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Bosch ConnectedWorld IoT conference in Berlin **The internet of things from a single source: Bosch launches cloud for its IoT services** Computing center located in Germany

March 9, 2016
PI 9161 RB Res/SL

- ▶ Bosch CEO Denner: “The Bosch IoT Cloud is a major milestone”
- ▶ Key features are privacy and data security
- ▶ Bosch IoT Cloud improves Germany’s innovative strength
- ▶ Software expertise and IT infrastructure are significant competitive advantages

Berlin and Stuttgart – Bosch is launching its own cloud for web-based services. In the Bosch IoT Cloud, the international supplier of technology services runs various applications for its connected mobility, connected industries, and connected buildings businesses. The first cloud is located in Germany. “As of today, we offer all the ace cards for the connected world from a single source. The Bosch IoT Cloud is the final piece of the puzzle that completes our software expertise. We are now a full service provider for connectivity and the internet of things,” said Bosch CEO Volkmar Denner at the Bosch ConnectedWorld conference in Berlin on Wednesday. Bosch is the only company worldwide that is active on all three levels of the internet of things. The Bosch Group offers key technologies that enable connectivity such as [sensors](#) and software, and is also developing new services on this basis. “A major factor in the success of connected solutions is their scalability. Business models must be able to grow quickly when necessary. The Bosch IoT Cloud means Bosch now has the relevant infrastructure. We see this as a major milestone for Bosch,” said Denner, who is also responsible for research and advance engineering on the Bosch board of management. The Bosch IoT Cloud comprises technical infrastructure as well as platform and software offerings. To begin with, the supplier of technology and services will use it for in-house solutions. From 2017, it will also be made available as a service to other companies.

Cloud located in Germany

Denner stressed that it was a conscious decision to locate the cloud in Germany. “Many companies and consumers state that security concerns keep them from using cloud technologies and connectivity solutions. The Bosch IoT Cloud is the answer to those concerns.” Bosch operates its IoT cloud in its own computing center near Stuttgart. As Denner explained, “Consumers want to know whether their data are protected and secure. For this reason, the security we offer our customers is always state of the art.” The fundamental legal framework for this is German and European data-security regulations. As Denner explained, “The fact that the Bosch IoT Cloud is located in Germany gives it a competitive edge. Our cloud is a competitive advantage for Germany’s status as a seat of innovation.”

The brain of the connected world: the Bosch IoT Suite

The software core of the Bosch IoT Cloud is the company’s own IoT Suite. It identifies any objects that are web-enabled, orchestrates the exchange of data, and enables a multitude of services and business models. Big data management allows enormous amounts of data to be analyzed. “The Bosch IoT Suite is the brain of the connected world. It offers all the functions necessary to connect devices, users, and companies,” Denner said. Rules for automatic decisions can be stored in the Bosch IoT Suite – such as when patterns of wear and tear should be reported and preventive action taken to service machinery. Bosch and its customers already operate many solutions and projects that are based on this platform. The Bosch IoT Cloud currently connects more than five million devices and machines.

Bosch IoT competence for the connected world

Speaking to the conference’s 1,000 delegates, Denner stressed that this digital transformation should not be understood as a threat. “Digital transformation and increasing connectivity are huge opportunities for us.” In particular, it offers those companies with a strong industrial base and outstanding hardware expertise the potential not only to develop their traditional businesses but also to enter completely new fields. “The key prerequisite for this is to have in-house software and IT expertise. Bosch has been building these capabilities for many years.”

A wide variety of possibilities and business models

The company has already launched numerous products and solutions for the connected world. The Bosch Smart Home System, for instance, can tell users the current temperature in their home and let them change the setting while they are still on the road. Another solution running in the Bosch IoT Cloud is designed for heating service technicians. It gives them remote access to authorized Bosch heating systems so they can troubleshoot problems in the event of a breakdown.

This means they can bring along any required replacement parts to their first – and now only – service visit. Customers benefit from lower service costs.

