joint venture between Via and Mercedes-Benz Vans. There are already more than 90 implementations of Via technology in 20 countries worldwide, with more than 70 million journeys made to date. Shell is committed to the future of electromobility in the Netherlands and announced that it will accelerate the expansion of the ‘Shell Recharge’ fast-charging infrastructure. In the coming years, the Shell Recharge network will be expanded to 200 charging stations throughout the Netherlands.
Seat rebuild for ICE 4 and ICE 3 trains to start in March

Comfort plays an important role when travelling, complementing punctuality and reliability. The findings of customer feedback on the seats in the German ICE 4 and the modernised ICE 3 high-speed trains were all the more thought-provoking: too hard, seating surfaces too short, insufficient freedom of movement in the head and shoulder areas.

With its products from Switzerland, Systemtech Schneider AG proves that convenience and beautiful design can belong together.

A passion for beautiful design and functionality

With a devotion to details, shapes and materials, the company develops and implements overall concepts for railway rolling stock. With the various wall, floor and ceiling elements made of composite panels, entire family or sleeping compartments up to dining cars are designed and implemented to satisfy customer requirements.

The interior fittings are an essential part of the product range, but the most famous product is the Toilino®.

Modular system

Toilino® is a modular WC system in various versions – from simple to luxurious, with or without urinal. Special designs such as (family) cabins with shower are also possible. All cabins are comfortable and designed for passengers with reduced mobility. The complete project development, including engineering, prototyping, production, assembly and service, is completely carried out from a single source and without any external service providers. Customer-specific developments not only take into account the wishes with respect to design, colours, illumination and technical specifications, but they also include the aspects of functionality and aesthetics in addition to weight optimisation through lightweight construction. Systemtech produces full-size railway car and compartment models upon customer request. These mock-ups are used to present technical solutions, design and functionality in a realistic way for illustration purposes.

All requirements are met

In order to fulfill customer requirements, it is essential to comply with the respective country-specific standards, as well as the TSI specifications. The certification according to the valid standards of the railway industry (fire protection, bonding, welding, etc.) are fulfilled and constantly supervised by the compliance department. The full scope of supply of the Toilino® modules includes a complete set of documents as well as the corresponding training offers.

Systemtech Schneider AG has recently won the tender of the German railway company DB for the reconditioning of 40,000 seats in the modernised ICE 3 and ICE 4 trains from March 2020 onwards. The order has a volume of around 40 million Euros and should be completed by the end of 2021. Then nothing will stand in the way of comfortable seating on rail journeys.

From domestic production

The seats will be manufactured at the Clerprem Deutschland GmbH plant in Neustadt, Saxony, and a total of just under 60,000 seats will be installed in the modernised ICE 3 and ICE 4 trains under 60,000 seats will be installed in the Clerprem Deutschland GmbH plant in Neustadt, Saxony, and a total of just 60,000 seats will be installed in the modernised ICE 3 and ICE 4 trains. From March 2020 onwards. The order has a volume of around 40 million Euros and should be completed by the end of 2021. Then nothing will stand in the way of comfortable seating on rail journeys.

Seat rebuild for ICE 4 and ICE 3 trains to start in March

These new seats are the result of customer feedback

Photo: DB AG / O. Lang

With customer surveys: In the case of 2nd class seats, a further three centimetres were added to the adjustment system compared to the criticised seats. In 1st class, the effective seat surface was increased by three centimetres.

The armrests of the seats in both classes were given a genuine leather cover and better upholstery. Pillows have also been improved and newly designed pillowcases that have been tested with customers will also be installed.

Innovative rail solutions

- FIRE, SMOKE, AND TOXICITY
- COMPLIANCE
- 3D PRINTING MATERIALS

PA/66-67/20FR LS is a newly developed flame retardant 3D printing filament that complies with EN 45545-2, NFPA 701 and IEC 61010-1. It is certified for use in the rail passenger transport sector and within the connected system components and effectively printed numerous parts including replacement rail, steps, etc. manufactured in the region.
A closely timed future

Existing rail networks must be future-proof, and therefore everything currently revolves around IoT, AI and Industry 4.0: better availability through condition-based maintenance of tracks or turnouts, sensors for comprehensive data collection and automated production.

