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Robert Bosch GmbH  
Postfach 10 60 50  
70049 Stuttgart

Media und Public Relations  
Leitung: Melita Delic  
Presse-Forum:  
[www.bosch-presse.de](http://www.bosch-presse.de)



## **Bosch solutions for urban mobility**

November 2017

PI 9869 BBM FF/af

- ▶ Connected parking saves fuel and time – and reduces stress
- ▶ 48-volt drive systems make electric scooters an urban reality
- ▶ 300 projects for tomorrow's diesel engines

Coup: Bosch already offers mobility services for large cities. The Coup e-scooter sharing service is one example. After debuting in Berlin, it has now been launched in Paris. Bosch has put 1,600 e-scooters on the road – and more are on the way. Anyone 21 years of age or older with an international or EU category B driver's license can use this service. The Coup app enables users to find, reserve, and pay for the nearest e-scooter and then simply ride away on it – all without a key. A helmet and two charged batteries are stored under the seat. Coup makes sure the batteries are always charged so that customers do not have to worry about anything. Powered by electricity from renewable sources, the e-scooters can travel as fast as 45 kph. Users can park them in specially designated zones within Coup's area of operations.

Multimodal: In July 2017, Bosch launched the test phase for a mobility assistant that analyzes real-time data to find the quickest route through a city. This app guides commuters to their destinations efficiently, allows cities to regulate traffic volumes, and enables mobility providers to enhance utilization of their various means of transport.

Connected parking: Step by step, Bosch projects are helping take the stress out of the search for parking. At present, this search accounts for one-third of urban traffic. Whether community-based parking, active parking lot management, or automated valet parking – Bosch solutions for connected and automated parking save time and fuel, and spare people's nerves.

Finding a parking space: Bosch community-based parking simplifies the search for a suitable space. Using the ultrasonic sensors of their parking assist system, cars identify and measure the gaps between parked cars as they drive past them. The data gathered is transferred in real time to a digital parking-space map

that can help guide drivers to available spaces. Together with Mercedes-Benz and other manufacturers, Bosch is testing this service in cities across Germany and elsewhere in Europe. This system is to be expanded so that drivers can pay parking fees digitally.

Connected cars: By 2025, connectivity will have clearly changed driving for everybody. Connected functions will save almost 400,000 metric tons of CO<sub>2</sub> – as much as one major German national park can capture and store in three years. Strategies such as community-based parking and active parking-space management can reduce the number of kilometers driven in search of parking spaces by 480 million, while highly automated driving can also save fuel.

RDE: This year will see the first-time certification of diesel models that comply with the Euro 6 standards for real driving emissions, or RDE. Bosch is currently pursuing some 300 RDE projects with its customers. The company wants to support automakers in their efforts to make nitrogen-oxide driving emissions from diesel vehicles even lower. In urban test drives, Bosch has already shown this is possible.

Particulate filters: In Europe, Bosch will no longer be carrying out engineering work for spark-ignition engines that are not fitted with a particulate filter. Such filters have helped significantly reduce the particulate emissions of diesel engines, and this is now a goal for gasoline engines as well.

48-volt drive system for light electric vehicles: Bosch has developed a finely tuned 48-volt drive system – comprising a motor, control unit, battery, charger, display, and app – that is ideal for urban mobility. This drive system makes for efficient urban mobility and, thanks to its rapid acceleration from a standstill, for greater driving enjoyment. Whether two, three, or four wheels, this system is available for all classes of light electric vehicles. As it is made up of off-the-shelf automotive components, manufacturers will have the benefit of production-tested parts and minimal development expense. This gives both established OEMs and new players in the market the opportunity to launch vehicles within 12 to 18 months.

Final mile: Bosch electromobility is already in evidence in German urban delivery traffic. Bosch supplies the powertrain system for the German Post Office's Streetscooters. This is Europe's largest electric-vehicle fleet.

Keeping Bosch associates mobile no matter what: All Bosch locations in the Stuttgart metropolitan area rely on public transportation on days when particulate-pollution warnings are issued. In such cases, Bosch associates who work in Stuttgart can use their company ID as a ticket for work-related trips by public transportation. This special arrangement between the transportation authorities in Stuttgart and Bosch is yet another mobility solution the supplier of technology and services offers its workforce. It also allows Bosch to support the city's efforts to combat particulate pollution.