Sensor data from asparagus fields makes its way into the Bosch IoT Cloud, too. Farmers can improve their harvest and their yield if they know the exact temperature of the ground. The Bosch IoT Cloud also generates an online map of available park-and-ride spaces throughout Stuttgart's commuter train network. Sensors detect which parking spaces are unoccupied and send this information to the cloud, where it is added to a real-time map that users can call up on their smartphone. Another example is the book-and-park service for truck drivers. Whenever they are looking for a rest area to park in, their truck sends its location data to the Bosch IoT Cloud. This then reserves an available parking space nearby and informs the driver. "These examples show that intelligently connected devices, complemented by services from our IoT Cloud, are the basis of successful IoT business models. Connected solutions improve people's quality of life and conserve natural resources," Denner said.

Background:

Cloud computing

In cloud computing, data and programs are no longer hosted on computers in homes or offices, but in a cloud computing center instead. The center's operator is responsible for security and operations, makes the required computing capacity available, and provides the necessary programs, data security, and backups. This relieves customers of many costly and time-consuming tasks. Cloud technology and cloud platforms form the basis for fast, simple scalability of applications.

Bosch ConnectedWorld – where industries meet to discuss implementation

The Bosch ConnectedWorld event is an annual conference on the subject of the internet of things. This year, some 1,000 international experts are meeting in Berlin to talk about current areas of application and new business models. By showcasing successful examples, the conference demonstrates how the vision of the internet of things has become a reality.

Press photos: 1-CR-21570_1, 1-CR-21633_1, 1-BBE-21802_1, 1-BBE-21804, 1-BBE-21871, 1-BEG-21866, 1-BEG-21859-d, 1-RB-21911, 1-RB-21910, 1-RB-21913, 1-RB-21915, 1-RB-21916, 1-BBM-21502_1, 1-CM-21824, 1-RB-22032-e

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The Bosch Group is a leading global supplier of technology and services. It employs roughly 375,000 associates worldwide (as of December 31, 2015). According to preliminary figures, the company generated sales of more than 70 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. If its sales and service partners are included, then Bosch is represented in roughly 150 countries. This worldwide development, manufacturing, and sales network is the foundation for further growth. In 2015, Bosch applied for some 5,400 patents worldwide. 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."

The company was set up in Stuttgart in 1886 by Robert Bosch (1861-1942) as "Workshop for Precision Mechanics and Electrical Engineering." The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant up-front investments in the safeguarding of its future. Ninety-two percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a charitable foundation. The majority of voting rights are held by Robert Bosch Industrietreuhand KG, an industrial trust. The entrepreneurial ownership functions are carried out by the trust. The remaining shares are held by the Bosch family and by Robert Bosch GmbH.

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



Bosch takes a car to an internet congress **re:publica: Bosch turns the connected car into a personal assistant**

April 2016

PI 9250 CM Ks

- ▶ Automated driving opens up new interaction and communication possibilities for drivers
- ▶ Interface concept takes an integrated approach; large-surface monitors offer flexible display options that can be adapted to any situation
- ▶ Connecting car and home enhances safety and convenience
- ▶ Bosch intends to use the show car to initiate a discussion about the future of mobility with the people attending re:publica 2016

Always online, connected with their surroundings, driving themselves: over the next decade, cars and car driving will make huge strides forward. New functions also have repercussions for the design of car interiors. Bosch will be exhibiting a new show car at [re:publica 2016](#), one of the most important events worldwide dedicated to the topics of digital society, in Berlin on May 2-4, 2016. The car presents a vision of what the interiors of future vehicles could possibly look like, how car and driver will soon be able to communicate with each other – and the possibilities that will arise from this. Bosch CEO Dr. Volkmar Denner firmly believes that the “car of the future will be a new digital living environment.”

Highly automated driving on the freeway will do more than significantly improve safety and fuel-efficiency. From the cars of the future, drivers will also be able to communicate – including by video conference – with others, such as friends, family, or coworkers. “Alongside the home and the office, the car will become the third living space and a personal assistant,” Denner says. re:publica 2016 is the tenth edition of this event and will provide a platform for discussion of the many and diversified issues related to digital society.

