

[01] Bosch mobility division grows at twice the rate of the market

[02] More efficiency for goods transport: Bosch supplements technology for commercial vehicles with web-based logistics services

[03] Super truck will turn roads into data highways

[04] Connected technology for logistics professionals

[05] High-tech concept cuts operating costs

Robert Bosch GmbH
Postfach 10 60 50
70049 Stuttgart

Media und Public Relations
Leitung: René Ziegler
Presse-Forum:
www.bosch-presse.de



Bosch mobility division grows at twice the rate of the market

International Motor Show (IAA) 2016

September 21, 2016

PI 9342 BBM joe/ab

- ▶ One in four euros earned by Bosch's Mobility Solutions business comes from technology for commercial vehicles
- ▶ New Bosch services inject more efficiency into the whole logistics chain
- ▶ Bosch looking to double sales by 2020 with exhaust-gas treatment systems
- ▶ The company is the global market leader for steering systems for commercial vehicles
- ▶ Bosch expects to double its sales of connectivity boxes for commercial vehicles in 2017

Hannover – Bosch's Mobility Solutions business sector continues to grow apace. "We want to further accelerate our growth, which is why we are developing innovative services for the mobility of tomorrow alongside our solutions for vehicle electrification, automation, and connectivity," said Dr. Rolf Bulander, chairman of the Bosch Mobility Solutions business sector, at the IAA Commercial Vehicles 2016 show in Hannover. This year, Bosch's mobility business will grow close to 5 percent, adjusted for exchange-rate effects. This puts it well ahead of global vehicle production, which is expected to grow by less than 2 percent in 2016. A large part of Bosch's growth comes from technology for commercial vehicles, and the business sector already generates a quarter of its sales with systems for light and heavy commercial vehicles. With its newly established "Commercial Vehicle and Off-Road" unit, Bosch plans to intensify its efforts in working on solutions for trucks and off-highway applications. Sales in this segment are expected to double in the next ten years, with an increased focus on services and solutions, through which Bosch aims to boost the efficiency and security of the logistics ecosystem.

New emissions standards provide impetus to Bosch business

At the heart of this development is the commercial vehicle powertrain. New emissions regulations have prompted an increase in the demand for modern

Bosch diesel systems. As a result, the trucks on the road today can be more eco-friendly than just about any other vehicle – adhering to the Euro 6 emissions standard, for instance, even in real traffic conditions. There are also plans to introduce comparable emissions standards in the two growth regions of China and India. By 2020, the proportion of common-rail systems in newly manufactured commercial vehicles worldwide will have risen from 70 to 90 percent. Alongside these developments, exhaust-gas treatment is another growth area for Bosch. Systems such as Denoxtronic are forecast to almost double the company's sales by the end of the decade. Bosch is also bringing more efficiency to the powertrain. By implementing a range of measures – for instance, the electrification of auxiliary units such as the hydraulic pump – it is possible to reduce fuel consumption by up to 10 percent. Besides systems for heat recovery, Bosch is already working on hybrid and gas drive systems, the alternative drive concepts of the future.

Software and systems expertise required for automated driving

Commercial vehicles of the future will be fully automated, but getting there is a gradual process. It has begun with assistance systems that provide more and more support to the driver. Some of these, such as automatic emergency braking and lane departure warnings, are already mandatory. In the future, truck drivers will also be assisted when changing lanes, turning, and maneuvering. Bosch accident investigators estimate that, together, these systems will be able to prevent 90 percent of the accidents that are caused by trucks and result in bodily injury. Steering is a key technology in automated driving. Bosch is the global market leader in steering systems for commercial vehicles, and predicts that half the trucks in Europe, Japan, and the U.S. will have electrically assisted steering by 2025. The company is also drawing on its broad, in-depth knowledge of software and systems to pave the way for automated driving. Bosch anticipates that platooning – when trucks on the freeway travel close together in each other's slipstreams – will be ready for the market by 2025. Bosch will be demonstrating the potential solution at the IAA Commercial Vehicles 2016 show with its "Vision X" concept study.

