

# INFORMER

## DIGITAL BUSINESS MODELS

Data-based services from Knorr-Bremse and Nexxiot

## SUCCESSFUL TRADE FAIR

Retrospective: Knorr-Bremse at InnoTrans 2022

## GLIMPSES OF A BETTER WORLD

Knorr-Bremse Global Care supports local projects

EDITION  
56

December 2022 – the Customer Magazine  
of Knorr-Bremse  
Rail Vehicle Systems



**KNORR-BREMSE**



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Member of the Management Board  
Knorr-Bremse Systeme für  
Schienenfahrzeuge GmbH

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Dear Reader,

In its recently published World Rail Market Study, the European Rail Supply Industry Association UNIFE predicts that the global rail supply market will grow by 19.5 percent between now and 2027. The report’s authors identify Europe as one of the main drivers of this growth. I believe one reason for this is that policymakers and industry in Europe have fully grasped the answer to one of the most urgent challenges of our time: They understand that rail is the way forward, if we wish to create an eco-friendlier mobility system.

I had a similar feeling at the InnoTrans trade fair in Berlin, where visitors were visibly enthused by the dazzling array of products, systems and services. You can read all about our presence at the trade fair on pages 12–19.

Europe’s Rail Joint Undertaking (ERJU) is a unique technology initiative on a truly grand scale, in which vehicle manufacturers, system suppliers, infrastructure companies and centers of competence are pooling their wide-ranging expertise. Policymakers are doing what they can to support this initiative with public funds. For me, Knorr-Bremse’s involvement in yet another venture like this is not only a source of motivation – it is also our duty as a company. On this occasion, we are taking part in nine projects that are summarized on pages 8/9.

We are also helping to forge the future through our Digital Freight Train (DFT) program. We are about to start field testing the “FreightControl” automation system with our partners Havelländische Eisenbahn (HVLE) (pages 26/27). Today, mandatory brake testing on around half a million freight cars in Europe is still carried out manually, but we are developing a solution that will allow this time-consuming step in the set-up process to be carried out from the driver’s cab using, for example, a handheld tablet.

This Christmas and New Year edition is, however, not all about rail vehicle systems. Global Care e.V. is an independent charity that aims to create opportunities for those in need at a local and global level. Entrepreneurial thinking, project planning that focuses on making an impact, and active involvement are important principles of Global Care’s work. On pages 20/21, we feature three current projects in Ukraine, Lower Bavaria and Berlin.

I would like to take this opportunity to wish you and your loved ones a happy festive season and a successful start to the New Year.

Yours sincerely,

*Peter Radina*

Dr. Peter Radina



DR. PETER RADINA,  
Member of the  
Management Board of Knorr-Bremse  
Systeme für Schienenfahrzeuge GmbH

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Knorr-Bremse’s customers  
and business partners

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Innovative technologies and systems competence from a single source

Knorr-Bremse Rail Vehicle Systems offers an impressive variety of customized solutions for braking and onboard systems.



Braking Systems



Entrance Systems



Climate Control  
Systems



Power Electrics



Control Systems  
/ TCMS



Digital  
Solutions



Lifecycle  
Management



Electrical  
Systems



Wiper / Wash  
Systems



Driver  
Assistance



Sanitary  
Systems



Coupling  
Systems



Signaling  
Systems

# Double drive – double benefit

© Siemens Mobility



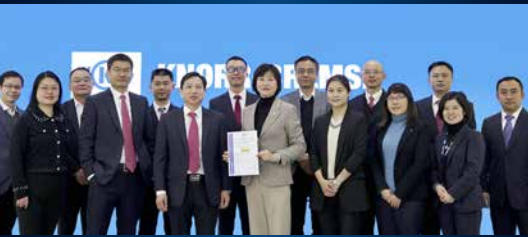
They use less diesel, emit less CO<sub>2</sub> – and are greener: DB Cargo is renewing its fleet of locomotives and is acquiring new dual-power locomotives from Siemens Mobility. The first 100 Vectron Dual Mode vehicles were ordered back in 2020, and in early 2022 an order for a further 50 was confirmed, including four for the DB Bahnbaugrupp. The air supply and the brake control systems will come from Knorr-Bremse.

At present, DB Cargo has to use diesel locomotives to drive individual freight cars to the customer’s siding. The reason is this: Even if the main route is electrified, the “last mile” can usually only be driven with an internal combustion engine – so diesel locomotives have to be used for the entire route. Hybrid locomotives solve this problem: They operate electrically where overhead lines are available and only switch to the diesel engine for that “last mile.” Double drive – double benefit.

By using the new locomotives, DB Cargo intends to save some eight million liters of diesel and 17,000 tonnes of CO<sub>2</sub> every year. Delivery of the units from Siemens to DB is scheduled to start in 2023; Knorr-Bremse has been supplying its systems to Siemens Mobility since summer 2021.

# First of 2,232

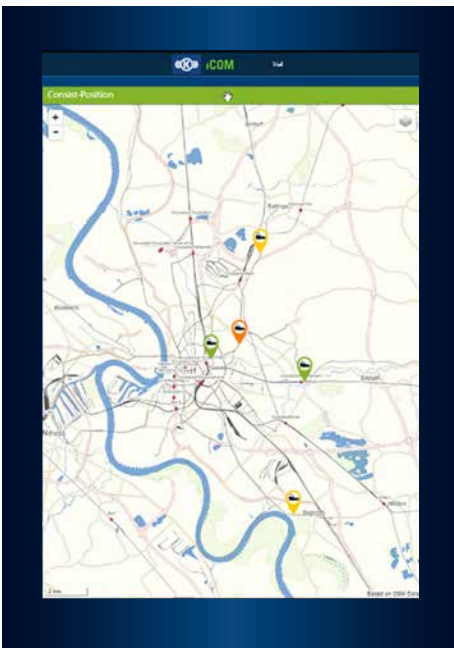
Knorr-Bremse’s site in Suzhou, China, has become the first in the world to receive Gold certification under the IRIS rail industry standard.



