

A special edition from

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DIE ZEITUNG FÜR TRANSPORT, LOGISTIK UND MANAGEMENT



SPECIAL

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AUTONOMOUS DRIVING

The digital revolution
opens up new horizons

INTERVIEW

Karlsruhe tests the
commercial vehicles
of the future

TRUCK RACING

Jochen Hahn wants
title number five

KNORR-BREMSE



GUNNING FOR A FIFTH TITLE

Truck racing: In his first year in his new truck, Jochen Hahn still managed to finish second in the 2017 European Truck Racing Championship. Having completed the technical fine-tuning during the winter, his sights are firmly set on winning a fifth title in 2018.



Same again in 2018, please: Jochen Hahn out in front of his truck racing rivals.

Jochen Hahn is certainly not going to forget the 2017 European Truck Racing Championship in a hurry. It was a season of remarkable victories and bitter setbacks for the racer from Altensteig. In the end, the four-time European champion drove his new Iveco truck to a tremendous second place in the overall standings.

In Hahn's opinion, the championship was decided early on in the season: "We had a few technical issues during the second race weekend in Misano. We realized that the vehicle was still at the development stage." But the streetwise Hahn didn't panic and used all his years of racing experience to stay in touch with

his rivals. His partnership with Knorr-Bremse proved invaluable: "Knorr-Bremse has been one of our partners right from the beginning. The solutions we have developed together have played a huge part in our success, and the great thing about our know-how is that we can apply it to different makes of vehicle."

Hahn is delighted to have secured the runner-up spot in the 2017 championships. "We achieved everything we set out to. Right from the outset, we knew that our focus in 2017 would be on developing and testing the vehicle. Consequently, over the course of the winter we have once again pooled all the know-how that we and our partners have built up.



The priority during the 2017 season was to continue the technical development of the new truck.

I am certain that we have made a big stride forward." As a result, Hahn's goal for the new truck racing season which starts at the end of May is quite simple: "We want to be the European champions again!" However, this doesn't mean that he will be underestimating the competition: "All of the top five from

Rivals and friends: Hahn has nothing but admiration for the achievements of his fellow drivers.

last season are outstanding drivers with huge experience." The 2018 season kicks off in Misano, Italy, on 26 May. So don't forget to keep your fingers crossed for Jochen Hahn. If he wins his fifth European title, no one will be able to deny him his place in the truck racing hall of fame.

DEAR READER,

The commercial vehicle world is in the grip of epochal change. For years, safety and fuel efficiency were the definitive topics, but for some time now new developments have been driving innovation in our industry: Electrification, networking, and autonomous driving are set to bring radical change to the trucks and the entire transport sector of the future.

Knorr-Bremse has deliberately focused its product portfolio on pioneering, future-oriented technologies. Today, with products like the emergency braking system AEB, the telematics solution ProFleet Connect or In Motion Charging (IMC), the dynamic charging system for trolleybuses, we already offer central elements for the commercial vehicles of tomorrow. We have a report on this in our cover story.

The Baden-Württemberg test area for autonomous driving in Karlsruhe allows vehicle systems to be scientifically tested and developed for automated and connected driving in real road traffic conditions. One of the main areas of interest is commercial vehicle traffic. In our interview, Professor Eric Sax, director of the information science research center FZI in Karlsruhe, explains the numerous advantages of autonomous driving in terms of safety and cost efficiency.

Even though this year's Knorr-Bremse Special has a brand new layout, it would not be complete without one familiar face: Jochen Hahn. Together with the four-time European champion we take a look at his goals for the new season, and at least this much can be revealed: He isn't going to settle for second place again this year.

I hope you enjoy reading this new edition of Knorr-Bremse Special

Bernd Spies



Bernd Spies, Chairman of the Board of Management of Knorr-Bremse Systeme für Nutzfahrzeuge GmbH

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NEW HORIZONS

Commercial vehicles: Electrification, networking, and autonomous driving are the trends set to dramatically change the vehicles and in fact the entire transport sector of tomorrow.