Sensors, software, and services the key to increased transport efficiency

Automated driving means connected driving. In Europe and North America, every new truck will be telematics capable as soon as 2017. Bosch is also playing its part in preparing commercial vehicles for connectivity with its connectivity control unit. The company will more than double its unit sales of this piece of hardware in 2017. For instance, Bosch will be supplying the truck data center for new Daimler trucks. As well as the hardware itself, Bosch also possesses its own IoT cloud, which the company uses to implement smart services such as Secure Truck Parking. From the beginning of 2017, logistics companies and drivers will be able

to use this booking platform to reserve secure truck parking bays along freeways. In the coming year, Bosch will also be launching TraQ, a solution that monitors goods using integrated micromechanical sensors and brings more transparency to the logistics chain. These examples go to show that Bosch can boost transport efficiency with logistics services as well as with commercial vehicle technology.

Press photos: #452437, #452438, #452439, #452440

Contact for press inquiries: Jörn Ebberg, phone: +49 711 811-26223

Mobility Solutions is the largest Bosch Group business sector. In 2015, its sales came to 41.7 billion euros, or 59 percent of total group sales. This makes the Bosch Group one of the leading automotive suppliers. The Mobility Solutions business sector combines the group's expertise in three mobility domains – automation, electrification, and connectivity – and offers its customers integrated mobility solutions. Its main areas of activity are injection technology and powertrain peripherals for internal-combustion engines, diverse solutions for powertrain electrification, vehicle safety systems, driver-assistance and automated functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, repair-shop concepts, and technology and services for the automotive aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP anti-skid system, and common-rail diesel technology.

The Bosch Group is a leading global supplier of technology and services. It employs roughly 375,000 associates worldwide (as of December 31, 2015). The company generated sales of 70.6 billion euros in 2015. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiaries and regional companies in some 60 countries. Including sales and service partners, Bosch's global manufacturing and sales network covers some 150 countries. The basis for the company's future growth is its innovative strength. Bosch employs 55,800 associates in research and development at 118 locations across the globe. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life."

Additional information is available online at www.bosch.com, www.bosch-press.com, twitter.com/BoschPresse



BOSCH

September 21, 2016
RF 0268-d my

**More efficiency for goods transport:
Bosch supplements technology for commercial vehicles
with web-based logistics services**

Statement by Dr. Rolf Bulander,
chairman of the Mobility Solutions
business sector at Robert Bosch GmbH,
at the press conference for the IAA Commercial Vehicles
show on September 21, 2016 in Hannover

Check against delivery.

Robert Bosch GmbH
Postfach 10 60 50
70049 Stuttgart

Corporate Communications,
Brand Management,
and Sustainability
E-Mail
Ludger.Meyer@bosch.com
Telefon: +49 711 811-48583
Telefax: +49 711 811-7612

Leitung: Dr. Christoph Zemelka
www.bosch-presse.de

Ladies and gentlemen,

Today, the ways we have at our disposal to improve the efficiency of goods transport are more versatile than ever before. One of these is to cut a commercial vehicle's operating costs, an approach that includes automating the vehicle. Another is to make the whole logistics chain more cost effective by implementing web-based services. This press conference is our chance to present our solutions in these areas. I would like to welcome you all here today, also on behalf of my colleague on the management board, Mr. Heyn. He will take the floor after my statement to show you "Vision X," a visualization of what truck driving might be like in the next decade.

First, though, let us take a quick look at the current business situation. In spite of a subdued economic climate, Bosch's Mobility Solutions business sector continues to grow. While global vehicle production is rising by less than 2 percent this year, our growth in sales is approaching 5 percent in real terms. The number of our associates worldwide is increasing from 217,000 to a good 225,000. We are also increasing our investment in innovation. At the beginning of 2016, there were 43,600 associates working in research and development for Mobility Solutions; by the end of the year, it will be almost 47,000. One of the responsibilities of this team is work on the future of the commercial vehicle.

New ways to transport goods economically: Bosch's objectives

In this future, demand for transportation will continue to grow around the world. In Germany, the volume of goods transported will increase by 50 percent in the next 25 years; in China and India, it will more than double. Most of this freight traffic will be by road, which is all the more reason to take a whole new approach to cutting the operating costs of commercial vehicles. So where are we focusing our attention? First, a few points:

- Even today, every fifth truck journey is an empty run. This rate can still be significantly reduced – for instance, by using trailer sensors that continually report the trailer’s location and load level, making freight handling platforms and transport management systems faster and smarter.
- Personnel accounts for almost a third of truck operating costs – a greater share than fuel. The more automated the truck, the more efficient the staffing – whether it’s a case of the driver being able to take care of logistics tasks on the go, or needing just one driver instead of two on a long-distance trip.
- One in ten euros spent on truck operating costs goes toward insurance. We can expect premiums to go down as the number of accidents decreases, thanks to assistance systems that range all the way up to automated driving. Premiums will also fall if we make transporting goods by road safer. Each year, cargo theft from parked trucks incurs losses of more than 16 billion euros in Europe alone.