IoT and artificial intelligence for predictive maintenance

At InnoTrans 2018, KONUX GmbH presented the Predictive Maintenance System for turnouts – an end-to-end solution that uses IoT sensors and artificial intelligence (AI) to improve network availability, extend plant life and reduce costs.

The KONUX system continuously monitors and analyses the condition of key turnout components and delivers practicable findings. It thus enables better maintenance planning by helping infrastructure operators to detect failures at an early stage and plan the optimum time and type of maintenance required. Since then, further important milestones have been achieved.

New functionalities

Thanks to advanced algorithms in machine learning, a prediction can be made of how the condition of the track bed will develop over a period of 90 days; the hit rate is 90 percent. This allows the actual effect of maintenance measures such as tamping, grinding/planning or welding to be validated. 100 percent of the trains running over the points around the clock are detected.

New components

The switch frog has been added to the system as a new monitored component. Due to its characteristics, the frog is the component with the highest wear and tear. The KONUX Predictive Maintenance System now detects anomalies of the vibration data in the area of the frog, so that measures can be planned in time to avoid serious and costly damages. The market launch of the solution for monitoring the condition of the turnout drive is planned for summer 2020. This will address 58 percent of the delays caused by this switch component.

ENGIE acquires Powerlines Group

The Powerlines Group with its subsidiaries is one of Europe’s leading system providers of railway electrification for local and long-distance networks. ENGIE is a global provider of low-CO2 energy and services.

In response to the urgent challenge of climate change, ENGIE aims to be a global pioneer in CO2 reduction and a leading force in shaping the energy revolution. Since it was founded, the Powerlines Group has enjoyed an extremely dynamic growth thanks to its clear strategic focus on internationalisation, diversification and professionalisation.

In October 2019 the Austrian Powerlines Group announced the takeover of the group by the French ENGIE Group. In the past financial year the Powerlines Group generated revenue of over 300 million Euro with over 1,100 employees.

The acquisition combines two companies with a common vision: climate-friendly and reliable turnout systems for future mobility. The railway sector is a crucial lever for achieving the European climate goals. The electrification of rail networks is one of the main pillars in the decarbonisation of public transport. With their joint expertise, ENGIE and Powerlines will accompany and support their customers in solving their energy challenges by implementing complex turnout projects and integrated solutions for future mobility.

The future of rail operations and maintenance of the rail network is a complex but necessary task. Through the use of the huge amounts of data generated in a network, Stukton Rail BV from the Netherlands therefore takes a preventive approach to rail asset management, in which network data is collected, secured, analysed and interpreted. For rail infrastructure operators, this means maintaining efficiency and extended facility life, an overview of future requirements for the renewal of equipment, real-time data, cost-effective and safe execution of maintenance work, operational flexibility and adaptation to changing market conditions.

Know today what will happen tomorrow

The future of rail operations and maintenance of the rail network lies in the use of the huge amounts of data generated in a network. Stukton Rail BV from the Netherlands therefore takes a preventive approach to rail asset management, in which network data is collected, secured, analysed and interpreted. For rail infrastructure operators, this means maintenance efficiency and extended facility life, an overview of future requirements for the renewal of equipment, real-time data, cost-effective and safe execution of maintenance work, operational flexibility and adaptation to changing market conditions. This results in safer and more reliable rail networks.

Stukton’s smart maintenance approach is based on 100 years of experience in the construction, renewal and maintenance of rail infrastructure, power supply, catenary systems and signalling. Customers can also draw on the expertise in the field of vehicle electronics when infrastructure and rolling stock are to be increasingly networked with automatic train operation, ETCS, ERTMS or energy integration.

Maintenance work during the night – thanks to preventive maintenance.

At InnoTrans 2020, the newly created ENGIE Solutions unit within the Group will be presenting itself as a system provider at a joint booth with Powerlines, Icomera, Ineo Rail, Ineo Systrans, Ineo UTS, ENGIE Axima and Ineo SCL, all of which are active in the transport sector.
From planning to maintenance: infrastructure from one source

Too many cooks spoil the broth, this time-honoured saying also applies to the operation of railway infrastructures. Too many enterprises and partners often make processes and work confusing and, on balance, expensive. Amberg Technologies AG remedies this situation and offers a customised total package with its solutions, products and services: from planning to maintenance.

Right from the start, during the planning phase, geological surveys, 3D images of the entire area using mapping as well as geo-mechanical and structural calculations provide an overall picture of the general conditions and challenges of a project. These are transferred into a Building Information Model (BIM) of the infrastructure.