Facilities that meet the strict requirements for IRIS Standard ISO/TS 22163, which was first published five years ago, receive Bronze certification. Only the top five percent of applicants make the grade for the Silver certificate, and the requirements for the coveted Gold certification are even tougher. In fact they are so tough that the first ever Gold certificate has only just been awarded – to Knorr-Bremse’s site in Suzhou.

Earning the award is a demanding process. First, an auditor is commissioned by an independent certification body to check whether the site meets all the criteria set out in a 100-page catalog of questions. Next, they assess the facility’s performance in five key processes: development, requirements management, purchasing, production and/or service. And last but not least, they investigate what the facility’s key customers think of the service it provides, and award it a “customer perception” score. According to Markus Kleinheidt, Knorr-Bremse’s Vice President Quality & HSE Management, the site’s outstanding marks for customer perception deserve special recognition, because “as we know, few customers are more exacting than the Chinese.”

# Update on Knorr-Bremse CBM partnership with Rheinbahn



POSITION AND CONDITION of the vehicles at a glance

Implementation of a CBM system does not normally involve mass transit operators and manufacturers working together. But Knorr-Bremse RailServices and Rheinbahn AG have formed a partnership to do just that – with a system that monitors the condition of hydraulic braking systems on low-floor LRVs. In July the partners presented an update on the project at the Voestalpine mass transit symposium in Frankfurt am Main.

While Rheinbahn is in a better position to understand the progress of incidents and improve availability by finding sustainable solutions to vehicle malfunctions, Knorr-Bremse is focusing on the development and adaptation of CBM functions. “It is also important for



THE FLEET COCKPIT provides an overview of component wear and recent messages

us as partners to tailor our software functionality to the customer’s requirements,” explains Markus Schumann, Head of Sales Digital Products and Services at Knorr-Bremse Rail Vehicle Systems. The interference-free diagnostic hardware and software was installed in the first vehicles in 2018. “This really helped us with producing and optimizing successive iterations of our diagnostics and CBM software and validating real component condition assessments,” says Schumann. One of the lessons they learned was that implementing measures related to availability and CBM for braking systems involves more than just the brakes themselves. For instance, it emerged that there was a lack of drive data synchronized with the braking system diagnostic information. Schumann describes how this influenced the project’s development: “As a result, in May 2022 we started work on a prototype that also integrates the drive data from the CAN bus.”