These are just a few examples, but they hint at the versatile ways in which we can realize further savings in transporting goods by road. And logistics companies are not the only ones who stand to benefit. An improvement to the commercial vehicle is an improvement to the entire logistics chain – not to mention the environment and society. Efficient trucks help preserve the environment, while automated trucks help prevent accidents. Bosch’s role in these developments is in accordance with our development philosophy – “Invented for life.”

What, then, are our specific goals? I have two points to make here, one concerning the savings potential of our solutions, the other concerning the opportunities for growing our business:

- First of all, Bosch will be pursuing a dual savings strategy in commercial vehicles. We can boost the efficiency of the powertrain by as much as 10 percent if we implement a variety of measures. That means saving a

good 5,000 euros a year in operating costs for long-haul trucks. And we will be able to save much the same amount again by automating and connecting the vehicle, thereby reducing the number of accidents and breakdowns, for instance.

- Second, we view these solutions as a great opportunity for Bosch to grow its business. Our Mobility Solutions business sector already generates one quarter of its sales with technology for commercial vehicles, from vans on upward. In the future, Bosch will be expanding its focus on systems and services for heavy commercial vehicles – whether for trucks or even for construction and agricultural machinery. To this end, at the beginning of the year we set up the Commercial Vehicle and Off-Road unit, a sales organization with its own system development. We want to double our business volume in this segment over the next ten years.

Euro 6 goes global: A boost to Bosch powertrain systems

What innovations do these objectives entail? To answer that, I'd like to address three topics: our powertrain systems, automation, and the connectivity of the commercial vehicle. The last two points in particular will be highlighted by our "Vision X" concept of the truck of the future. But first let us turn our attention to the commercial vehicle drive, a domain for which Bosch employs 2,600 developers alone.

Our diesel systems provide the prerequisites for trucks to drive eco-friendly. These trucks can adhere to the Euro 6 emissions standard in real traffic conditions. China and India are also planning to introduce comparable emissions regulations by the year 2020. This is a boost to our international business. By the end of the decade, the proportion of newly manufactured commercial vehicles worldwide equipped with common-rail systems will have risen from 70 to 90 percent. Exhaust-gas treatment is an area of particular growth, and we anticipate that we will be able to nearly double our sales by the beginning of the next decade.

In the future, climate protection regulation for the commercial vehicle will play a larger role. Carbon dioxide thresholds are on the horizon in Europe, while the limits now applicable in the U.S. are due to be reduced further. As a result, any technology that saves fuel will become even more appealing – including alternative drive systems, which in the past have hardly been worth it due to the low price of diesel. Bosch develops these sorts of systems too, both for hybrid and gas drives as well as heat recovery. 48-volt entry-level hybrids have particularly good prospects, and not just because of the fuel savings: they also stand to profit greatly from the trend towards higher voltage levels in commercial vehicles. More powerful on-board electronics are a key requirement in the high-tech truck of the future.

Fewer accidents, fewer breakdowns: Automating truck driving

Bosch has a long tradition of showcasing new technologies in commercial vehicles. It was here that we deployed our first high-pressure injection system and our first exhaust-gas treatment solution. We want to continue that tradition and drive the market forwards with our automated driving solutions – my second innovation topic. We have at our disposal broad and in-depth knowledge of software and systems for creating the necessary technological conditions:

- First, we will turn the truck into a 40-ton smart device. Its software functionality will increase over six times by 2025, and it will have 20 times the computing capacity it does today.
- Second, we need to connect the powertrain, assistance, and steering systems. Bosch is now the global market leader in steering systems for commercial vehicles – and we predict that half the long-haul trucks in Europe, Japan, and the U.S. will have electrically assisted steering by 2025. Without this steering system, there can be no automated truck.