### **Contact person for press inquiries**

Florian Flaig,

Phone: +49 711 811-6282

*Mobility Solutions is the largest Bosch Group business sector. In 2016, its sales came to 43.9 billion euros, or 60 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 390,000 associates worldwide (as of December 31, 2016). The company generated sales of 73.1 billion euros in 2016. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. 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 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 nearly every country in the world. The basis for the company's future growth is its innovative strength. At 120 locations across the globe, Bosch employs some 59,000 associates in research and development.*

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## **A smart city in China: Bosch to make Tianjin intelligent**

### **Strategic cooperation agreed**

June 20, 2017

PI 9718 RB Gri/KB

Frankfurt, Germany – The Bosch Group is to be part of one of China’s pioneering smart-city projects: on June 20, the leading global supplier of technology and services signed a strategic cooperation framework agreement with the city of Tianjin. The aim of the alliance is to explore possibilities for putting the “Smart Tianjin” initiative into practice. The Chinese port is to be made into a smart city.

Attending the signing ceremony, which took place during the Tianjin-Frankfurt Cooperation Forum, Peter Tyroller, the member of the board of management of Robert Bosch GmbH responsible for Asia Pacific, said: “China’s new urbanization has put smart-city solutions on the map as one of the key drivers of urban development. Cities need to provide increasing levels of convenience, energy efficiency, and security. We are pleased to have the opportunity to offer Tianjin our connected solutions as a way of improving quality of life and creating an economically more efficient city.” With the sensors, software, and services the Bosch Group provides as an innovation-driven IoT company, it is well positioned to help take China into the smart-city era.

#### **Tailor-made solutions for the needs of “Smart Tianjin”**

In the rough triangle encompassing Beijing, Tianjin, and Hebei province, China is planning an international metropolitan area. With more than 15 million inhabitants, Tianjin will be an important industrial center and transport hub within this area. With this in mind, the Tianjin municipal government has set up a “Smart Tianjin” initiative. As part of this initiative, Bosch will design a smart-city blueprint for Tianjin, sharing and leveraging experience accumulated in other international smart-city projects, and taking local needs into consideration. To be closer to its client, Bosch will set up a project office in Tianjin.

## **Bosch smart-city solutions for mobility, energy, buildings, security, and e-governance**

Bosch will contribute the know-how it has gained so far from other smart-city projects, including Singapore, San Francisco, Stuttgart, Berlin, and the Hamburg docks. For smart cities, Bosch offers solutions in the areas of mobility, energy, buildings, security, and e-governance – in other words, digital city administration. In the mobility sphere, its solutions include environmental monitoring, connected parking, fleet management, e-mobility, and multimodal transport. When it comes to energy, the range includes virtual power plants, energy-efficient heating, hot water, and cooling systems, as well as energy storage units. The security solutions encompass systems for fire protection, access control, and video surveillance. For residential buildings, Bosch provides smart home technology and connected household appliances. As for e-governance, the range includes the community app and the city data platform.

## **Bosch in China**

In 2016, the Bosch Group recorded sales of 12.5 billion euros in China. This means that the supplier of technology and services increased its sales by 12 percent year on year, a rise of 19 percent in local currency. With some 59,000 associates, China is also home to Bosch's largest workforce outside Germany. Bosch has been active in China since 1909, and all four of its business sectors are now represented there. The Bosch Group also sees great potential in China for its business with IoT connectivity – not only in the area of smart cities, but also in the fields of connected mobility and the industrial internet.

## **Contact person for press inquiries:**

Jingying Lou

Phone: +86 21 2218-8828

Email: [Jingying.Lou@cn.bosch.com](mailto:Jingying.Lou@cn.bosch.com)

*In China, the Bosch Group manufactures and markets automotive original equipment and aftermarket products, industrial drives and control technology, packaging technology, power tools, security and communication systems, thermotechnology, household appliances. Having established a regional presence in China in 1909, Bosch employs close to 59,000 associates (as of December 31, 2016) and operates 62 legal entities and facilities, with consolidated sales of CNY 91.5 billion in fiscal 2016.*

Additional information is available online at [www.bosch.com.cn](http://www.bosch.com.cn).

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## Press Release

Kitchen experience of the future

### **BSH develops concepts for tomorrow's kitchens**

- **BSH steps up investment in research and development with the focus on digital technologies**
- **Connected solutions and services offer growth potential**
- **Personal kitchen assistant concept opens up the world of artificial intelligence**

**Munich, May 4, 2017 (bsh) – Controlling appliances remotely, operating them with facial expressions or speech, and a wealth of additional services – tomorrow's kitchen is connected and offers a variety of multimedia options. The ideas and future concepts for this are forged in the innovation hub at BSH Hausgeräte GmbH. One such example is Mykie – “my kitchen elf”. Mykie adds a personal assistant to BSH's vision of the connected kitchen. As a kitchen specialist, he provides everyday support and transforms cooking into an experience.**

#### **Digital solutions open up strong growth potential worldwide**

BSH is the first home appliance manufacturer to connect the entire home appliance portfolio with its open Home Connect system. The Mykie kitchen assistant concept fits into the home appliance portfolio of different brands connected via Home Connect, and hence also into the attractive partner network of the digital ecosystem offering a variety of services that can be accessed online.