Unmanned and silent, the battery-driven delivery vehicle draws up. The drone accompanying it whizzes off and takes the parcel to its destination. Far away, the recipient can go online to keep track of how their smart home is directing the consignment to its allocated spot.

All up in the air? Technically speaking, all this would be within the realms of possibility even today. But forecasts vary on precisely when such scenarios will actually become part of our everyday lives. One thing is certain, however: The transport sector is undergoing far-reaching changes. Dr. Peter Laier, Member of the Executive Board of Knorr-Bremse

AG responsible for the Commercial Vehicle Systems division, describes the change like this: "After many years in which the main focus was on safety and fuel efficiency, automated driving and telematics are the new drivers of innovation in our industry."

Electrification, networking and autonomous driving are the trends set to make their mark on mobility in the future, and they will change it dramatically. Passenger and freight transportation will be not only more sustainable, but also safer and more effective. And these trends are the gateway to new activities and business models.



ProFleet Connect is designed for trucks and trailers of all brands.

TRUCKSERVICES PROFLEET CONNECT

One of the greatest attractions of this telematics system for fleet operators is the diversity of its possible applications: "ProFleet Connect is a brand-independent telematics solution for truck and trailer units," explains Frank Merwerth, who has project responsibility for ProFleet Connect at Knorr-Bremse Truck Services, and adds: "Thanks to the modular design, with a basic package and up to six additional packages, the system can be individually adapted to specific customer requirements." The spectrum ranges from telephone and navigation functions, through real-time tracking of deliveries and their documentation, to monitoring of the vehicle's condition, for example for refrigerated trucks. All this brings substantial benefits for the customer in the form of optimized vehicle coordination and utilization, lower administrative costs, and driver coaching for an optimized driving style. This results in higher efficiency for the fleet as a whole.

ProFleet Connect was developed by Knorr-Bremse in conjunction with the British company Microlise, which specializes in telematics solutions for commercial vehicles and already has more than 300,000 of these systems in operation.

Take electrification, for example: For urban areas in particular, whose growth continues unabated all over the world, electric-drive vehicles are seen as the silver bullet for reducing traffic-related health threats. This widely held belief is reflected in the rapidly increasing demand from municipalities for electrically powered urban buses, and also in the vehicle manufacturers' intensive development initiatives for all-electric delivery vehicles.

When it comes to freight traffic in general, the urban environment in particular – the "last mile" – is where very strong growth is anticipated. The main driving forces behind this development are likely to be the continuing growth of e-commerce and customers' ever higher expectations. This poses new challenges for both logistics suppliers and the manufacturers of the vehicles they require: Higher sustainability is called for from the vehicle industry. And a study has formulated the prospects for logistics as follows: "The consumers increasingly want to determine the delivery parameters for products and services themselves. They want customized deliveries to a specific location at a time of their choosing."

Connectivity and automation: Many experts see these factors as the key to meeting these challenges. According to them, "the need to facilitate deliveries on the same day or even within the hour is placing new demands on the vehicles and their connectivity." They believe that dynamic route planning will replace the conventional routine of fixed daily rounds.

This could mean that the companies' urban infrastructure will have to become denser and yet more decentralized at the same time. Data connectivity generally facilitates much better vehicle utilization and tighter controls on the flow of goods. But beyond that, connectivity is the fundamental prerequisite for the automation of driving, which is set to bring about the greatest transformations in future mobility. Platooning is one example of an application for automated driving which is already practicable: Several trucks drive close together behind the lead vehicle in a convoy in which all the vehicles are precisely synchronized



Platoons with several trucks are one application of automated driving that is already possible.

thanks to wireless coupling. This significantly reduces fuel consumption by harnessing the slipstream effect.

And there's another aspect of platooning: Connectivity plays a major part in the form of telematics. This is because it is the only way of linking up to the operator's management system, for example, or to any other software platform, and that is what facilitates effective planning of the platoon, and hence the fair distribution of the benefits it brings, in the first place. Autonomous driving has many advantages. Dr. Jürgen Steinberger, Member of the Management Board of Knorr-Bremse Systeme für Nutzfahrzeuge GmbH, cites two plus points which are already widely acknowledged: "It takes the load off the driver and increases safety on the roads." It is also anticipated that



"AUTOMATED DRIVING AND TELEMATICS ARE THE NEW DRIVERS OF INNOVATION IN OUR INDUSTRY."