Automation is on its way, approaching function by function, but is already helping us avoid accidents today. Commercial vehicles have long been

required to have an ESP for stability control, in addition to other safety systems such as automatic emergency braking and a lane departure warning system. New functions on the way include turning, lane change, and maneuvering assistants. We estimate that, together, these systems will be able to prevent 90 percent of the accidents caused by trucks and resulting in bodily injury. As for logistics companies, fewer accidents means fewer disruptions and lower insurance premiums. As a result, the economic viability of the commercial vehicle becomes a driver of its automation. This is particularly true of platooning, or convoying, a brilliant automated slipstreaming solution for the freeway. We estimate that this solution will be ready for implementation no later than the middle of next decade – and Mr. Heyn will be showing you exactly what that means for truckers when he presents our “Vision X” concept.

Nothing without connectivity: Bosch offers hardware and services

As a general rule, automated truck driving is also connected driving – my third innovation topic. Platooning, for instance, requires a virtual longitudinal axis along the column to relay steering and braking actions from the lead truck to the following vehicles. However, connectivity is much more than an aid in commercial vehicle automation; it is also a direct help in cutting operating costs. One example is Bosch’s fleet management solution: connectivity control units that access control unit data so we can uncover errors or wear and tear early on and maintain vehicles proactively. This avoids the costs of breakdown and towing.

The economic benefits of connectivity are so substantial that by next year, every new truck in Europe and the U.S. will be telematics capable. Bosch will more than double its unit sales of connectivity boxes for commercial vehicles in 2017. For instance, we will be supplying the Truck Data Center for new Daimler trucks.

Still, we offer more than the hardware to connect commercial vehicles. The connected truck will be part of the internet of things, for which we possess our own cloud with integrated software platform. Our commercial vehicle customers can use the Bosch IoT Cloud to implement services, just as we do for our own services. One of these is Bosch Secure Truck Parking, a booking platform for reserving secure truck parking bays along the freeway, which will go live at the beginning of 2017. Everyone has encountered the problem of trucks blocking up service stations as they park overnight. Germany's freeways alone need an additional 14,000 secure truck parking bays. It's not a problem we can solve straightaway, but we can use the limited number of spaces we have more efficiently. Our booking platform gives fleet operators the assurance that their goods are safely parked overnight, and where exactly that will be. There is already a pilot project under way involving selected freight operators on one of the company's own parking lots near the A5 in Karlsruhe. This is due to be joined by a truck stop in Bavaria over the coming weeks.

A slice of the future: Goods that report their condition during transport

With this example, I come now to my concluding remarks. It shows how hard we are working on solutions for the whole of freight traffic. In addition to our knowledge of the sector, we also possess sensor and software expertise and access to the Bosch IoT Cloud – a broad basis from which to implement new services for the logistics ecosystem. In the future, Bosch will boost transport efficiency both with logistics services and commercial vehicle technology. I leave you with a prime example of each approach:

- Next year we will be launching TraQ – an Industry 4.0 solution that monitors goods with the help of integrated micromechanical sensors. This means that recipients always know the location of their valuable goods and the condition of their cargo.
- Here at the show, we are showcasing a digital mirror replacement system – a world first for trucks that also improves aerodynamics. The solution

reduces fuel consumption by up to 2 percent, which works out to a savings of almost 1,000 euros a year.

Bosch is helping to reduce costs in every way possible. That is the key to growing our business in the commercial vehicle and logistics sector.



Super truck will turn roads into data highways Bosch VisionX

September 21, 2016

PI 9345 BBM FF/ab

- ▶ VisionX concept study provides a glimpse into the future of truck driving
- ▶ Automated driving in platoons will take the strain off drivers, improve economic efficiency, and make driving safer
- ▶ Hybridization and connectivity help improve the overall cost picture

Stuttgart/Hannover – At the 66th IAA Commercial Vehicles trade fair, Bosch will be presenting a 40-ton smart device in the form of a truck tractor – all part of its VisionX concept study on the future of commercial vehicles. “Connected, electrified, and automated – that’s the future of trucks. And that’s what Bosch has encapsulated in VisionX,” says Dr. Markus Heyn, member of the board of management of Robert Bosch GmbH. One of the many technologies envisaged in VisionX is platooning. Besides making life easier for drivers on long journeys, this also represents a significant safety improvement. What’s more, platooning offers a major boost to transport efficiency.