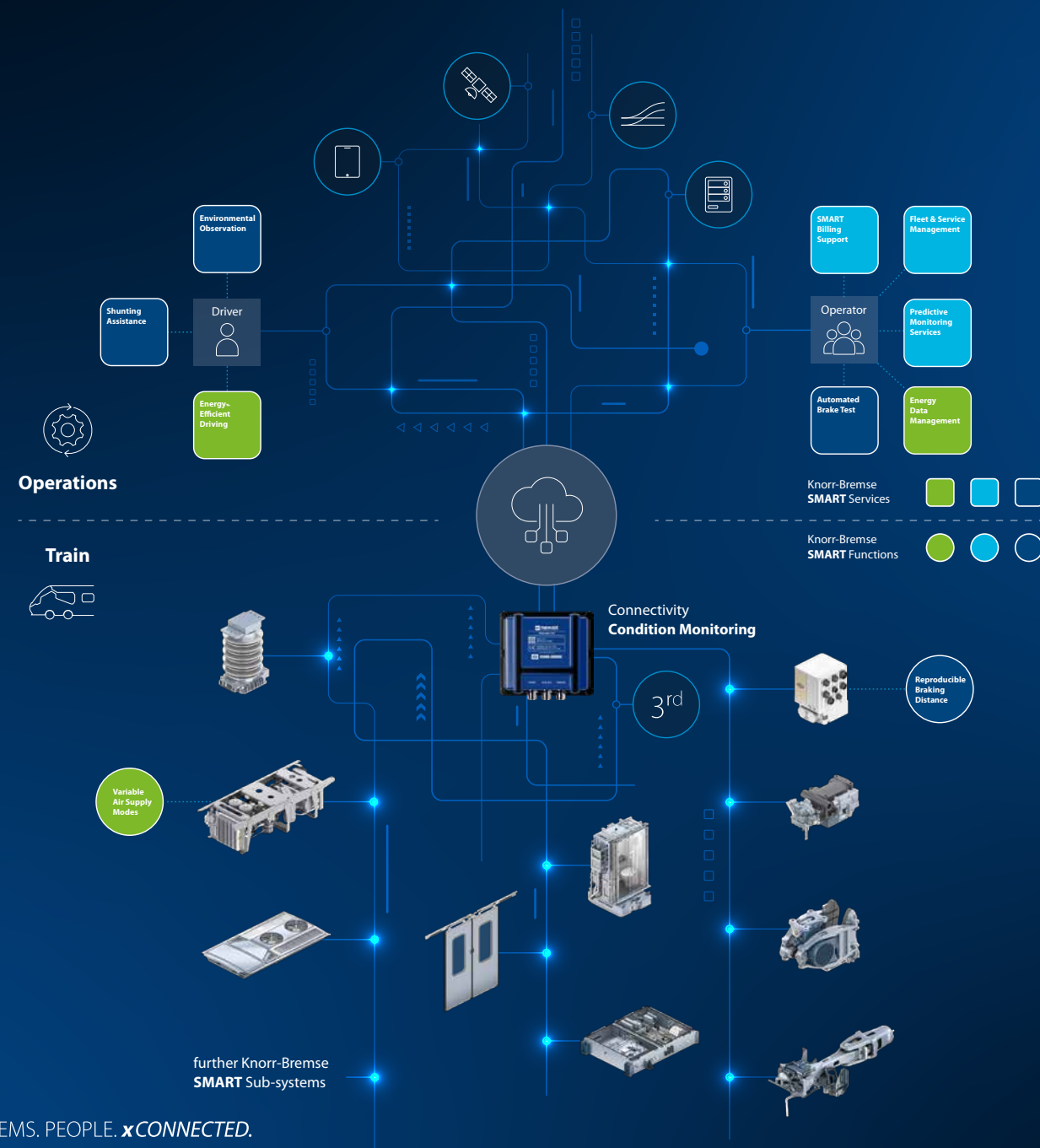
bring together your

## OPERATIONAL LANDSCAPE for

optimized  
**ECOLOGICAL FOOTPRINT**

dynamic  
**TRAFFIC FLOW**

accelerated  
**TRAIN OPERATIONS & MAINTENANCE**



# The advance of digital business models in the rail sector

## Knorr-Bremse is acquiring a stake in Nexxiot – a leading supplier of IoT technology for freight cars and containers

As part of its strategic program of minority stake acquisitions, Knorr-Bremse is to make extensive use of the sensor technology and digital ecosystem developed by Swiss company Nexxiot, which specializes in converting freight cars and containers into networked assets by equipping them with IoT technology. In Europe alone, Nexxiot has already supplied its systems to 200,000 vehicles – more than 25 percent of the European fleet.

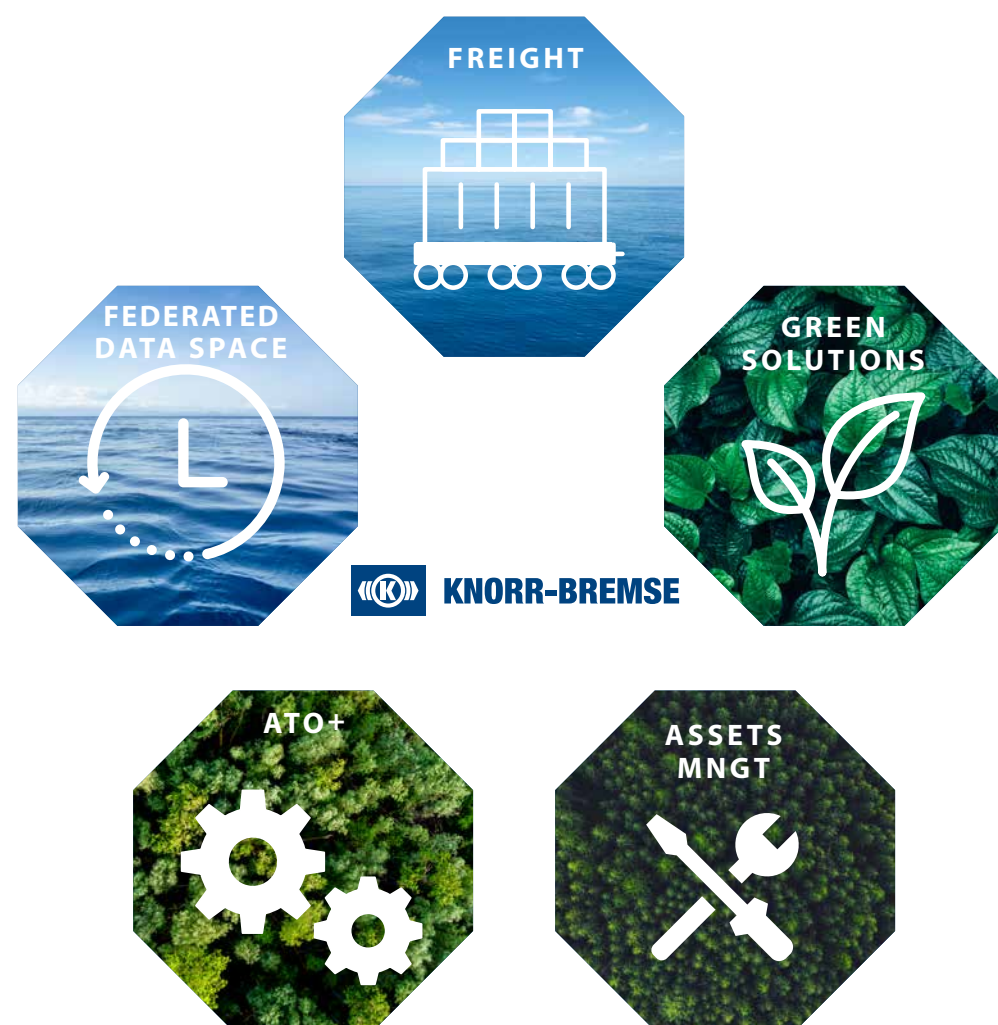
Linking Knorr-Bremse systems technologies with Nexxiot's digital eco system will provide the foundation for a new generation of data-based services. Once Knorr-Bremse brakes, doors, HVAC, sanitary and other systems are connected with Nexxiot's cloud-based digital ecosystem and are generating data-driven information, customers will benefit from increased vehicle availability, optimized lifecycle costs and greater operational efficiency.

In the first phase of the partnership, Knorr-Bremse will offer to retrofit Nexxiot's data-gathering sensor technology to braking, entrance, HVAC and other sub-systems that are already in operation. A second phase will then see Knorr-Bremse original equipment integrated into the digital ecosystem from the very outset.



# From road to rail

The ERJU Grant Agreements are scheduled to be signed at the end of December, with the associated research projects getting under way immediately afterwards. As part of this initiative, Knorr-Bremse will be a driving force behind no fewer than nine pioneering technology-focused projects.