Dr. Peter Laier,
Member of the Executive Board
of Knorr-Bremse AG

SAFETY DIRECT

The Safety Direct system from Bendix CVS, Knorr-Bremse's North American subsidiary, focuses on driver coaching and recording what happens in the event of an emergency. From excessive cornering speed to collision warning, this tool analyzes a total of 14 different safety-relevant parameters and summarizes the results in clearly presented evaluations. It includes a camera which records serious incidents, providing valuable help for the analysis.



The automatic Advanced Emergency Braking System (AEBS) is being optimized continuously.

SHOULD THE WORST HAPPEN

The avoidance of accidents is one of the most significant arguments in favor of automated driving. A key element is the automatic braking system AEBS (Advanced Emergency Braking System). Back in 2015 Knorr-Bremse launched a system with merged radar and camera sensor data and it is hard at work on optimizations – also including a blind spot assistant, which the driver can use to check the area alongside the vehicle via a monitor.

Knorr-Bremse is also bringing to market improvements such as braking the vehicle to a standstill (AEBS 80 to 0 km/h) and "Highway Departure Braking": If the vehicle starts to leave the roadway, the system responds by issuing a series of warnings, and then initiates braking if the driver fails to respond. If the driver changes lane to evade an obstacle, but there is yet another obstacle there too, the new Multi-Lane AEBS function kicks in: As soon as the system detects that there is also an obstacle in the alternative lane, the driver's evasive maneuver ceases to override the emergency braking function. The full emergency braking procedure is executed.

unmanned vehicles driving autonomously will increasingly be used in areas away from public roads, such as mines, for example.

What is certain is that digitalization and automation will blur the current industry boundaries and that completely new, innovative business models will take hold. Knorr-Bremse has also considerably broadened the base on which various subsystems are now being increasingly networked to achieve comprehensive systems competence.

The new Knorr-Bremse Steering Systems unit is not only a full-service provider for steering systems, but also offers a completely new development in the form of electronically controlled hydraulic steering: This forms the basis for lateral control in highly automated driving. And with TruckServices ProFleet Connect, Knorr-Bremse now offers a brand-independent telematics solution boasting universal suitability for truck and trailer alike – and thanks to its modular design it meets a huge range of requirements.

With the takeover of Düsseldorf-based Vossloh Kiepe, the commercial vehicle portfolio has been extended to include future-oriented elec-



The Highway Departure Braking function brakes the vehicle on the shoulder if LDW is ignored.

trical systems for buses, such as the In-Motion Charging technology, which combines the benefits of battery trolleybuses and streetcars.

"WE WANT TO TAKE THE LOAD OFF THE DRIVER AND INCREASE SAFETY ON THE ROADS."

*Dr. Jürgen Steinberger,
Member of the Management Board of
Knorr-Bremse Systeme für Nutzfahrzeuge GmbH*



INTERMODAL TRANSPORT

A combination of tried-and-tested trolleybus technology and high-tech batteries: That is In-Motion Charging (IMC) from Kiepe Electric. "Dynamic recharging gives e-buses a range that is virtually unlimited," says Erik Lenz, Head of Sales, Bus and E-Mobility at Kiepe Electric. Because wherever there is an overhead wire, the e-bus can not only travel by means of its current collector, but also recharge its batteries. This gives the bus a radius that goes far beyond that of the overhead wire network. The dual IMC concept is particularly suitable for long articulated or double-articulated buses in cases where either the break times are insufficient for recharging the batteries fully or the day's workload would require a bigger battery. However, the IMC concept also allows for socket charging of stationary vehicles as well as opportunity and overnight charging.



Double-articulated bus with In-Motion Charging: Sometimes running on the overhead wire, sometimes on the battery.