Platooning: automated slipstream driving on the freeway

In the future, multiple assistance systems will combine with automation to make trucks safer and more reliable – almost as if they were on rails. Vehicles will receive all the data they need in real time from the Bosch IoT Cloud, including information on their route, traffic congestion, detours, and the unloading facilities available at their destination. This lets them avoid downtime. What’s more, some aspects of driving will be taken over by the truck itself. For instance, once it reaches the freeway, it joins a platoon – a kind of freight train composed of trucks. In such a platoon, the truck is one of a number of trucks all following a lead vehicle to which they are electronically connected and linked. With the convoy members accelerating, braking, and steering in sync, automated driving reaches a whole new level, increasing safety and taking the strain off drivers. The driver steers the truck until it receives data identifying a suitable convoy. The same applies when the truck leaves the platoon to exit the freeway; at that point,

the driver resumes control to complete the journey in manual or partially automated mode.

Making life easier for drivers, particularly on long-haul routes

“Once the truck joins a convoy on the freeway, drivers can start planning their next route while still remaining in complete control. They can access all key information on the screens in their cab and take the wheel if they need to,” says Heyn. “Connected and automated trucks are the future, and we are looking to play a major part in their development.”

Boosting efficiency through hybrid technology and convoying

Increasing efficiency still further will continue to be a major focus in the future. That’s why the Bosch VisionX concept study takes the diesel engine – which is particularly economical in the world of heavy goods transport – and combines it with electric motors for auxiliary systems such as the hydraulic pump. Trucks of the future will benefit not only from this hybrid technology, but also from the advantages of convoying, which include improved safety thanks to coordinated braking, accelerating, and steering, as well as a significant economic plus. “In a convoy, you can combine the safety gains of automated driving with the efficiency boost that is so crucial to the commercial vehicle sector,” says Heyn. “Slipstream driving enables fuel savings of up to 10 percent. That’s a strong argument in the commercial vehicle industry.”

VisionX as part of the connected logistics chain

“Perfectly connected like a smart device, the truck of the future will become a key component of international logistics processes,” states Heyn. Bosch’s new systems will make drivers’ lives easier in many ways – from accepting shipping documents and loading the truck, to carrying out automated maneuvers once the truck arrives at its destination. By accessing the Bosch IoT Cloud, hauliers and customers will be able to track where the truck and its cargo are located at any point in time. What’s more, drivers will be able to find and reserve parking spaces along the route, making the journey less stressful.

Innovation is in the details, too

Although a truck’s fuel consumption plays a key role in the total cost of ownership, other factors also play a major part, such as the losses incurred when trucks stand idle. The Bosch VisionX concept study shows how much scope there is for optimizing this situation in the future, too. For example, predictive maintenance can monitor the technical condition of a truck in real time and inform the freight forwarder of any maintenance work or repairs that are due. This is the best way to plan breaks in a truck’s schedule, thus keeping downtime to a minimum and further boosting transport efficiency.

Press photo: #454496, #454497, #454498, #454499

Contact person for press inquiries: Florian Flaig, phone: +49 711 811-6282

Mobility Solutions is the largest Bosch Group business sector. In 2015, its sales came to 41.7 billion euros, or 59 percent of total group sales. This makes the Bosch Group one of the leading automotive suppliers. The Mobility Solutions business sector combines the group's expertise in three mobility domains – automation, electrification, and connectivity – and offers its customers integrated mobility solutions. Its main areas of activity are injection technology and powertrain peripherals for internal-combustion engines, diverse solutions for powertrain electrification, vehicle safety systems, driver-assistance and automated functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, repair-shop concepts, and technology and services for the automotive aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP anti-skid system, and common-rail diesel technology.

The Bosch Group is a leading global supplier of technology and services. It employs roughly 375,000 associates worldwide (as of December 31, 2015). The company generated sales of 70.6 billion euros in 2015. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiaries and regional companies in some 60 countries. Including sales and service partners, Bosch's global manufacturing and sales network covers some 150 countries. The basis for the company's future growth is its innovative strength. Bosch employs 55,800 associates in research and development at 118 locations across the globe. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life."