This form of visualisation plays a decisive role not only in the planning, but also in the construction, operation and maintenance of an infrastructure. In the first phase, it ensures a better understanding of the complex processes of a construction project. For example, in a tunnel construction project, project participants can see both the alignment of the tunnel and the surrounding geology.

During construction, the data from geological monitoring and from the track monitoring system Track Control continuously flow back to the Amberg cloud solutions. In the constant interaction of information, for example from seismic pre-exploration, tunnel driving control, profile control as well as current scan data or monitoring data in real time, the model grows into a digital image of the building. The transfer of design data from the BIM for railway surveying equipment as well as the optimisation of construction site logistics, the so-called lean management, can also be integrated. The data flow back from the construction site – that is, field to BIM – and thus keep the model up to date.

During the operating phase, comprehensive monitoring and inspections guarantee the long life of the infrastructure. By identifying and measuring changes, interventions can be planned early and in a targeted manner.

Artificial intelligence to predict damage

This sustainable way of thinking is the inspiration for new ideas at Amberg. In future, older tunnels will be recorded in 3D, modelled, provided with further relevant information and made available as digital twins. Artificial intelligence will soon enable automated, rapid and predictive detection and prediction of possible damages.

The digital twin is the building documentation of the future. All data and models are available anywhere and around the clock. Amberg has the experience and expertise to successfully plan and implement infrastructure projects in all life cycle phases.
About 30 years ago, GSM-R became the standard for railway communications on the basis of the 2G-technology GSM, and hardly anyone could anticipate how breathtakingly fast the technology would change.

In our days, some of the 2G-functionalties appear to be almost archaic and for several diverse reasons the time has come to adapt railway communications to the changes in realities. One of them is that suppliers intend to cease their support of the 2G-technology by 2030 or in some exceptional cases by 2035. But a quickly progressing digitisation also takes place in the railway world and beyond, boosting the demands on supporting telecommunications technologies, particularly in terms of the required broadband networks.

The multitude of modern applications requires reliable, fast and undisturbed communication platforms with great bandwidths and short latencies – or response times – for the transmission of signals, that the 2G technology is unable to supply. Although the supporting systems and applications are being adapted to the current state-of-the-art, they are nevertheless limited by the basic technology that is being used: The Internet with its functionalities has become an everyday companion for users, and particularly so for applications beyond the private use, like social media, email retrieval, route planning et cetera. First and foremost, the industry needs broadband networks in order to handle the data volumes of the technologies that are commonly known as industry 4.0.

With regard to railways, more than the current communication of a train driver with the operations centre must be possible. Railway communication technology must be able to reliably process the data volumes that are incurred by interconnected infrastructure assets and trains, the ETCS/ETCS signalling system or the automatic operation of trains.

FRMCS: the challenge

Future Railway Mobile Communication System, short FRMCS, was the name of the project that was initiated in 2014 by the International Union of Railways UIC, with the aim of developing a system that meets the challenges of an interconnected world of railways. The GSM network – and therefore also the GSM-R-technology was standardised under the responsibility of the European Telecommunications Standards Institute (ETSI), an institution that was created by the European Union. With the third generation of mobile phone networks UMTS, the standardisation institutes of the USA, Japan, Korea and China joined in, and for this reason, it is also called the Third Generation Partnership Project (3GPP). Meanwhile, 4G (LTE) and 5G have also been standardised by 3GPP and the GSM specifications have also been transferred to 3GPP. For this reason, standardisation is meanwhile applied around the world.

For FRMCS, this means that now many institutions have to cooperate in this project, in order to reach an optimum. While some partners must define the requirements of the railways (UIC), others (ETSI) must describe them in Use Cases and submit them as so-called Change Requests to 3GPP. 3GPP is in charge of verifying if these Use Cases can already be fulfilled with existing standardised functionalities. 3GPP and the connected framework MCX for safety-critical applications is therefore an ideal entry point for FRMCS to enable the use of existing safety-critical services. This means a significant gain in standardisation and provides more flexibility for the future digital applications. If hitherto things seemed complicated to read, they will not become simpler: it must further more be exactly defined which transmission technologies and which application layers shall be used. As a special challenge, the railway sector will be facing the coexistence of GSM-R and FRMCS as it is not possible to implement such a fundamental transition from one day to the next. The community will have to solve the special task of developing the best migration path.