A whole raft of new technologies is required to ensure that rail transportation of passengers and freight plays an even more important role in tomorrow's environmentally-friendly mobility solutions. Under the auspices of Europe's Rail Joint Undertaking (ERJU), the European Union and the European rail industry are preparing to make these technologies market-ready. The scheme brings together major operators and vehicle manufacturers, system suppliers like Knorr-Bremse, research institutes and transport infrastructure specialists, enabling them to pool their expertise and accelerate progress. Here is a brief overview of the projects Knorr-Bremse's R&D departments will be working on as part of the ERJU:



## Flagship Area 1

**Mobility management in a multi-modal environment and digital key technologies**

### Federated dataspace

Drawing up an overall design concept for a joint dataspace ecosystem for the European rail system. This project is also intended to establish interfaces with related areas within the mobility sector, based on standards designed to facilitate independent, frictionless data exchange.



## Flagship Area 2

**Train systems – from digital to automated operations**

### Reproducible Braking Distance (RBD)

Developing a significantly improved braking system that ensures punctuality and short journey times, even under extreme climatic conditions. The objective is to achieve proof of concept on a demonstrator train.

### To be followed by: Integrated Adhesion Management

This project focuses on algorithms for brake control units, including adhesion management systems and new hardware. It should also help to identify the scope for increasing transport capacity by introducing these new systems.



## Flagship Area 3

**Comprehensive, integrated asset management for the European rail system**

### Integrated Asset Management

Developing a condition-based monitoring algorithm designed to optimize wear and performance models. This work is intended to culminate in a new approach to condition-based maintenance for all rail systems.



## Flagship Area 4

**Sustainable, green rail systems**

### Green Refrigerants

Developing new technologies for the use of halogen-free and low-GWP refrigerants in rail transportation. The project will cover every relevant step of the process, from HVAC design to refrigerant manufacturing and field testing.

### Air quality for healthy environment

Testing technologies designed to provide effective protection against particulate, viruses, bacteria and volatile organic compounds on trains under real-life conditions. It will be crucial to ensure that the system does not generate any damaging by-products, such as ozone.

### Electro-mechanical braking system (EM-Brake)

Designing and testing an electro-mechanical brake system suitable for approval, including the power supply and safety plan, prior to conducting field testing on a vehicle.



## Flagship Area 5

**Transforming European freight traffic**

### Digital Automated Coupling Type 5

Assembling automatic couplings that can connect and separate mechanical, pneumatic and electric systems on the vehicle.

### Digital Freight Train

Developing a range of brake control units for use with digitally interoperable freight trains, incorporating multiple features. These should include train integrity systems, automatic brake testing and a remote-controlled parking brake.

## clean[air] for new RENFE trains



**ROOF-MOUNTED HVAC UNIT**  
SRM40/20/air for double-deck trains

The Spanish state railways RENFE (Red Nacional de los Ferrocarriles Españoles) are strengthening their local transport fleet with two major orders. In both of them, components of the innovative clean[air] concept from the Knorr-Bremse company MERAK for clean and safe air are used.

Specifically, the RENFE orders are for 152 six-car units from Alstom's Coradia platform and 59 commuter train sets from Stadler. These are both high-capacity trains that can transport more passengers than the vehicles previously used, in order to relieve the Spanish railway hubs.

From the point of view of the air conditioning systems, both projects are challenging: Systems for "single" and double deck variants are supplied – combining high cooling capacity with optimized performance in terms of noise and energy efficiency.

All systems include MERAK's clean[air] technology for improved air quality. Additionally, the Merak Long Life Filter (MLLF) installed in all units provides a service life up to four times longer than that of standard filters with the same size for equivalent performance.

## Merak's custom[air] reaches Sustainability Award finals



Left to right: Georg Jorke (Sustainability/Ecodesign Specialist, Knorr-Bremse Rail Vehicle Systems), Rafael Querencias (Development Engineer, Merak) and Jörg Bober (Senior Specialist Brake Systems Design & Standards, Knorr-Bremse Rail Vehicle Systems) at the Sustainability Congress awards ceremony in Berlin on October 20, 2022

In today's world, sustainable supply chains, production systems and products are a must. This was the message put across by the organizers of October's Berlin Sustainability Congress, where they held their first ever Sustainability Awards. Merak's new custom[air] concept was a finalist in the Research & Development category.

The configurator app takes a whole-system approach, calculating the CO<sub>2</sub> emissions, onboard air quality and total operating cost of customized HVAC solutions. It includes various different green[air] and clean[air] technologies as well as representative climate data for the location where the system will be used. The app finds the optimal configuration to meet the customer's sustainability and health and safety requirements as closely as possible.

## Knorr-Bremse and Thales seal cooperation deal



**KNORR-BREMSE AND THALES** sign collaboration agreement on innovative solutions for automated freight train operation.

Automatic Train Operation (ATO) promises to deliver multiple benefits for the rail freight sector, including greater efficiency and capacity, energy savings, performance enhancements and improved punctuality. The latter, in particular, depends on smooth, consistent driving based on factors such as track characteristics, topography and surrounding traffic, as well as train-specific parameters.

At present, many of these factors are still monitored manually, but digital and automated functions can significantly improve how they are tracked and utilized. By using sensor-based, real-time data, for example, new features can deliver intelligent insights to train drivers and help them to devise optimal driving strategies based on tried-and-tested driver informa-

tion systems. The key is a smart combination of Thales track and train signaling technology and safety-critical on-board elements such as Knorr-Bremse braking systems.

"The partnership agreement we have signed with Thales has enormous potential for bringing about the innovations required to enable safe and smooth automatic train operation," said Dr. Nicolas Lange, Chairman of the Management Board of Knorr-Bremse Rail Vehicle Systems, on the occasion of the signing of the agreement. "Even though fully autonomous operation is still work in progress, the necessary technologies – including ATO solutions – are maturing rapidly," adds Dr. Yves Joannic, Vice President Main Line Signaling and Managing Director Ground Transportation Systems at Thales Germany. "The aim is to work together to boost the development of automated train functions in the freight market."