#### **Winking kitchen assistant enables shared cooking experiences**

Mykie is operated by means of voice recognition. As a personal assistant, he listens to the user, responds with a facial expression, answers questions, and provides help for a range of everyday topics and queries. For example, Mykie knows what's in the fridge right now, how much longer the pizza still has to bake in the oven, or which recipe steps have to be followed. Mykie projects these steps conveniently and clearly onto the kitchen wall and sends the recommended appliance settings from the recipe directly to the connected appliances. Apart from controlling the home appliance functions, additional services, such as accessing online entertainment offers, are also offered. Thanks to an integrated camera, Mykie can also bring several users together virtually if desired, thus enabling shared cooking experiences, regardless of where the individual users happen to be.

**Mykie development stage**

BSH Hausgeräte GmbH presented the smart kitchen assistant concept at the International Consumer Electronics Fair (IFA) in Berlin in 2016. Experience on the expectations consumers have regarding an assistant in the kitchen environment is currently being collected within different cooperation ventures and market research studies. The information from this will be incorporated successively into the next development phases. A precise date for the market launch of Mykie has yet to be fixed.

Additional press materials are available in the newsroom at: <https://www.bsh-group.com/newsroom/press-releases>

You can now find out about current topics at BSH worldwide at: <http://stories.bsh-group.com/en/>

With annual sales of around €13.1 billion in 2016 and more than 58,000 employees, BSH Hausgeräte GmbH is one of the global leaders in the home appliance sector. BSH manufactures at around 40 factories, operates over 80 companies and has a presence in around 50 countries.

BSH is a company of the Bosch Group.

Contact for journalists:

BSH Hausgeräte GmbH

Corporate Communication Region Europe

Eva Bauerschmidt

Tel.: +49 (0)89 4590-3441

E-mail: [eva.bauerschmidt@bshg.com](mailto:eva.bauerschmidt@bshg.com)



## **High tech for farms: with agricultural technology, Bosch opens up market worth billions** Bosch transfers technologies from cars to agriculture

November 13, 2017

PI 9864 RB IEh/KB

- ▶ Bosch generates 1 billion euros in sales with agricultural technology
- ▶ Smart technologies make agriculture more efficient
- ▶ Bosch makes farms digital with sensors and connected platform

Stuttgart, Germany – With farmers using sensors to determine the perfect time for harvesting, consulting apps to measure soil temperature, and steering automated tractors across fields, the market for agricultural technology is growing worldwide. It is also a lucrative field for Bosch. From powertrain systems for tractors and hydraulic solutions for agricultural machinery to connected products for smart farming, the company is transferring automotive technology to agriculture, and is already generating sales worth 1 billion euros as a result. Moreover, this business is set to keep growing. By the middle of the next decade, Bosch plans to double sales of technologies for agriculture. “Bosch can do more than cars and cordless screwdrivers. We are bringing high tech to farms, opening up a market worth billions,” says Dr. Markus Heyn, member of the Robert Bosch GmbH board of management.

### **Bosch’s business with agricultural technology is growing**

Bosch wants to make agriculture more sustainable and more efficient. The challenges are considerable, since the world is home to a constantly growing number of people. According to studies, the world’s population will total 8 billion by 2025. To feed people, more food needs to be grown. But the amount of arable land is not growing. That means farmers need to increase their yields. While one farmer fed 4 people in 1900, the figure now is 155 people – and that figure is on the rise (source: Rheinischer Landwirtschafts-Verband).

One key to higher yields and more efficiency in the field is connectivity. Studies indicate that the market for digital agriculture is set to grow worldwide from 3.5 billion euros today to 6 billion euros. Smart farming and the connectivity of agriculture are catapulting farms into the future – and are also driving forward new technologies at Bosch. “Through the internet of things and the Bosch IoT Cloud, we are making farms digital,” Heyn says. There are very few companies apart from Bosch that have the necessary software, sensor technology, and service expertise. From field connectivity to machinery, Bosch solutions support farmers in their everyday work and help optimize harvests or make operating processes more efficient. Bosch is also applying MEMS sensors originally developed for cars to agriculture. These sensors measure relevant values such as temperature and humidity, and transmit them via the cloud to farmers’ smartphones. Using an app, they are able to keep an eye on their crops at all times, no matter where they are, without having to actively check on crops in the field. Farmers save time and increase the quality and yields of their products. Another service that the Bosch IoT Cloud can help make reality is connecting agricultural machinery. Vehicle data can be used to predict faults and remedy them in good time, preventing breakdowns and expensive repairs in the first place.

