Press release
Munich, September 14, 2022

Smart Solutions for the rail industry: Knorr-Bremse showcases digital process and product landscapes at InnoTrans 2022

- **Knorr-Bremse acts as enabler and multiplier, actively supporting and assisting customers through the rail sector's digital transformation**

- **Higher vehicle availability, with improved sustainability, safety and efficiency – smart digital systems, data-driven tools and intelligent services can achieve these industry objectives**

- **Partnerships with high-tech firms are accelerating the development of solutions**

Munich, September 14, 2022 – Train manufacturers and operators are asking for smart solutions and applications – and Knorr-Bremse is providing customers with the support they need to negotiate the rail sector's digital transformation. Just exactly what solutions Knorr-Bremse is delivering to enrich the industry's process and application landscape will become clear at InnoTrans 2022 (Main Hall 1.2, Booth 250).

Dr. Jürgen Wilder, Member of the Executive Board of Knorr-Bremse AG and responsible for the Rail Vehicle Systems division, is well aware of the potential of digitalization for the industry as a whole: "We regard ourselves as a facilitator and multiplier, actively supporting our customers through the digital transformation. To make the most of these digital opportunities, we're systematically developing digital solutions, as well as new products and services based on our already highly successful core business. Customers are already experiencing the tangible benefits of these developments in their day-to-day operations."

Technologies for the Internet of Things (IoT), coupled with growing automation and data usage, are the drivers powering Knorr-Bremse's developments. The result is a range of smart products and services that all contribute to the company's declared goals: dynamized **Traffic Flow**, improved **Ecological Footprint** and accelerated **Train Operations & Maintenance**.

Establish and exploit a process ecosystem for digitalization
A rail vehicle is only as intelligent and safe as its subsystems. Increasingly, Knorr-Bremse is making these subsystems capable of capturing data, which is then analyzed in the cloud, along with other traffic- and infrastructure-related data. More and more of Knorr-Bremse's smart applications are drawing their intelligent functionality from this pool of data.

This is how, for example, the train cybersecurity systems produced by Knorr-Bremse brand Selectron meet the high security standards demanded by customers. **Defense-in-depth concepts** coupled with the company's **Threat Detection Solution** anti-risk architecture and connected to the central Train Control and Management System (TCMS) – a kind of smart switchboard for all train subsystems – all work together to ensure that vehicles operate securely. In this established, well-protected process ecosystem, vehicle manufacturers and operators can configure an **application landscape flexibly tailored** to their own fleets.

Partnerships with startups are boosting digitalization and product innovation
Comprehensively digital in thought and deed, startups and young high-tech firms are pushing forward the development of end-to-end solutions for the transportation industry with their agile working methods and – often highly specialized – expertise in software and AI. Seeking to make the most of the long-term opportunities for the rail industry of this shared technology and innovation, Knorr-Bremse has interests in several such companies.

Rail Vision in Israel is working with Knorr-Bremse on AI-based environmental observation and object detection systems for automated train operation (ATO). Using electro-optical sensors, trains can detect infrastructural objects or damage and identify obstacles up to two kilometers away. One of the partners' main objectives is the **intelligent networking of sensor systems with braking systems**; very soon, it will be possible to trigger the latter automatically whenever sensors detect objects on the track or other potential hazards.

Railnova in Belgium supplies telematics solutions and maintenance software to the rail industry. The smart software for optimizing rail fleet maintenance processes is already used on more than 3,000 networked locomotives and trains. A new remote diagnostics tool, as well as real-time monitoring of fleet operating data, will make vehicles even easier to maintain and consequently even more available.

Nexxiot in Switzerland equips railcars and containers with IoT technology, turning them into networked assets (systems). In the future, Nexxiot's IoT technology could enable more than 100,000 of the systems supplied annually by Knorr-Bremse to link up to Nexxiot's **(cloud-based) infrastructure**. It should also be possible to network a similar number of existing, operational assets by means of upgrades and retrofits. The resulting data-driven insights form the basis of Knorr-Bremse's digital business models. How does this add value for customers? Trains become more available, life cycle costs are optimized, and efficiency is vastly improved.

Where to find Knorr-Bremse: Main Hall 1.2, Booth 250
"Get into the Flow" is the banner under which Knorr-Bremse will be taking InnoTrans visitors on an all-embracing tour of connected solutions for sustainable, efficient rail transportation. At the company's central booth in Main Hall 1.2 (Booth 250), Knorr-Bremse has packaged its solutions and systems into four solution spaces. Each space is based on key customer and market imperatives: Ecological Footprint, Traffic Flow, and Train Operations & Maintenance. The fourth solution space – **Smart Solutions** & Application Landscapes – is the all-pervasive loop that runs through and brings together all the other spaces.

Captions:

Digitalization and automation are the core drivers of the rail sector's transformation. | © Knorr-Bremse

Digital products and services can improve rail operators' Traffic Flow, Ecological Footprint and Train Operations & Maintenance. | © Knorr-Bremse

Knorr-Bremse (ISIN: DE000KBX1006, ticker symbol: KBX) is the global market leader for braking systems and other systems for rail and commercial vehicles. Knorr-Bremse's products make a decisive contribution to greater safety and energy efficiency on rail tracks and roads around the world. About 30,500 employees at over 100 sites in more than 30 countries use their competence and motivation

to satisfy customers worldwide with products and services. In 2021, Knorr-Bremse's two divisions together generated revenues of EUR 6.7 billion. For more than 115 years, the company has been the industry innovator, driving developments in mobility and transportation technologies with an edge in connected system solutions. Knorr-Bremse is one of Germany's most successful industrial companies and profits from the key global megatrends: Urbanization, Sustainability, Digitalization and Mobility.

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