FRMCS: the future

Last year, the 5G licenses were auctioned. 5G will allow for an ultra-high-speed and reliable data transmission: the latency of the 5G technology is anticipated to be as short as a mere millisecond (for comparison: 3G-networks have a latency of about a hundred milliseconds). This means that data can be transmitted almost in real time. Nevertheless, for the time being it has not been clarified yet which bandwidths and frequency ranges will be available for railways. The decision is expected during this year and national regulation bodies will then be able to implement them. It is only on this basis that the final configuration of FRMCS as the future communication system for the European railways will be possible.
**LED lighting solutions for the Swiss Ceneri Base Tunnel**

Competition in emergency and safety luminaires with high demands on durability and quality was sought for the development of special lighting systems for the Ceneri Base Tunnel in the canton of Ticino.

At BöSha Technische Produkte GmbH & Co. KG these criteria were fulfilled. The 15.4-kilometer-long, third-largest tunnel construction project in Switzerland consists of two single-track tubes, which are about 40 metres apart and which are connected to each other by a total of 46 cross-galleries. BöSha developed special LED cross-gallery luminaires for Cablex AG, a wholly owned subsidiary of Swisscom. 550 of them were installed and in future they will illuminate not only the galleries but also the technical rooms in the Ceneri Base Tunnel.

**Special requirements in the tunnel**

In addition to a high efficiency, special requirements are imposed on the luminaires for use in tunnels: A uniformity of G1 1:40, a luminaire mounting height of 250 centimetres and illumination levels of 50 lux on average at banquets were required.

The LED cross-gallery luminaires are equipped with wiring via plug connectors with IP 69 screw connection, an impact-resistant Class IK 10 housing with high IP protection and special vibration-inhibiting luminaire brackets. The required shock and vibration test has been carried out in accordance with EN 60068-2 with a five-fold tolerance at frequencies of 1 to 5 Hertz. The frequency was 1 to 5 Hertz. The first oscillation reached an amplitude of 1 kilonewton per square metre, caused by a pressure shock, the further oscillations reached amplitudes of 0.1 to 0.2 kilonewton per square metre. The cycle was completed with an amplitude of 0.4 kilonewtons per square metre, that started at negative value, caused by the suction effect. A pressure cycle test with 200,000 cycles was also carried out.

**High standards and easy maintenance**

With a service life of 50,000 hours in the temperature range from −25 to +50 degrees Celsius, the requirements of other general tunnel safety lighting standards have been doubled. In accordance with the specifications, a central closing mechanism with a patented double-sided locking system allows the LED cross-gallery luminaire to be opened without tools, thus facilitating maintenance work.

BöSha prismatic escape route luminaires were also installed at 96 points in the Ceneri base tunnel. These luminaires have also withstanded the pressure and suction load of 200,000 cycles. Each of them is furthermore redundantly equipped with two lighting circuits. Developed according to the latest LED technology, the luminaires have a high savings potential compared to those with conventional technology.

**Brenner Base Tunnel: Construction progress on schedule**

The largest infrastructure project in Europe and at the same time the world's longest underground rail link is on schedule: 115 kilometres, or 50 percent of the gigantic project, have been excavated. Around 1900 employees in Austria and Italy are working on the construction progress of the Brenner Base Tunnel.

So far, around 115 kilometres of tunnel have been excavated, including 34 kilometres of railway tunnel, 43 kilometres of exploratory tunnel and 38 kilometres of other tunnel structures such as emergency stations, logistics and access tunnels. At the four construction lots Tulfes-Pfons, Pfons-Brenner, Mauts and Eisack underpass, the weekly advance rate averages around 500 metres – both mechanically and conventionally.

Three tunnel boring machines are capable of driving eleven tunnels simultaneously. The number of drives will soon be co-financed by the EU, this construction project of the core network corridor that the EU has defined with the Trans-European Transport Network (TEN). Between 40 and 50 percent of this construction project of the century will be co-financed by the EU, since the most important measure is to counteract the constantly increasing traffic volume over the Brenner Pass. Last year, 2.4 million lorries crossed the Alps there, more than the four Swiss and the two French Alpine passes combined recorded in the same period.