New display and user interfaces

The show car's human-machine interface follows an integrated approach. It provides the driver with one single interface that supplies information in the interactive form best suited to the given situation. In practical terms, this means that Bosch has replaced the usual front and middle consoles with large-surface monitors. These can display any information flexibly, as required by the given situation. All-round interior lighting completes the display concept. Its color is selected based on the driver's preference, but the lighting can also warn of potential hazards: if a pedestrian or cyclist is about to cross in front of the vehicle, the interior lighting blinks rapidly to direct the driver's attention to the left or right side as necessary. This ambient light function is therefore another of the vehicle's extensive range of safety features, which also include lane-keeping support and emergency brake and traffic jam assists.

Automated driving opens up new possibilities

In the Bosch show car, the driver has access to real-time traffic and weather information, both from the cloud and in social media and communication applications. To ensure that drivers do not endanger others when using these functions, they can be used only during automated driving. Bosch engineers paid special attention to the safe and seamless transfer of this responsibility from the driver to the car and back. In a first step, drivers are informed when highly automated driving is possible. If they want the car to take control, they simply place their thumbs on specific contact points on the left and right sides of the steering wheel for three seconds. If drivers wish to regain control of the vehicle or are about to exit the freeway, they use the same procedure.

It is in automated driving that the strengths of the flexible display concept really come into their own. Images from a video conference, e-mails, or media player then take precedence; a simple swipe is all it takes for drivers to shift back and forth seamlessly between the different displays. Adaptive algorithms adjust the content to the situation and drivers' habits. Preferences such as seat and mirror positions or preset radio stations can of course be saved as well. Fingerprint identification allows the driver to start the car. At the same time, personal settings are retrieved from the memory.

Connected with the entire world – and with home

Over the internet of things, the vehicle can also connect with other domains, such as the driver's home. If a visitor rings the doorbell, the car switches on the intercom. A fingerprint sensor in the car allows the driver to open the front door remotely. In this way, a package delivery person can be admitted into a sealed-off foyer, for example. The driver can also confirm receipt of the package by fingerprint. Once again, this cannot happen without automated driving.

Once the vehicle arrives at home, it reconnects with the home security system, allowing the driver to first retrieve images from the home's exterior cameras before driving onto the property. It is also possible to view the vehicle's direct surroundings using the on-board cameras. This prevents trespassers hiding behind the car from gaining access to the property. Such features are particularly attractive in countries where security is at a premium. Once the passengers have all exited the car, it then parks itself in the garage – ready for the next drive.

Created in cooperation with the prototype developer EDAG, the show car exhibited at re:publica 2016 features an outer skin consisting of lightweight 3D-printed modules.

Additional information:

Presentation by Bosch developer Prashanth Halady on May 4:

<http://bit.ly/1WXfLFV>

Press photos: 1-CM-22093, 1-CM-22094, 1-CM-22095

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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. At roughly 118 locations across the globe, Bosch employs 55,800 associates in research and development. 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."

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Flexible Bosch solution for smartphone integration **mySPIN offers almost 50 compatible apps worldwide** Cooperation with the IT company Tencent in China

December 2, 2015
PI 9132 CM Ks/af

- ▶ mySPIN offers almost 50 compatible apps worldwide – three times as many as comparable systems
- ▶ Success in China: Bosch acquires the vehicle manufacturers JAC and Changan Ford as its customers and cooperates with “WeChat” operator Tencent
- ▶ mySPIN will be able to provide vehicle data for new apps in the future

Use the navigation, streaming services, or the calendar on your smartphone even while driving your car? The smartphone integration solution mySPIN from Bosch makes this possible – and it is legal and user friendly. The Bosch technology, which has been used by Jaguar Land Rover throughout the entire fleet since 2014, connects the cellphone with the car, regardless of whether the device uses iOS or Android. With mySPIN, apps selected and modified by Bosch can be operated via the touch screen in the center console without picking up your smartphone. Bosch has now taken a giant step in China toward the further dissemination of this OEM solution. For one, the vehicle manufacturers JAC and Changan Ford will be offering the integration solution in their models; for another, Bosch has signed a cooperation agreement with the Chinese technology corporation Tencent. The number of apps enhanced to include mySPIN functions has been rising steadily since 2013 and is currently just short of 50 – three times as many as available for comparable systems. Special focus is on navigation and media applications, such as TomTom, Parkopedia, hotelseeker, and Audials.