Additional information is available online at www.bosch.com, www.bosch-press.com, twitter.com/BoschPresse



Connected technology for logistics professionals Bosch solutions make truck drivers' lives easier

September 05, 2016

PI 9344 BBM joe/ab

- ▶ New displays and controls in trucks are as intuitive as smartphones and cause less distraction for drivers
- ▶ Connectivity allows for quick parking searches, simple cargo monitoring, and safe slipstream driving
- ▶ Platooning allows trucks to travel on freeways in a platoon, with 10 to 15 meters between them

Stuttgart – Whatever happened to the romance of long-distance truck driving? It disappeared from the scene a long time ago: today's drivers are often expected to load and unload their vehicles themselves, maneuver in tight spaces, wait in line for hours and hours, and cover seemingly endless kilometers. Drivers and their trucks work hard every day in logistics chains that are becoming increasingly streamlined. But Bosch is there to provide support. "Our connected technologies are like good copilots who take the strain off drivers day in, day out," says Dr. Markus Heyn, member of the board of management of Robert Bosch GmbH in charge of the commercial vehicle business. Bosch solutions improve working conditions, making driving safer and more comfortable. The VisionX concept study, which Bosch presents at the 2016 IAA Commercial Vehicles trade fair, gives some idea of how the future might look behind the wheel of a truck. It reveals how connectivity combined with modern display and control instruments can provide the basis for intelligent cargo and route management as well as automated driving. It also presents the concept of platooning, which will make drivers' lives easier on long journeys in the future.

Intelligent displays provide a better overview

Efforts to improve conditions for drivers start in the cab. "Right now, a truck driver's workplace is just a jungle of switches and levers," says Heyn. "It does not lend itself to intuitive operation at all." This increases the risk of mistakes in the driver's cab: the nerve center of long-distance driving. This cockpit environment will undergo radical changes in the future. "We want to create an interface that is

as easy to use as a modern smartphone,” says Heyn in sketching out Bosch’s vision. One way to improve working conditions is to introduce clear, hierarchal control structures for rarely used functions together with displays adapted to each specific situation, such as convoying. This approach involves an electronic resource manager, which works in the background to keep the information and indications displayed to drivers at a sensible minimum, allowing them to focus their attention on the road. The cab of the future will be enhanced with a system of displays and cameras that monitor the traffic behind the vehicle, effectively replacing rear-view mirrors. Besides providing a better view when changing lanes, this system will also overcome the problem of blind spots. What’s more, the addition of a night mode will improve the driver’s vision in the dark.

Platooning will make drivers’ lives easier on long journeys in the future

“Automated trucks are the future, and we will be playing a major part in their development,” says Heyn. In the commercial vehicle sector, Bosch is currently focusing on automated driving on freeways. “We are looking at real-world use cases where automated driving offers the greatest benefits.” Platooning involves multiple trucks traveling in a platoon with 10 to 15 meters between them, all following a lead vehicle to which they are electronically connected and linked along a virtual longitudinal axis. All the trucks in the platoon accelerate, brake, and steer in sync with the lead vehicle. First and foremost, automated driving in the slipstream of the truck in front cuts fuel consumption by up to 10 percent, but it also makes the driver’s work easier and improves safety. When a truck turns onto the freeway, it is initially steered by the driver until it receives data identifying a suitable convoy. The same applies when the truck leaves the platoon to exit the freeway. Depending on how it is configured, automated platooning is likely to take at least another 5 to 10 years to reach maturity. Until then, Bosch assistance systems will fill the gap to help truck drivers manage congestion, change lanes, make turns, and bring their vehicles to a full stop in increasingly dense volumes of traffic. Bosch accident researchers estimate that, of all accidents caused by trucks involving physical injury, 90 percent could be avoided in the future by using these systems.

Connectivity helps drivers find parking spaces

It is not just traffic congestion woes that cause stress for drivers, but the lack of suitable parking areas along major highways, too. Estimates suggest that Germany alone needs 21,000 more truck parking spaces. What’s more, the parking areas that do exist are currently used inefficiently. This is another area where Bosch technology can help. “Secure Truck Parking is a Bosch solution that draws on the benefits of connectivity to tackle the shortage of parking spaces,” says Dr. Johannes-Jörg Rürger, president of the commercial vehicle and off-road unit at Bosch. “The service will be available starting this fall.” Drivers will

receive information from the Bosch IoT Cloud on which parking spaces are free, allowing them to reserve a space in advance at a freeway rest area or designated truckers' parking zone. Equipped with barriers, cameras, and access control systems, these parking areas protect trucks against theft and damage when drivers stop to take a break or spend the night.

Logistics processes go digital at last

Although the clipboard for shipping documents is still ubiquitous at many freight forwarders' offices, its days are numbered. As in so many other areas, the future here is digital. Thanks to increasing connectivity, those involved in the cargo management process will be able to use an app to exchange data securely and exclusively among themselves in a simple and fully electronic process. This will eliminate a lot of paperwork for the forwarding company, customer, and driver. Service centers will constantly monitor the cargo of a connected vehicle, protecting it against theft and thus protecting drivers against attacks as well.