**Contribution to climate protection**

The Brenner base tunnel is scheduled to go into operation in 2028 and will herald a new era of mobility in the Brenner corridor with a significant reduction in travel time of almost 70 percent. In addition, the tunnel is considered to be one of the most important environmental protection projects in Europe, since climate targets cannot be achieved without shifting traffic to rail. One tonne of goods transported by rail generates 21 times less CO₂ than transported by road. The construction of the Brenner base tunnel will pay for itself in terms of the emissions it generates after around 18 years of operation – with a project life period of around 200 years. The construction is also accompanied by numerous ecological compensation measures.

**Special feature: the exploratory tunnel**

A special feature of the Brenner base tunnel is its third tunnel tube, the so-called exploratory tunnel. This is primarily used for geological preliminary exploration in order to make driving smoother. Half of the work is carried out by blasting and half by tunnel boring machines. The exploratory tunnel saves time and money: as a service and logistics tunnel during the construction phase and as a maintenance and drainage tunnel during operation.

**Tunnel construction site in Mauts (Italy)**

Photo: ÖBB
Tailor-made for the urban space

The Transport System Bögl (TSB) travels at speeds of up to 150 kilometres per hour, is extremely quiet, independent of weather conditions and more economical than conventional rail-bound transport systems. It thus solves numerous challenges in urban public transport. The system will be presented at InnoTrans 2020.

As the developer and manufacturer of the track system, the company Max Bögl has already been involved in earlier maglev rail projects. On the basis of this experience, the company has developed its own Transport System Bögl (TSB) for local transport. After more than 125,000 journeys and 83,000 kilometres on the specially built test track near Nuremberg, it will be presented to the trade public at InnoTrans.

It offers efficient and emission-free passenger transport in urban conurbations on routes of less than 3 to over 30 kilometres. At up to 150 kilometres per hour, the TSB is twice as fast as trains and 50 percent faster than underground trains. The particular advantage for urban areas is that the rides can be flexibly adapted to traffic demands with very short headways, if necessary. The up to six-vehicle sections offer space for up to 762 passengers and are not only independent of weather conditions, but also completely quiet due to the running gear enclosed by the track. The TSB thereby requires comparatively little urban space. It tilts comfortably into curves at up to eight degrees and can cope with gradients of up to ten percent. It can therefore be well integrated into the urban landscape and can be built at ground level, on stilts or in tunnels.

Cost-effective and low-maintenance

Max Bögl calculates with a price of 30 to 50 million Euro per kilometre with a double-track elevated guideway. This is about one sixth of the cost of an underground railway line. In addition, the construction time is comparatively short because the track is made up of industrially manufactured segments. An important advantage are the low operating costs, as the railway is wear-free and fully automatic.

The first customer is already convinced: The Chinese company Chengdu Xinzhu Road & Bridge Machinery Co. Ltd. is currently building a demonstration line in Chengdu and will market the TSB in China – a country with many rapidly growing mega-cities and a high demand for innovative transport solutions.

All-round carefree package

Max Bögl offers the system consisting of vehicle, track and control technology as a package and is responsible for both planning and implementation. The company, founded in 1929, has decades of experience in railway line construction.

Cooperation: ZF in the ‘advanced TrainLab’

ZF Friedrichshafen AG is cooperating with Deutsche Bahn AG in testing new technologies in the rail sector in the ‘advanced TrainLab’ – a test vehicle of Deutsche Bahn AG based on an ICE-TD train, which is currently being used for testing purposes on the tracks of the Federal Republic of Germany.

Connect@rail is an advanced system for condition monitoring, which allows comprehensive status recognition of components of the test train. Furthermore, connect@rail enables the rail infrastructure to be checked for potential dangerous points. In this way, safety and efficiency in rail traffic can be increased. In Germany alone, 1.8 million people commute to work every day – that is 59.4 percent of all employees. And the trend is rising.

The car is still the first choice for employees. But traffic jams, the lack of parking space and increasing emissions require a rethink. If rail transport is to play a greater role in the mobility mix of the society, trains must be able to withstand peaks in capacity utilisation and higher frequencies, and operate more efficiently. It is also important to avoid downtimes. Deutsche Bahn is therefore researching the use of new, innovative technologies with the ‘advanced TrainLab’ – a rolling test laboratory based on a class 605 (ICE-TD) multiple unit train – in order to achieve these goals. ZF cooperates with DB AG and has installed its connect@rail system in the diesel-electric train. For use in the ‘advanced TrainLab’, ZF is installing wireless acceleration sensors on the unsprung parts of the train’s bogie, which can also record the temperature behaviour, the vibrations and oscillations as well as the inclination of the train. The wheel-rail contact can also be monitored. In this way, connect@rail enables not only the monitoring of the vehicle, but also of the track condition.