Strong expansion in China

Bosch’s cooperation partner Tencent is one of China’s three largest Internet companies. Its services such as “QQ Music” or the mobile communication app “WeChat” reach more than 500 million users. Tencent is planning to optimize an app for mySPIN that will make a selection of its communication services available while driving. These new services will not only expand the portfolio of

mySPIN applications, but will also add to the growing number of adaptations for the regional market. In a similar vein, the Chinese vehicle manufacturer JAC will begin offering mySPIN in its new models from 2016, giving its customers the opportunity to access a broad range of useful applications while driving their cars. The manufacturer Changan Ford will follow in 2017.

Innovative pathways to new apps

When selecting applications for mySPIN, Bosch does not limit its cooperation to well-known providers such as TomTom, but explores other paths as well: the development of its own apps, like Drivelog, or collaborations with startups, such as Familo. This app, for instance, is the winner of a hackathon organized by Bosch. Hackathons are events bringing together programmers, software developers, designers, and project managers for a brief period of time so that they can collaborate intensively on the joint development of a software program. By taking a number of approaches, Bosch ensures that popular apps are available and that innovative new providers also have the opportunity to reach customers in their cars.

Making vehicle data usable

Thanks to the unique structure of mySPIN, carmakers retain at all times full control over the selection of the apps that their customers can use and how the user interface is designed – and what happens with the available information. “This is also an advantage for drivers because they have a trusted partner in their carmaker,” says Torsten Mlasko, managing director of Bosch SoftTec GmbH. In the future, automobile manufacturers will also use the mySPIN interface to make vehicle data available to the apps. Data such as tire pressure or fuel level can then be used in the apps. A filling station offering low prices, for instance, will be suggested only if the fuel gauge has reached the reserve level.

All of the apps approved for mySPIN have been specifically designed for use while driving so that there is as little distraction as possible – assuring greater safety. The technical hurdles for applications in this instance are low. A software development kit is provided to app developers. Carmakers can each decide what apps will be available for use in specific vehicles and define them on a so-called white list, which can be flexibly updated and expanded. In addition to the integration of iOS and Android smartphones, a solution for Windows phones has already been realized as a prototype and can be provided to vehicle manufacturers upon request.

Simply.Connected.

Visit Bosch at [CES 2016](#) in Las Vegas, NV, USA:

Tuesday, January 5, 2016, 8 to 8:45 a.m. local time: press conference

with [Dr. Volkmar Denner](#), chairman of the board of management of Robert Bosch GmbH, at Mandalay Bay Hotel, South Convention Center, Level 3, Banyan Rooms A-D.

Wednesday, January 6 through Saturday, January 9, 2016: **Bosch booths showcasing solutions for smart homes, smart cities, and Industry 4.0** at the Smart Home Marketplace, Sands Expo Center, #71517, and **showcasing connected mobility** at North Hall, #2302.

Follow the Bosch CES 2016 highlights on Twitter: [#BoschCES](#)

Press photo: 1-CM-21209

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*The sales figure disclosed for 2014 does not include the former joint ventures BSH Bosch und Siemens Hausgeräte GmbH (now BSH Hausgeräte GmbH) and ZF Lenksysteme GmbH (now Robert Bosch Automotive Steering GmbH), which have since been taken over completely.



CES 2016 (January 6 to 9), Las Vegas Touchscreen display with buttons users can feel **Bosch recipient of the CES 2016 Innovation Award** in the “In-Vehicle Audio/Video” category

November 11, 2015

PI 9111 CM Ks/af

- ▶ Bosch presents new touch screen with haptic elements at the [CES 2016](#)
- ▶ “Touch & Feel”: Keys on the touch screen can be identified by feel thanks to variances in surface structures
- ▶ Differences in finger pressure call up different functions
- ▶ CES 2016 Innovation Award winner