# Four highly successful days

September 20 saw the long-awaited opening of InnoTrans 2022. Over the next four days, the Berlin Exhibition Center was the top meeting place for the global rail industry, with over 3,000 exhibitors and some 140,000 visitors from more than 130 countries. And at the center of it all was Knorr-Bremse.



## Knorr-Bremse at InnoTrans 2022

The idea underlying the Company's highly popular exhibition booth was the Future of Mobility, with a main focus on optimizing the rail industry's ecological footprint, improving traffic flows, and increasing the efficiency of train operations and maintenance processes. A crucial role for the future of the rail sector is going to be played by smart solutions based on networkable sub-systems, functionalities, services and applications that can be tailored to individual requirements.





# Welcoming customers and policymakers

**“The reason customers put their faith in us is our combination of expertise and reliability.”**

Dr. Jürgen Wilder, member of the Knorr-Bremse Executive Board with responsibility for the Rail Vehicle Systems division

Executive Board Member Dr. Jürgen Wilder shows Dr. Roland Busch, CEO of Siemens AG (r.) a round the Knorr-Bremse booth.

Specialist discussion with Dr. Richard Lutz, CEO of Deutsche Bahn AG (r.)



Anna Vaschenko (Senior VP Sourcing) of the Skoda Group with Torsten Grunwald Vice President Global Sales Original Equipment



The EM brake generated considerable interest among technical specialists and journalists at the daily World Innovation Tours.

Dr. Jürgen Wilder (l.), receives Dr. Volker Wissing, Federal Minister for Digital and Transport (r.).



Christian Bernreiter, Bavarian Minister for Building, Housing and Transport (r.), talks to Mario Beinert, Member of the Management Board of Knorr-Bremse Systeme für Schienenfahrzeuge GmbH (l.).



Michael Theurer, Parliamentary State Secretary in the Federal Ministry of Transport and Digital Infrastructure (2nd from l.) and Axel Schuppe, General Manager of the VDB (r.).



Henrik Hololei, Director General for Mobility and Transport (DG MOVE) at the European Commission (2nd from r.)



Tino Schopf, State Secretary in Berlin Senate Department for Economics, Energy and Public Enterprises (l.)



Left to right: Dr. Jürgen Wilder, Martin Ertl, Dávid Vitézy, State Secretary in the Hungarian Ministry of Technology and Industry, responsible for transport policy, Dr. Zoltán Pafféri, CEO MÁV Group Hungary



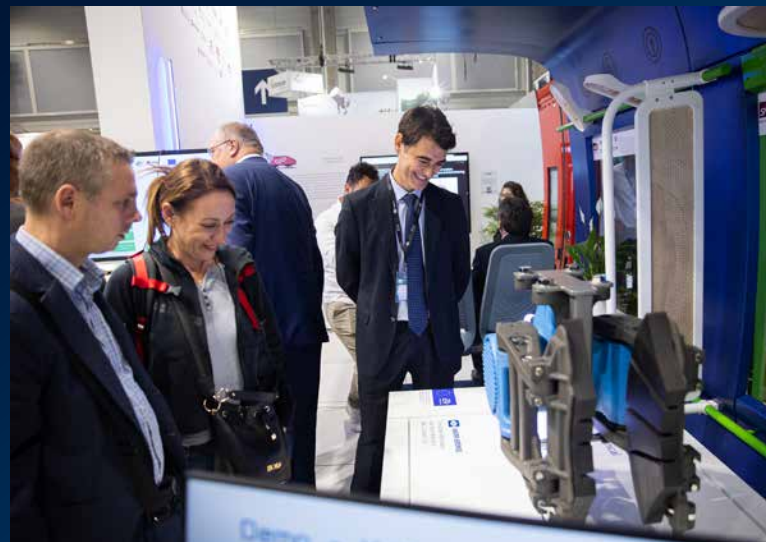
# Products and systems for tomorrow's rail vehicles – available today from Knorr-Bremse

With AirSupply Smart, Knorr-Bremse has achieved a paradigm shift in air supply, with compressed air delivered according to demand, depending on vehicle load, speed and braking processes as well as operating data and ambient conditions. The advantages are less noise pollution for local residents and lower costs for fleet operators.



The new LifeDrive (Linear motor IFE Drive) has two independently operated door leaves – a huge advantage for tightly scheduled trains. If passengers on crowded platforms are able to enter and leave a train faster, it can also depart faster. Door opening is contactless.

Bring together your operational landscape: The key to smart rail vehicles lies in smart sub-systems that rely on data from digital technology within the systems themselves. Combined, if necessary, with relevant traffic and infrastructure data, a comprehensive pool of information can be created in the Cloud as a basis for developing customized services and functions.



Reliable, convenient sanitary systems are crucial for on-board passenger comfort. Evac, the Group brand for fully integrated sanitary systems in passenger trains, exhibited an example of the toilet cabin of the future.



The LEADER driver information system is an example of smart functionality from Knorr-Bremse's range of applications. It utilizes information about the train's configuration, as well as its route, schedule, current speed and position as determined by GPS, to calculate the most energy-efficient way of driving it at any given moment. In an ideal case it can also take current traffic conditions into account.



Knorr-Bremse made a guest appearance with the EM Brake as part of the Europe's Rail Joint Undertaking (ERJU) presence at the trade fair.



By entering the market for coupling systems, Knorr-Bremse is combining its claim to market leadership in innovative rail transportation solutions with a tradition of coupling manufacture. With its Digital Automatic Coupler it has created the basis for a Digital Freight Train (DFT) that will make rail freight logistics faster, more flexible and easier to plan.





Left to right:  
**TORSTEN GRUNWALD**  
 (Vice President Global Sales  
 Original Equipment),  
**MARIO BEINERT**  
 (Member of the  
 Management Board,  
 Knorr-Bremse Systeme  
 für Schienenfahrzeuge  
 GmbH) and  
**FRANK UDER**  
 (Vice President Global  
 RailServices, R/RS)

## In conversation with Mario Beinert, Torsten Grunwald and Frank Uder

After a four-year break, the global rail industry trade fair InnoTrans returned to Berlin at the end of September. Our three colleagues talk about how the event went from a Knorr-Bremse perspective.