Everything at a glance

The measurement and route data are transmitted to the ZF IoT Cloud and can be read out via computer or mobile device for evaluation and visualisation. The operator thus receives real-time analyses that help him to recognise the condition of the vehicle and the infrastructure and to plan maintenance cycles based on their condition. This ensures a smooth and cost-optimised operation of the entire fleet. Passengers benefit from more efficient and emission-free transport and increased vehicle availability. The DB AG test train offers a unique opportunity to test the advanced condition monitoring system under real conditions, commented Dr. Klaus Geßelhörder, head of ZF’s Industrial Technology Division, on the cooperation. Under the motto Mobility-Life-Balance, ZF is working towards the goal of clean and safe mobility across all business units.

The ZF sensors are located on the bogie of the test train. Photo: ZF Friedrichshafen AG

The ZF sensors are located on the bogie of the test train. Photo: ZF Friedrichshafen AG

New temperature sensors T2E and TCR6

The two temperature sensors T2E and TCR6 are the two new ones in the railway portfolio of the Swiss Baumer Group. Both measure the temperature in power electronics, in diesel engines or in cooling systems of locomotives and trains with an accuracy of ±0.1 Kelvin. For both sensors, there is also a measuring tip for accelerated response times; T2E, delivers the correct temperature value after only 1.3 seconds. They are tested according to the important standard EN 50155, which regulates the properties of electronic equipment on rail vehicles, making sure that the sensors reliably withstand shocks, vibration, dirt and moisture and that they robustly resist against electromagnetic interference. Furthermore, the railway industry increasingly requires a clear identification of each individual component in a vehicle. For this reason, each Baumer sensor for railway applications has a designation according to the 653 standard (GAIAS serial number and GBN). It therefore becomes possible to trace back each individual sensor over its entire life cycle in order to know when and how it was manufactured.

Baumer | Hall 27 | 130
Power electronics from Medcom for the Impuls

The new Impuls 36Weh from the Polish vehicle manufacturer Newag SA is a three-car articulated trainset that can be driven both electrically – with pantograph under catenary – and with diesel.

Future-proof system

The modern drive system consists of two traction housings to control the operation of the asynchronous traction motors, each with a power output of 400 kilowatts, and for generating the voltage to supply the vehicle’s onboard systems. Each housing contains the FT-800-3000 traction inverter, the PSM-R2 auxiliary converter and a Medcom converter cooling system. Medcom has thus developed a modern traction system that achieves high performance and reliability parameters. The braking energy can be recuperated into the overhead line, thus saving energy. Together with the developed vehicle control system, the overall solution contributes to a lower energy consumption and ultimately to lower vehicle operating costs.

Medcom has the technology to offer completely emission-free and environmentally friendly public transport vehicles in Poland, said Piotr Wronski, Member of the Board of Directors at Medcom. The new Impuls is also the first major step towards the creation of an electric-hydrogen hybrid train.
At the beginning of November 2019, the German Federal Government increased the funds for local public transport by rail by a total of 5.2 billion euros by 2031.

Online Ticket Shop – easy and inexpensive

The ticket shop for day/permanent tickets and student tickets will be open as of March 2020 under www.innotrans.com/ticketshop. Trade visitors save time and money with their online ticket, and have the right to free use of Public Transport in Berlin (ABC) during its validity.

Application start from March 2020

Starting next month, it will be possible to apply for participation in the Eurailpress Career Boost via a contact form at www.eurailpress.de/careerboost. Once the application deadline will have expired, the applications will be reviewed by an internal Eurailpress jury and five applicants per professional category will be selected. The 25 selected candidates will receive a confirmation and an invitation to InnoTrans in Berlin by the end of August, where free admission to InnoTrans on Wednesday 23 September and a performance on the Talent Stage will be awaiting them. Company talent scouts in search of suitable young professionals at the Eurailpress Career Boost do not have to register separately. They will be able to make direct contact with the candidates on 23 September at the Recruiting LAB at the InnoTrans Campus in Hall 21e.

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incl. Mobility+
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Opening Ceremony
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