New York/Hildesheim – A touch screen with haptic feedback developed by Bosch was honored with the “CES 2016 Innovation Award” in the “In-Vehicle Audio/ Video” category on November 10, 2015. The special feature of the touch screen: thanks to haptic feedback, users can operate infotainment applications such as navigation, radio, or smartphone functions interactively. The keys displayed on the touch screen have the feel of realistic buttons so that it is often possible for users to find their way around the keyboard without looking while operating the applications. They can keep their eyes on the road for much longer periods, substantially enhancing safety while driving. “The new touch screen combines the simple operation of mechanical buttons with the advantages of a touch screen, significantly enhancing ease of operation” says Manfred Baden, President of the Bosch Car Multimedia division. “The innovative technology offers everything that is required to ensure its fast success on the market.” The CES Innovation Awards are sponsored by the Consumer Technology Association (CTA)TM and recognize the best products at the CES in advance of the show every year. Bosch was previously the recipient of the Best-of-CES Award for the Chevrolet MyLink system in the category “Car Tech” in 2013.

Sensitivity right to the fingertips for enhanced safety while driving

The new touch screen offers a unique form of interaction. When touched, the display responds with haptic elements as well as visual and acoustic signals.

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Drivers can feel the keys on the touch screen without looking thanks to variances in the surface structures – and without immediately triggering an action. Rough, smooth, or even patterned surfaces stand for different buttons and functions. The virtual button is not activated until the operator presses it more firmly. Users have the feeling that they are pressing a normal, mechanical button. In appearance, however, the touch screen with haptic elements does not differ from a conventional display.

The touch screen also recognizes the amount of pressure applied by the fingers and activates different functions accordingly. Light pressure, for example, initiates the Help function; by applying varying pressure, users can control how fast or slowly they scroll through a list. Since drivers can feel the keys, looking at the keyboard while pressing a button to change a radio station (for example) is often unnecessary – eyes stay on the road more frequently. The touch screen is equipped with two sensors: a conventional touch sensor and a second sensor that measures the amount of pressure from the fingers. Special software and suspension mechanics are employed to create the various surface structures.

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Press photo: 1-CM-21773

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Infotainment from Bosch: **Connectivity at its best in Suzuki vehicles** Safe and easy touch-screen operation

November 2015
PI 8557 CM Ks/af

- ▶ Radio, navigation, telephone and smartphone integration
- ▶ User-friendly route guidance based on SD map navigation
- ▶ Smartphone integration via Mirror Link™ and Apple CarPlay®

Comprehensive integration, user-friendly operation, multimedia functions – the Bosch unit now being introduced by Suzuki in several models worldwide creates a connected information system offering a broad range of various infotainment and assistance functions aimed at meeting today's demands for added value.

The new system ensures that passengers in Suzuki vehicles stay in constant contact with the outside world. The 7-inch color touch-screen displays a host of practical and convenient connectivity options in a single device, including smartphone integration via Mirror Link™ and Apple CarPlay®, advanced map navigation and voice control, a hands-free Bluetooth® system, and exceptional music enjoyment via audio-streaming or crystal-clear radio reception (with digital radio in Europe). “Using the smartphone connection and the easy-to-understand menus and symbols on the display, users of the new Suzuki system can stay connected with the outside world anytime and from anywhere,” commented Manfred Baden, President of the Car Multimedia division at Bosch.

Easy plug and play: pinch, swipe, or use voice commands

Thanks to the low-glare 7-inch display, voice commands, and steering wheel remote control buttons for volume, telephone, or available sound and storage media, system operation is truly easy and intuitive. Function keys and knobs have been completely eliminated. The many options available in the menus – whether choosing radio stations, selecting music titles, pulling up navigation maps, or addressing telephone lists – can be easily and safely operated on the touch screen by pinching, swiping, or sliding your fingers on the screen.