Predictive maintenance prevents unscheduled downtime

Another way of taking the strain off drivers is to minimize the time they spend worrying about truck maintenance. In the future, Bosch predictive maintenance will provide them with the reassurance they need. The truck transfers all the data relevant to repairs and servicing to a computer center in an encrypted format. The center then uses that data to compile a report on the vehicle's condition and sends it to the forwarding company, which can neatly arrange the truck's schedule to accommodate its visits to the repair shop. The benefit for drivers is that they can focus exclusively on their journey knowing that no maintenance work has been scheduled during their shift. "Predictive maintenance is a fantastic example of how innovative Bosch technology can benefit both drivers and forwarding companies," says Ruger.

Press photo: #452279, #452280, #452281, #452282

More information:

[The Bosch innovations on show at the IAA 2016](#)

Contact person for press inquiries: Joern Ebberg, phone: +49 711 811-26223

Mobility Solutions is the largest Bosch Group business sector. In 2015, its sales came to 41.7 billion euros, or 59 percent of total group sales. This makes the Bosch Group one of the leading automotive suppliers. The Mobility Solutions business sector combines the group's expertise in three mobility domains – automation, electrification, and connectivity – and offers its customers integrated mobility solutions. Its main areas of activity are injection technology and powertrain peripherals for internal-combustion engines, diverse solutions for powertrain electrification, vehicle safety systems, driver-assistance and automated functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, repair-shop concepts, and technology and services for the automotive

aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP anti-skid system, and common-rail diesel technology.

The Bosch Group is a leading global supplier of technology and services. It employs roughly 375,000 associates worldwide (as of December 31, 2015). The company generated sales of 70.6 billion euros in 2015. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiaries and regional companies in some 60 countries. Including sales and service partners, Bosch's global manufacturing and sales network covers some 150 countries. The basis for the company's future growth is its innovative strength. Bosch employs 55,800 associates in research and development at 118 locations across the globe. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life."

Additional information is available online at www.bosch.com, www.bosch-press.com, twitter.com/BoschPresse



High-tech concept cuts operating costs Bosch increases transparency and efficiency

September 5, 2016
PI 9343 BBM Ks/ab

- ▶ Partial electrification boosts high economic effectiveness of diesel engines even further
- ▶ Automated driving in convoys offers freight forwarding companies substantial efficiency improvements and enhanced safety
- ▶ Connectivity makes the logistics chain transparent, to the benefit of freight forwarders and their customers

Stuttgart – For freight forwarders, everything comes down to total cost of ownership, or TCO. Every cent counts when you are running large fleets of vehicles covering huge numbers of kilometers, so a TCO analysis is required for each and every investment. With competition becoming increasingly fierce, finding ways to reduce costs over a vehicle's entire lifetime is a top priority for forwarding companies. "The success of new technology for commercial vehicles rests on its ability to boost profitability and efficiency," says Dr. Markus Heyn, member of the board of management of Robert Bosch GmbH. Key considerations for freight forwarders include cutting fuel costs – which represent almost a quarter of their total spend – and eliminating unprofitable downtime. The VisionX concept study Bosch will be presenting at the IAA includes strategies to tackle both these issues. This visionary study shows how connected information and innovative solutions can be used to drive fuel consumption down even further and significantly improve cost efficiency and TCO.

Diesel engines are an efficient and reliable option for long-haul transport

Bosch has already introduced numerous innovations that have boosted the efficiency of diesel engines in commercial vehicles. Common-rail injection and the Denoxtronic exhaust-gas treatment system are just two of the technical milestones the company has achieved. Helmut Weißbeck, senior vice president for commercial vehicle and engine sales in Bosch's commercial vehicle and off-road business unit, is confident about what lies ahead: "The diesel engine will continue to be a major pillar of heavy-duty truck transport for the foreseeable

future.” In fact, the diesel engine has the potential to become even more efficient in the future with the help of new Bosch technologies. Trucks of the future will include electrified auxiliary systems, such as water and hydraulic pumps, which will further improve the diesel engine’s overall efficiency. Powertrain hybridization – in other words, incorporating electric motors for specific driving situations – will also play a key role, cutting the fuel consumption of heavy trucks by up to 6 percent and thus reducing the TCO even further.