### **Spraying and saving**

Not only is Bosch making farmers’ work easier and helping them increase yields, the company is also helping make agriculture more environmentally friendly through technology. As part of a research partnership with Bayer, Bosch is developing smart spraying technology. Using camera sensors, it is able to differentiate between crops and weeds and target weeds with pesticides – at lightning speed, in a single process. “Smart spraying sustainably clears fields of weeds. This safeguards yields while minimizing environmental impact,” Heyn says.

Bosch’s system expertise is making agricultural machinery more efficient and convenient to use. Smart Cab, which Bosch co-developed as a member of the CAB concept cluster, turns agricultural vehicles into connected command centers in the field. All components – vehicles, cameras, and drones alike – can interact with each other in the smart cab. Via the cloud, camera drones send detailed pictures of the condition of crops to the driver’s cab, and operators can receive warnings from the object recognition camera about living obstacles such as deer. Using a feature store, vehicle users can download certain functions over the air directly to the machine. In this way, nozzles can be adjusted depending on weather conditions and the state of the soil, for example.

**Bosch at AGRITECHNICA 2017:** At the world's largest agricultural technology trade fair, Bosch will be showcasing new technologies for smart farming and agricultural machinery at two booths.

### **Deepfield**

Hall 9, booth G03

### **Bosch Rexroth**

Hall 16, booth A04

A "Connected Agriculture" press briefing will take place at the Deepfield booth from 15:00 to 15:30 CET on November 13, 2017.

### **Press images:**

#1038098, #1038100, #1056404, #1038085, #1038126, #1162501, #1162556, #1162499, #1162500 #1257427, #1257428

### **Contact persons for press inquiries:**

Inga Ehret

Phone: +49 711 811-16476

Christiane Wild-Raidt

Phone: +49 711 811-6283

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## Preventing milk from going sour Bosch supports farmers with new sensor system

November 13, 2017  
PI 9865 RB Cwi/KB.

- ▶ Sensor measures milk temperature
- ▶ Farmers receive data right on their smartphones, saving time
- ▶ Converting older milk tanks is easy

Renningen, Germany – Studies indicate that milk is one of the most-consumed foods. In Germany alone, per capita consumption of fresh milk products stands at 90 kilograms a year. The new Bosch Deepfield Connect milk monitoring system provides quality-assurance support for milk producers and dairies. The road from the cow to consumers is a long one: milk is stored in tanks for up to three days before it makes its way to the refrigerator aisle or is processed further. This involves considerable risks. Germs and sour milk can negatively impact farmers' yields. "The milk tank features multiple openings that are sealed with rubber caps. We are equipping these rubber caps with an infrared sensor and gathering measured data," says Thijs Verploegen, the product manager in charge of the system. The data is sent to the Bosch IoT Cloud, where it is processed and transmitted directly to the milk producer's smartphone.

### **Retrofitting older tanks is easy**

The sensor measures milk temperature. Among other things, this makes it possible to determine whether the milk is properly stored. A defective agitator means that milk will no longer be evenly cooled. "It is crucial that the agitator, cleaning, and cooling work properly and that the milk does not get any warmer than 4 degrees Celsius for several hours at a time," Verploegen explains. "If it did, the number of germs would increase, and the milk would be unfit for consumption." An app alarms farmers when the cooling breaks down, allowing them to act in good time before the milk becomes sour. The data can be shared with dairies and tanker drivers, helping them see at a glance whether the quality of the milk is acceptable. The milk monitoring system also offers an additional advantage: it can be installed in any milk tank – regardless of the model,

manufacturer, or age of the tank. This makes it possible to retrofit the latest technology to older milk tanks at low cost.

### **Solutions for Agriculture 4.0**

The new sensor solution is a good fit for the Deepfield Connect product family. It provides connected solutions for Agriculture 4.0. The basic principle can be used for a wide range of agricultural produce. It is based on sensors that measure microclimatic data such as temperature and the humidity of the air and soil. Using a transmitter, the readings are sent via radio to the Bosch IoT Cloud. From there, the information is routed to the Deepfield Connect app on growers' smartphones, allowing them to keep an eye on their crops at all times, without having to be in the field. For example, this lets growers know that frost is likely even before temperatures fall below freezing and gives them a chance to cover plants or take other appropriate measures. The record of temperature and humidity readings lets them know whether everything is alright, whether there is a risk of fungal infection, or if irrigation needs to be adjusted, saving growers time and increasing their yields. This year, it also became possible to use the system for additional fruit and vegetable varieties as well as wine-growing, in addition to asparagus and strawberries.