SMALL VALVE, BIG IMPACT

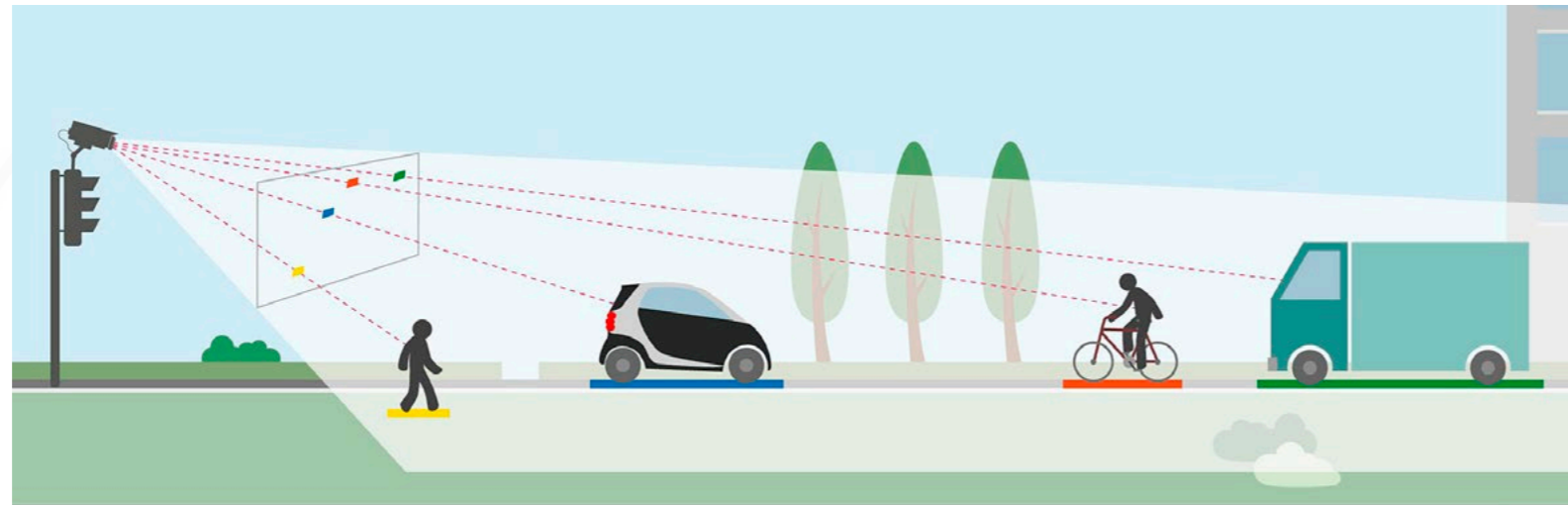
Experts say that the efficiency of diesel engines is capable of increasing from its current 45 percent to 50 percent in the long term. Air-path management is one of the key issues when it comes to optimization, and ranges from charging to exhaust gas recirculation (EGR), to engine braking. For example, the more precisely the control valve works during EGR, the greater potential there is for optimization where engine-out emissions and consumption are concerned.

Knorr-Bremse has long-standing expertise in exhaust brake valves. Knorr-Bremse's recent acquisition of the British GT Group marks a substantial extension of its portfolio encompassing valves for air path management. The GT Group are renowned specialists in this segment, with vast know-how in areas including EGR valves and air intake valves.

There are a good 600 of these buses in operation worldwide. And many more have been ordered. These vehicles are in use from Europe to the USA, where San Francisco is currently adding nearly 300 units to its fleet of IMC buses. And specifically with the requirements of electric urban buses in mind, Knorr-Bremse has also developed an innovative new screw-type compressor with an electric drive system for supplying compressed air. The screw-type compressor is perceived as being much quieter than the traditional piston variant with its pulsating background noise, making it ideal for electric vehicles.

“MORE SAFETY, HIGHER COST EFFICIENCY”

Interview: Professor Eric Sax of the information science research center FZI explains how automated driving can already have benefits today – and what we can expect in the future.



Professor Sax, strictly speaking, autonomous driving in commercial vehicles has been with us since 1981, when ABS was introduced. Where do we stand today?