**Perfect integration with the vehicle**

The Car Multimedia experts from Bosch have developed a smartphone integration solution for the Suzuki vehicles that guarantees the perfect connection of smartphones via Mirror Link™ and via Apple CarPlay®, assuring simple operation and fast personalization of the app experience. By plugging into the USB slot, the smartphone can be recharged at the same time during the trip. The system also offers Bluetooth® connection capacity for cell phones. It can be easily controlled via menus which provide direct access to the phone book or call lists and text messages. In addition, the Suzuki system is able to read, analyze, and play back virtually any popular digital audio and video format. Thanks to Bluetooth® audio streaming, audio data can be transmitted wirelessly and played for a rich in-car music experience. Besides playing audio files stored on an iPod, USB flash, drive or SD card, the device can play back videos via USB or from an external DVD player.

Optimized route takes you to your destination while lowering fuel consumption

The SD map navigation in the new Suzuki system uses precise, acoustic driving recommendations to guide drivers to their selected destination. Once the destination has been entered, the route is calculated instantly, and the maps and driving recommendations appear in easy-to-read 2-D or 3-D map views. Drivers can also select an “Optimized Route”, which is calculated to consume a minimum of fuel and reduce CO₂ emissions. Moreover, it is possible to make side trips at any time to many different points of interest, including personal favorites (myPOIs), or to find a Suzuki partner anywhere in the dealer network.

By providing this compact multimedia unit featuring innovative smartphone integration and a broad range of functions to the Japanese manufacturer, Bosch is continuing its successful partnership with Suzuki. “Suzuki can now make a powerful infotainment solution for connected contents and services available to its customers worldwide,” said Manfred Baden.

Press photos: 1-CM-20584, 1-CM-21772

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BOSCH

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The Bosch Group is a leading global supplier of technology and services. It employs roughly 360,000 associates worldwide (as per April 1, 2015). The company generated sales of 49 billion euros in 2014. 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 subsidiary and regional companies in some 60 countries. Including its sales and service partners, Bosch is represented in roughly 150 countries. This worldwide development, manufacturing, and sales network is the foundation for further growth. In 2014, Bosch applied for some 4,600 patents worldwide. The Bosch Group's strategic objective is to create solutions 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."*

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**The sales figure disclosed for 2014 does not include the former joint ventures BSH Bosch und Siemens Hausgeräte GmbH (now BSH Hausgeräte GmbH) and ZF Lenksysteme GmbH (now Robert Bosch Automotive Steering GmbH), which have since been taken over completely.*



Connected Workshop - the Bosch vision **The workshop of the future is connected**

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- ▶ Usage-based maintenance and preventive repair become reality
- ▶ Customer confidence and increased revenue through connected quick diagnostics
- ▶ Ideal repair preparations prior to the workshop appointment for an effective throughput of the vehicle
- ▶ New technologies to optimize the repair process

Solutions for the connection of diagnostic and test devices with, for example, the customer service area have been available for quite a while. The aim is to avoid having to collect customer and vehicle data again and again, and thus being able to optimize the throughput of the vehicle in the workshop. Bosch had provided important stimuli with its workshop network, which were then realized in the open asanetwork.

The Internet of Things, fast data connections and the possibility of intelligently processing even very large amounts of data have by now opened up completely new dimensions for the so-called Connected Workshop. The workshop of the future knows the "state of health" of their customers' vehicles and, if necessary, recommends the vehicle owner to have the vehicle repaired even before a component fails. This helps omitting breakdowns and unnecessary downtime, which is especially important for commercial vehicles. The workshop has all information at hand that is necessary for the repairs and is thus able to carry out all works on the customer's vehicle effectively, completely, without delay and in high quality. Bosch has developed the respective components for the Connected Workshop which in the meantime have been tested in practice in pilot projects.

This is what the vehicle workshop of the future looks like

The future of the workshop starts with the connected vehicle. A central control device continuously records driving data and information about the

operating status and the stress on the different vehicle components. The data is transmitted to a central data processing center where it is processed for preventive diagnostics by using intelligent algorithms. This software combines the vehicle's measured values with data collected from former repairs, experiences from fleet operation and Bosch knowhow about components and vehicle systems. Like this, it is possible to both adapt maintenance appointments to the individual vehicle stress and to calculate the remaining lifespan of individual vehicle components in advance. The Bosch software package also makes it possible to carry out test procedures via telematics services in order to prepare and shorten the upcoming workshop visit.