**Mr. Beinert, how would you sum up Knorr-Bremse's first major trade fair in four years?**

**Beinert:** The Company's presence there had a really modern and exciting feel to it. We put our customers' needs at the center, and divided our solutions into four key areas: Ecological Footprint, Traffic Flow, Train Operations & Maintenance and, running through everything, Smart Solutions in the shape of applications, functions and services. Our innovative booth showcased innovative solutions for high-quality, modern rail transportation.

**The many face-to-face conversations between industry representatives, policymakers and customers are another important part of a major trade fair like this. But quantity isn't always quality...**

**Uder:** ... that's why the high level of the conversations is one of my abiding memories of the event. There's an optimistic mood in the industry at the moment. People

are genuinely interested in solutions that can make rail transportation even greener, as a real contribution to the development of a truly sustainable transportation system. There are all kinds of ways of cutting energy consumption and emissions and increasing efficiency in every aspect of a train's operation...

**... such as?**

**Grunwald:** One example is our Reproducible Braking Distance concept for reducing train headways. Then there are the new entrance systems that enable faster boarding and disembarking. Our Digital Freight Train innovations are making it easier for rail to compete with road for freight transportation. And we are already field-testing our EM brakes, which have yet to be used in mainline rail operations. These will lead to a paradigm shift. They will be the main enabler of the Airless Train – a train that does away with the complex system of compressors, compressed air tanks, pressurized air lines and hydraulics.

**One thing that stood out in Berlin was the extent to which digitalization and automation solutions have become a reality.**

**Uder:** The industry is making huge strides in this area. Digital functionality and smart services are the key to future-proof rail operations. And Knorr-Bremse is at the forefront of these developments. For instance, we are reducing vehicle downtimes through ingenious process optimizations, and using remote diagnostics and predictive maintenance to extend life cycles. At a time of spiraling energy prices and increasingly demanding environmental standards, our Energy Saving Services are also becoming more and more important. This message came across loud and clear from our customers at the trade fair.

**Grunwald:** It's important to stress that it's not about selling the customer a pre-configured system. There simply isn't one standard solution that works for everyone. Our industry is far too diverse for that. That's why we allow our customers to configure their own, optimal solution from the products, systems and services in our asset ecosystem.

**Beinert:** This is why trade fairs like InnoTrans are so important. Putting together the right package isn't straightforward, especially if you're trying to do it on a shared computer screen. You need to discuss everything in detail. The customer tell us their needs and we bring our expertise to the table. We then work together to create a custom solution. A trade fair booth that showcases our assets is the perfect place for this type of conversation.

**What's the next step after that?**

**Beinert:** We invited our customers at the booth to "Get into the Flow." This "flow" must be deeply and firmly anchored in the day-to-day business of the rail industry. The best way to do this is by implementing new technologies in concrete projects: getting them on the rails, so to speak. There has never been a better time to do this. Trains are the most sustainable mode of transport per capita or per tonne of transported goods. So I have no doubt that the future belongs to rail!



Left to right: Uwe Weyhing (RPB Rückert), Dr. Julia Kramer (Oliver Kahn Foundation), Johanna Sprenger (Wirtschaft kann Kinder e.V. and CG Elementum), Barbara Lipka (covivio), Ulrich Schmidt (Mitte District Office), Jasmina Srna (Safe-Hub Germany), Sükram Altunkaynak (Pankstraße Neighborhood Management) and Andreas Mamsch (Knorr-Bremse) at the groundbreaking ceremony in Berlin.



# Supporting local projects

Last year saw Knorr-Bremse Global Care continue to deliver numerous aid projects. Initiatives in Lviv, Aldersbach and Berlin represented glimmers of hope for a better world.

## Offers of help to Ukrainians

Knorr-Bremse Global Care has close ties with the city of Lviv in western Ukraine, where it has been supporting an orphanage and training center for several years. During the summer, the building took in and cared for 260 refugees from within Ukraine – mostly women, children and the elderly. Knorr-Bremse Global Care supported this work by funding food supplies and providing medical assistance and counseling. Leisure activities were organized for the children when it was safe to do so.

At the start of the war, Aldersbach in Bavaria provided a temporary home to 29 refugees from Ukraine, along with counseling and twice-weekly German classes. The Knorr-Bremse management team offered the use of its Hofgut Eck conference center for this purpose.

## About Knorr-Bremse Global Care

Knorr-Bremse Global Care is a global non-profit organization that supports projects run by partners in three areas: water, sanitation and hygiene (WASH); education; and emergency relief. Promoting the independence and individual responsibility of people in need are key objectives. Knorr-Bremse Global Care works primarily in countries with Knorr-Bremse sites, so that it can maintain direct contact, wherever possible, with the projects it supports, raise awareness of social causes among its employees and motivate them to play an active role themselves. The Knorr-Bremse Group supports Global Care through regular donations – just one of the ways the Company practices corporate social responsibility.

**KNORR-BREMSE**   
global care

## Safe Hub program for up to 3,500 young people in Berlin

At the end of June, Global Care, the Oliver Kahn Foundation, CG Elementum and the AMANDLA non-profit organization jointly held the groundbreaking ceremony for Europe's first Safe Hub education and sports campus, in the Berlin district of Wedding. Safe Hubs are places where equal opportunities and cooperation are a reality – where young people receive holistic support so that they can realize their potential.

They are based on a partnership approach: NGOs work with public and private-sector organizations and receive professional support from role models within the Safe Hub community. The current plan is to enable up to 3,500 young people to access Safe Hub programs at the Leopoldplatz site each year.