Safety remains one of the key issues. However, a lot of thought is also being given to creating added value.

What exactly is meant by that?

For example, we have created a concept for an autonomous fleet depot for a public transportation company. If the buses there can go through the bus wash and then drive to the parking lot autonomously at a maximum of ten km/h, on the basis of a fleet size of 240 buses this will save approximately 250,000 euros per year in labor costs.

A lot has already happened in terms of safety – from ABS to the automatic emergency braking system. What’s coming next in this field?

There will be a successive increase in the number of assistance systems: For example, lane-keeping, road construction zone and platooning assistance. We recently presented a face-based system for vital parameter recognition via webcam at the International Consumer Electronics Show, for example. With the aid of innovative image and signal-processing algorithms, the system is capable of autonomously identifying areas of the face and deducing the driver’s fatigue or stress level. The information gathered allows conclusions to be drawn regarding individual driving behavior. Combined with modern driver assistance systems such

as a distraction warning system or a medical emergency aid assistant, camera-based measurement can make driving as a whole more predictable and therefore safer. That is a great advance on today’s attention assistance and can significantly improve the interaction of driver and vehicle.

How big will the overall safety bonus from automated driving actually be?

It is more or less comparable with the safety belt, which has saved many lives. However, a great deal will depend on the manufacturers on the one hand and the inspection organizations and the entire approval process on the other.



The autonomous bus “Olli” in service in the test area can transport eight passengers.

One of the first wider applications being discussed is platooning. What chances do you see of that?

Many people believe that it will be particularly easy to implement on multi-lane highways,



In Karlsruhe today you can have a foretaste of the traffic of the future.

because certain complicating factors like oncoming traffic are absent. I believe, however, that it will be a long time before we see that being offered by various brands, for example. In fact, I consider it more likely that we will see platooning with driverless vehicles for buses on bus rapid transit (BRT) routes.

Some people predict that we will see autonomous driving in public transport in the coming decade. How realistic do you consider that to be? What we have seen up to now are showcases. Safeguarding the systems will be a Herculean task, which won’t make for such attractive headlines, however. We can probably expect that alone to take at least five years, but auto-

“AUTOMATED DRIVING IS NOT GOING TO BE HELD BACK.”

Prof. Dr.-Ing. Eric Sax,
Director, Forschungszentrum Informatik (FZI), Karlsruhe

ated driving is not something that can be held back. It won’t be disruptive, however, but consecutive – one thing after another. And it will be driven, as it has been up to now, by safety and cost efficiency.

How will autonomous driving change the traditional division of labor in industry?

That’s an intriguing question. It is not at all certain that the existing roles will be maintained. We’re already seeing suppliers or other outside companies becoming more important. After all, now we’re going to see big data actually inside the vehicle.

When will autonomous driving reach as advanced a stage in vehicles as ABS has done since 1991?

That is impossible to predict. However, it’s a dual-track process. One powerful driving force is safety. The other is cost efficiency.



PROFILE

After graduating in electrical engineering in 1993, Prof. Dr.-Ing. Eric Sax worked at FZI Forschungszentrum Informatik in Karlsruhe till 2002.

From then until 2014 he held various management functions with MBtech Group, heading the global electrical/electronic development function at Daimler Buses for his last five years there. At the end of 2014 he returned to his roots at FZI as director of the Institute for Technology and Information Processing, where he has made a name for himself as a specialist for driver assistance systems in commercial vehicles and systems engineering among other things.