As required, the driver is informed that maintenance is due or receives the recommendation to have an injector of the injection system replaced as the old one will probably fall out shortly. If the driver accepts the recommendation, he receives a call from the Service Center to schedule an appointment at the workshop. At the same time, the workshop is informed about all aspects of the upcoming repairs, spare parts are ordered and the availability of any necessary special tools is checked. Thus, everything necessary is done to guarantee a trouble-free repair process on the agreed workshop appointment.

All the repair information on an electronic job card

Once the driver arrives on the agreed appointment, the license plate is scanned when entering the premises. The customer service advisor is informed about the customer's arrival and at the same time, all data regarding the planned repair is sent to the electronic Bosch job card. This job card accompanies the vehicle throughout the workshop. While the customer service advisor drives the vehicle into the service area, the Bosch "Flex Inspect" component automatically reads out the fault memory, and checks the battery, the tire inflation pressure and the chassis geometry. Then, the advisor discusses all upcoming works on the vehicle with the driver. This raises customer confidence and gives the service center the opportunity to offer further services.

Augmented Reality supports the work of the mechatronics technician

The electronic job card also transmits all the repair information to the workplace of the mechatronics technician. At the same time, Bosch provides him with all diagnostics and vehicle data that is necessary for the repair. This information is permanently updated via Internet connection. Additionally, the mechatronics technician is supported by Augmented Reality on his Bosch DCU tablet computer. Augmented Reality broadens

the perception of reality. After the service employee has focused the camera of the tablet computer on the motor compartment, suitable information such as necessary tools and repair instructions are blended in the real picture. The time-consuming consultation of service manuals is thus omitted. Also components that are hidden behind coverings or the cabling behind a dashboard can be depicted as three-dimensional images. The data for the Augmented Reality backup are automatically sent from a cloud application to the workshop tablet.

The mechatronics technician can call for additional support by Bosch service center employees via remote service. Using special software, Bosch specialists are able to long-distance control test devices or check parameter of air-conditioning devices, provide support for calibration or guide the workshop employee step-by-step through the AC service.

All finished works are then documented on the electronic Bosch job card. The service employee is thus able to explain what has been repaired in detail when the customer picks up his vehicle. At the same time, the information regarding the repair process is transmitted to the data center where it is processed using the Bosch analysis software, which constantly improves preventive diagnostics.

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The Automotive Aftermarket division (AA) provides the aftermarket and repair shops worldwide with a complete range of diagnostic and repair shop equipment and a wide range of spare parts – from new and exchange parts to repair solutions – for passenger cars and commercial vehicles. Its product portfolio includes products made as Bosch original equipment, as well as aftermarket products and services developed and manufactured in-house. More than 18,000 associates in 150 countries, as well as a global logistics network, ensure that some 650,000 different spare parts reach customers quickly and on time. In its “Automotive Service Solutions” operations, AA supplies testing and repair-shop technology, diagnostic software, service training, and information services. In addition, the division is responsible for the “Bosch Service” repair-shop franchise, one of the world’s largest independent chains of repair-shops, with some 16,500 franchises. In addition, AA is responsible for more than 800 “AutoCrew” partners.

Additional information can be accessed at www.bosch-automotive.com.

The Bosch Group is a leading global supplier of technology and services. According to preliminary figures, its roughly 281,000 associates generated sales of 46.4 billion euros in 2013 (Note: due to a change in the legal rules governing consolidation, the 2013 figures can only be compared to a limited extent with the 2012 figures). Its operations are divided into four business sectors: Automotive Technology, Industrial Technology, Consumer Goods, and Energy and Building Technology. The Bosch Group comprises Robert Bosch GmbH and its more than 360 subsidiaries and regional companies in some 50 countries. If its sales and service partners are included, then Bosch is represented in roughly 150 countries. This worldwide development, manufacturing, and sales network is the foundation for further growth. In 2013, Bosch applied for some 5,000 patents worldwide. The Bosch Group's products and services are designed to fascinate, and to improve the quality of life by providing solutions which are both innovative and beneficial. In this way, the company offers technology worldwide that is "Invented for life."

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