# Close to the action – now also in Scandinavia

Knorr-Bremse recently acquired DSB Component Workshops from Danish train operator Danske Statsbaner (DSB). The new one-stop shop represents a significant expansion of its service partner portfolio for customers in northern Europe.

**DSB COMPONENT WORKSHOPS** specialize in maintenance (e.g. of bogies), repairs and supply of parts and components for train, car and locomotive sub-systems.



“Wherever our customers are operating their rail vehicles – we always strive to offer them a comprehensive range of services, from fast repairs to high-quality maintenance and overhauls,” explains RailServices Vice President Frank Uder. “That is why acquisition of this component and spare parts specialist fits so perfectly into our ‘one-stop shop’ strategy, with its focus on excellence, efficiency and availability.”

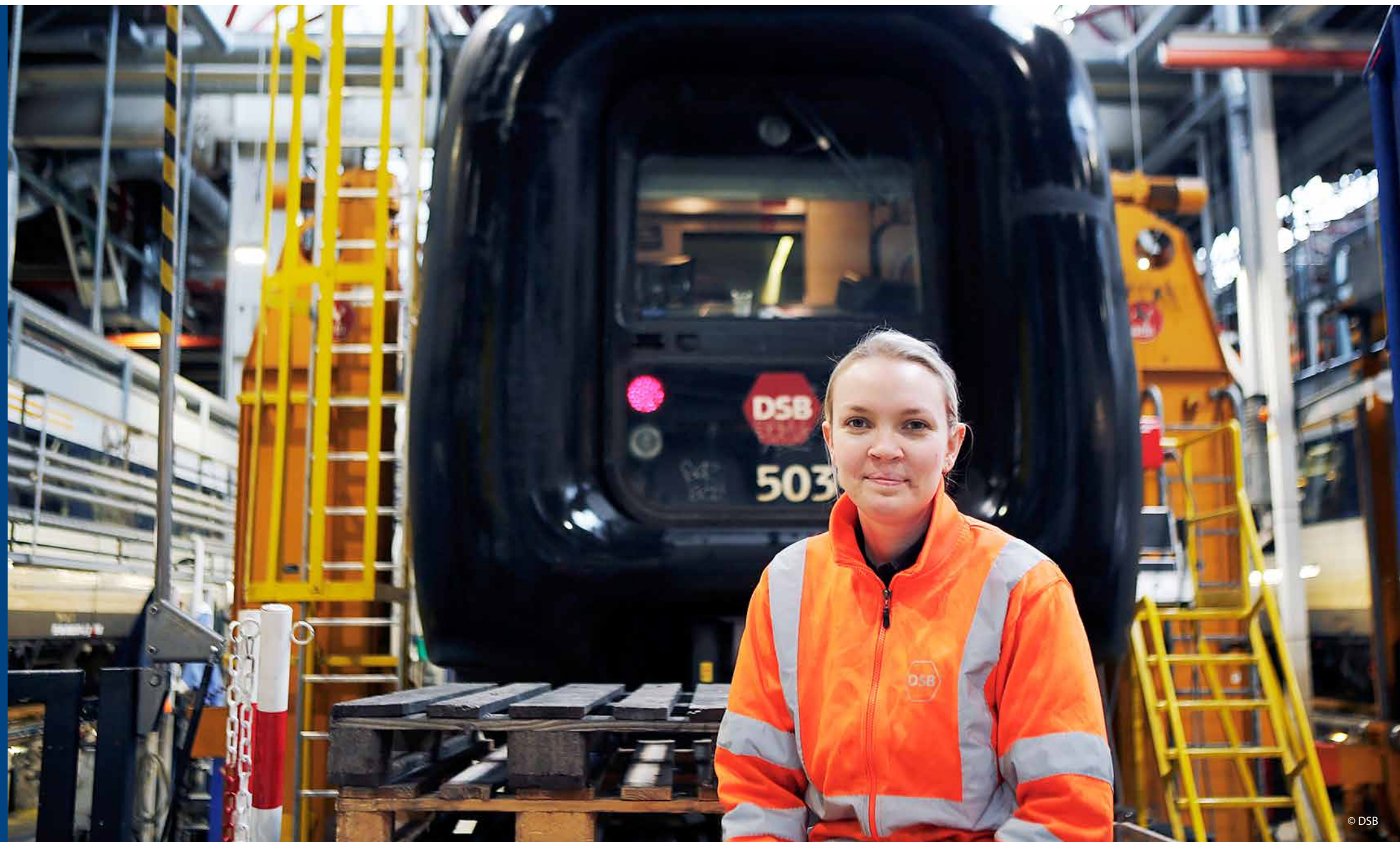
With this expansion, RailServices – the umbrella under which Knorr-Bremse bundles its aftermarket activities for the rail industry – is creating an expanded service hub, Knorr-Bremse Rail Systems Denmark A/S, to offer innovative local services in yet another region.

#### Only a few hours away: many Scandinavian operators and rolling stock companies

“High-quality services are some of the most critical criteria for smooth-running rail operations”, says Jonas Samuelson, Managing Director of the Vehicle & Component Services regional business unit. Our whole team is focused on and enormously motivated by this priority.” DSB Component Workshops currently employs around 400 full-time staff at five sites in Aarhus and Copenhagen, and DSB itself relies extensively on the new hub in the form of long-term maintenance contracts.

But the focus goes beyond Denmark: Given the increasing deregulation of Nordic rail markets, the acquisition represents an exceptional opportunity to provide high-quality services to other operators and rolling stock companies in Scandinavia. After all, their fleets operate just a few hours away from Knorr-Bremse’s new Danish service hub.

**WITH DSB COMPONENT WORKSHOPS** Knorr-Bremse is establishing an extended service hub for Denmark and the neighboring rail markets.





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**IN BADEN-  
WÜRTTEMBERG**  
Knorr-Bremse is  
to install braking,  
entrance, HVAC and  
sanitary systems on  
130 Alstom-built  
regional trains.