I WAS MADE FOR A LIFE ON THE ROAD. A LIFE FOR THE ROAD AND FOR PEOPLE. MILE FOR MILE. CARRYING HEAVY LOADS, DANGEROUS LOADS, ALWAYS UNDER TIME PRESSURE. SO MUCH THAT LIES BEHIND ME, SO MUCH I'VE YET TO EXPERIENCE. CITIES, HIGHWAYS, INTERSTATES, LOFTY MOUNTAINS, DEEP VALLEYS, HEAT, EXTREME COLD - AND I HAVE TO PERFORM AT ALL TIMES. BECAUSE EVERYONE RELIES ON ME: ON EVERYTHING ARRIVING AT ITS DESTINATION ON TIME - AND MY BOSS GETTING HOME SAFELY. AFTER ALL, THAT'S EXACTLY WHAT I WAS CREATED FOR. AND THAT'S WHY I'M PACKED WITH TOP-QUALITY MODERN TECHNOLOGY: A POWERFUL MOTOR, PERFECTLY BALANCED BRAKING AND POWERTRAIN SYSTEMS - EVERYTHING FOR A LONG LIFE ON THE ROAD. ONLY THE BEST OF THE BEST SO I DON'T GRIND TO A HALT. LONG JOURNEYS, STOP-AND-GO TRAFFIC, A REAL ENDURANCE TEST FOR MY BRAKES, BUT I HAVE TO PERFORM REGARDLESS. EVEN AFTER MANY MILES, MY BOSS CAN RELY ON THE FACT THAT I'LL COME TO A PERFECT STOP. BUT HE TAKES GOOD CARE OF ME. HE ALWAYS HAS ALL OF MY FUNCTIONS ON VIEW ON HIS SMARTPHONE AND ALWAYS KNOWS HOW I'M GETTING ON.

THE REASON I CAN ALWAYS GIVE MY BEST AT WHATEVER AGE - REGARDLESS OF HOW MANY MILES I'VE DRIVEN - IS BECAUSE I HAVE DRIVEN TOGETHER. SURE I'M NOT GETTING ANY YOUNGER, BUT WITH THE RIGHT SPARES I'M STILL CAPABLE OF GOING TOP PERFORMANCE. NOW MORE THAN EVER MY BOSS AND I KNOW EACH OTHER WELL. WE'RE A TEAM - AND I'M WELL RUN IN. THAT'S WHY I NOW GET GENUINE REMANUFACTURED SPARES THAT MAKES IT CHEAPER FOR MY BOSS - AND I STILL FEEL FIT AGAIN. AND IT CAN KEEP GOING LIKE THIS BECAUSE I'M STILL NOT ALLOWED TO STAND STILL. TIME IS MONEY AND EVERY MILE COUNTS. THE NEXT TRIPS, LOTS OF EXTRA MILES, ALWAYS NEW CHALLENGES TO FACE: HARSH WINTERS, SWELTERING SUMMERS - IT NEVER ENDS. I JUST KEEP ON DRIVING.

WE LOVE LIFE ON THE ROAD. AND EVEN WHEN I GET OLD, MY BOSS WILL STILL BE ABLE TO COUNT ON ME. BECAUSE EVEN THEN, THERE'LL STILL BE TOP-QUALITY SPARE PARTS TO KEEP US ON THE MOVE.

AND IF REQUIRED, THERE'S ALWAYS SOMEONE THERE FOR ME: THERE ARE DEALERSHIPS THROUGHOUT THE WORLD THAT CAN SUPPLY ME WITH GENUINE SPARE PARTS THAT FIT ME PERFECTLY. AND THE PROFESSIONALS IN THE WORKSHOP KEEP ME IN GOOD SHAPE AND GET ME BACK ON THE ROAD IN NO TIME AT ALL.

AND SO IT GOES ON: DAY IN, DAY OUT ON OUR REGULAR ROUTE - AND EVERY NOW AND THEN TO DESTINATIONS NEW. AND EVEN AFTER SO MANY TRIPS, I'M STILL NOT TIRED OF DRIVING: THERE'S SO MUCH TO SEE AND DO. WE'RE ALWAYS ON THE GO, MAKING SURE EVERYTHING GETS SAFELY TO ITS DESTINATION.



KEEP IT RUNNING

EVERY VEHICLE TELLS ITS STORY.
WE ARE PART OF THIS STORY!

Wherever a vehicle may happen to be, and whatever its destination, we're there along with it: mile for mile, in cities, countries, on all the roads - always a live wire, always on the move.

With spare parts in the known Knorr-Bremse OE Quality, which fit perfectly to every commercial vehicle and comprehensive services for distributors, workshops, fleets and drivers we take care, that it always arrives at its destination safely and in time.

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