Platooning cuts fuel consumption and risk of accident

Automated driving has many aspects. One solution specifically aimed at trucks is platooning, where multiple trucks travel along freeways in a caravan following a lead vehicle. This approach offers a number of technical advantages: as soon as the lead vehicle starts leading the convoy, the connected vehicle technology regulates the movements of the following trucks accordingly, allowing them to drive in a highly automated fashion. If the lead truck has to brake, the trucks behind immediately receive the message to apply their brakes, too. This significantly improves safety while allowing vehicles to drive closer together. “Platooning takes the strain off drivers and reduces freight forwarders’ costs,” explains Heyn. In fact, automated slipstream driving in convoys can cut fuel consumption by up to 10 percent, making a major contribution to reducing a vehicle’s TCO. And platooning offers other benefits, too: lower accident rates reduce accident-related costs and vehicle downtime.

Optimizing costs with a connected fleet

The trucks of the future will provide forwarders with encrypted access to vehicle data at all times. This transparency will allow operators to use their fleets even more efficiently. By connecting trucks to the Bosch IoT Cloud, dispatchers can obtain information on a truck’s current position, the route it will follow, and the planned destination of its cargo. This will provide greater flexibility when it comes to planning and routing new shipments – a key step in avoiding the problem of empty runs. Other benefits include the ability to maximize tonnage and capacity utilization.

Cargo monitoring improves security

Connecting vehicles and forwarding companies together also makes moving goods by road safer and more secure. Cargo theft from parked trucks costs the industry more than 16 billion euros a year in Europe. But using the Bosch IoT Cloud to monitor a truck’s cargo hold puts a stop to criminal activities. “Every time the cargo hold is opened, a sensor box logs and reports it. If that happens at an unscheduled time, the system raises the alarm by notifying the driver and the forwarding company,” says Dr. Johannes-Jörg Rüger, president of the commercial vehicle and off-road organization at Bosch, in describing the benefits

of the trailer control unit. “Senders, recipients, and forwarding agents can all use this same technology to track cargo shipments.” Users can access information on the type, location, and condition of the goods at any time. Examples include the temperature of the cargo hold and any shocks or vibrations that occur – in short, just about anything that could affect the condition and quality of the freight. Starting in 2017, Bosch will also be offering its TraQ solution, which provides more detailed tracking on an individual pallet level. These connected solutions create far more transparency in the logistics chain, speed up deliveries, and boost flexibility in the event of unexpected incidents.

Reducing downtime with predictive maintenance

Freight forwarders do not make any money when their trucks are standing idle. One way to minimize the time trucks spend off the road for servicing and repairs is by taking advantage of predictive maintenance. This solution involves the continuous, encrypted transmission of all relevant vehicle data to a computer center, including data such as mileage and the status of all the vehicle’s key parameters. The computer center evaluates this data and sends a report to the forwarding company. If a truck is due for servicing, the dispatcher can plan its schedule so that the service fits into it neatly. This also cuts the risk of unexpected damage, which typically results in costly downtime.

Press photo: #452274, #452275, #452276, #452277

More information:

[The Bosch innovations on show at the IAA 2016](#)

Contact person for press inquiries: Stephan Kraus, phone: +49 711 811-6286

Mobility Solutions is the largest Bosch Group business sector. In 2015, its sales came to 41.7 billion euros, or 59 percent of total group sales. This makes the Bosch Group one of the leading automotive suppliers. The Mobility Solutions business sector combines the group’s expertise in three mobility domains – automation, electrification, and connectivity – and offers its customers integrated mobility solutions. Its main areas of activity are injection technology and powertrain peripherals for internal-combustion engines, diverse solutions for powertrain electrification, vehicle safety systems, driver-assistance and automated functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, repair-shop concepts, and technology and services for the automotive aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP anti-skid system, and common-rail diesel technology.

The Bosch Group is a leading global supplier of technology and services. It employs roughly 375,000 associates worldwide (as of December 31, 2015). The company generated sales of 70.6 billion euros in 2015. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiaries and regional companies in some 60 countries. Including sales and service partners, Bosch’s global manufacturing and sales network covers some 150 countries. The basis for the company’s future growth is its innovative strength. Bosch employs 55,800 associates in research and development at 118 locations across the globe. The Bosch Group’s strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide

with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is “Invented for life.”

Additional information is available online at www.bosch.com, www.bosch-press.com, twitter.com/BoschPresse