# Selected supplier until 2025

**Knorr-Bremse has been chosen as a systems supplier for Alstom's Coradia Stream train platform. The Munich-based specialist will be responding to call-offs from the new Alstom platform until at least the end of 2025, supplying braking, entrance and HVAC systems. The first of these systems have already been ordered.**

A particular feature of Alstom's Coradia Stream regional train platform is its sheer flexibility. The interior layout and seating arrangements are customizable, so that operators who serve many long-distance routes have the option of reducing standing room to fit more seats. The interior can also be adapted to suit the season or meet specific needs, for example by fitting bicycle racks, ski racks and additional power outlets. At the same time,

generously proportioned windows ensure maximum comfort, space and light.

A closer inspection of the Coradia Stream platform reveals a range of products from Knorr-Bremse's three specialist areas – braking systems, entrance systems and HVAC units. Under the terms of the new framework agreement, Knorr-Bremse will be delivering these as a selected supplier until at least 2025.

## **Unabated demand for clean, reliable, high-availability rail transportation**

When it comes to braking systems, Knorr-Bremse has developed a number of project-specific electro-pneumatic versions, including the oil-free PistonSupply Eco compressor, flexible FlexControl Modular brake control and SysControl brake electronics, as well as magnetic track brakes and sanding systems. Group brand IFE is contributing reliable, weight-optimized, maintenance-friendly entrance systems, while Merak, the Group brand for integrated HVAC solutions, is supplying energy-efficient, modularly scalable air conditioning systems. The entrance and HVAC systems have also been tailored to meet the platform's specific requirements.

As Dr. Nicolas Lange, Chairman of the Management Board of Knorr-Bremse Rail Vehicle Systems, comments: "The demand for clean, reliable, high-availability rail transportation in Europe continues unabated, particularly in view of the impending shift in mobility modes." Alstom's Coradia Stream and the sub-systems provided by Knorr-Bremse show that both companies

have bought into this trend. Dr. Lange also stresses how important the agreement is for the future of Knorr-Bremse as a whole: "It is about more than just continuing a decades-long partnership with Alstom. It also cements our position as a major partner for important and prestigious platform projects."

## **First orders already received**

In addition to its current orders for Coradia Stream vehicles, Knorr-Bremse is already participating in several platform call-offs under the new framework agreement; for example, the company will be responsible for equipping electric locomotives for Italy's Trenitalia and Romanian operator ARF. Danish rail operator DSB has also signed a framework agreement with Alstom, including an initial order for 100 trains. They will be joined in the order book by 34 trains for Deutsche Bahn's "Expresskreuz Bremen" route, 29 for RB Regio AG's Kinzigtalbahn, and another 17 for the Main-Weser regional network.

The most recent order for Coradia Stream has come from German rolling stock specialist Landesanstalt Schienenfahrzeuge Baden-Württemberg (SFBW), which ordered 130 double-decker models last May. The contract also marks the first major order for the new global Evac brand for the Coradia Stream platform. Knorr-Bremse is also supplying three fully-integrated sanitary units per trainset.



# Two milestones for digitalized freight transportation



KNORR-BREMSE AND HAVELLÄNDISCHE EISENBAHN are working together on trialing the automatic brake testing system in a freight train.

**Knorr-Bremse's automated brake testing solution is about to be field-tested on a Havelländische Eisenbahn freight train, while the first Digital Automatic Coupler (DAC) prototypes have also now been assembled.**

These are two recent milestones achieved by Knorr-Bremse's R&D departments that are absolutely key to the digitalization and automation of the European rail freight sector – where most trains are still operated manually.

#### **Tablet-based automated brake testing from the driver's cab**

Knorr-Bremse is partnering with Havelländische Eisenbahn (HVLE) to install a DAC automation system on a freight train in order to enable automated brake testing. Known as FreightControl within Knorr-Bremse, the system comprises an innovative electronics solution that combines centralized railcar intelligence with braking system sensors. Because the HVLE train is not yet equipped with a DAC, it does not have a train-wide data bus. Instead, the brake testing signal is transmitted wirelessly. The field test train will be retrofitted in 2023 and is due to enter service in 2024.

The trial promises to deliver valuable insights into the potential benefits of automated brake testing in the rail freight sector. Currently, brake testing on over 500,000 freight cars in Europe is still carried out manually, making it an exceptionally time-consuming step in the set-up process. Automated testing enabled by FreightControl and carried out from the driver's cab using, for example, a handheld tablet will significantly reduce the time needed to ready freight trains for departure.

Knorr-Bremse will also use the trial to accelerate the development of its train automation system. As well as automated brake testing, the system includes other interoperable functions such as train composition recognition, train integrity monitoring, brake monitoring and electro-pneumatic braking. In conjunction with the DAC, it will form a powerful package of precisely synchronized solutions for digital freight trains.

#### **Advanced DAC version due to start trial on test train**

Major advances have also been made in the development of the DAC (FreightLink), and the first prototypes have now been assembled at the main plant in Budapest. Made of special steel, the coupling system can withstand enormous torsional and longitudinal forces. It is also designed for efficient maintenance and optimized life cycle costs. FreightLink performs two main functions on the train itself: On the one hand it acts as an enabler of onboard automation functionality and on the other it makes digital services possible, such as smart maintenance and ancillary services using big data analytics in the cloud.

The latest FreightLink version was put through its paces on the test rig in the summer and fall. The next testing phase is scheduled to start before the end of the year. A more advanced version will be installed on a train for field testing as part of the Europe's Rail Joint Undertaking (ERJU) initiative.



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 **KNORR-BREMSE**

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 **NEW YORK AIR BRAKE**

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 **IFE**

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 **MERAK**

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 **MICROELETTRICA**

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 **SELECTRON**

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 **KIEPE ELECTRIC**

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 **EVAC**

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