### **Additional information:**

The connected sensor system for milk monitoring will be presented to the public for the first time at Agritechnica, the world's largest trade fair for agricultural equipment, from November 12 to 18, 2017, in Hannover, Germany. Market launch is scheduled for early 2018.

More information about the Bosch Deepfield start-up is available [here](#).

### **Press photos:**

#1257427, #1257428

More information about Bosch solutions for agriculture is available [here](#).

### **Contact person for press inquiries:**

Christiane Wild-Raidt,

Phone: +49 711 811-6283

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## Car, we have to talk! Bosch puts the voice assistant behind the wheel

January 2018

PI 9804 BBM Fi/KB

- ▶ “Bosch is putting an end to the button chaos in the cockpit. We turn the voice assistant into a passenger,” says Dr. Dirk Hoheisel, Member of the Board of Management of Robert Bosch GmbH.
- ▶ Voice talent at Bosch is by nature multilingual and does not require an external data connection for support.
- ▶ “Casey”, “Linda”, or “Michael”: The driver decides on the name for the Bosch voice assistant.

Hildesheim, Germany — “I’m Casey, your new passenger. Are you ready to get started?” Voice assistants such as Alexa, Siri, Google, Cortana, and Bixby have taken charge of smart households, control lighting and the vacuum cleaner – Bosch now puts the voice assistant behind the wheel. The newly developed technology frees drivers from distractions so that they can concentrate on their essential task. “When drivers get into a modern car, they can sometimes feel like an airplane pilot – buttons, screens, a confusing menu navigation with a thousand sub-menus. Bosch is putting an end to the button chaos in the cockpit. Instead, we turn the voice assistant into a passenger,” says Dr. Dirk Hoheisel, Member of the Board of Management of Robert Bosch GmbH. The assistant, who responds to the name “Casey” the first time the driver gets in, makes driving safer as well as more comfortable. According to a study from the Allianz Center for Technology, German car drivers are frequently distracted when, for instance, they operate the navigation system, adjust the air conditioning, or answer a phone call. This kind of distraction is one of the primary causes of road accidents.

### **Responds to every word – even offline**

Voice command functions of the past offered little help in this respect. They are frequently structured as a menu of possible options. The driver must commit the structure to memory and read the required commands from the display, and that is just as distracting. “Say what you want the way you want to say it – Bosch puts a voice assistant in the car who understands the driver just like another person

would,” says Hoheisel. The Bosch assistant no longer responds to rigidly worded commands. The voice recognition system understands natural sentence structures and can even handle accents and dialects, and it does so in more than 30 countries of the world. English is not simply English for the talented linguist Casey; she speaks a British, American, New Zealand, or Australian dialect. More than a decade of work has been invested in the development of the voice control. Casey can do something that goes beyond the capabilities of even well-known competitors. She thinks ahead and learns. If, for instance, the driver wants to call “Paul”, the system automatically reviews the contacts and considers the driver’s present location, time, and situation before responding. When on the way to the office in the morning, “Paul” probably means the colleague at work while the same name in the evening might refer to the best friend. To make sure, Casey asks a question: “I have found five contacts called Paul. Do you want to call Paul Stevenson?” This dependency on context is a first stage of artificial intelligence. Another bit of sophisticated technology: the driver can, for example, also enter destination addresses in France in French – without having to make any changes in the settings manually. One example: “Take me to Champ de Mars, Cinq Avenue Anatole Paris.” Casey automatically understands the destination and calculates the route to the Eiffel Tower. What’s more: the Bosch assistant has no need whatsoever of an external data connection. The infotainment system in the car takes over the calculation without sending any data to the cloud. Casey even stays with the drivers in tunnels, when far away from areas with good mobile network coverage, or in other countries when the smartphone is offline.

### **Responds to any name**

The conversation in the car becomes even more personal when the driver christens the assistant with the name of his or her choice. The days are past when the voice command system responded only to the name given by the manufacturer. Regardless of whether it is called “Casey”, “Michael”, or “Linda”, the Bosch voice recognition system understands and speaks 30 different languages with a total of 44 female and 9 male voices. The driver activates the assistant by calling out “Hey, Casey” or uses the new name given to the assistant. The driver starts every new dialog simply by speaking directly to the assistant; no longer does the driver have to wait for a beep before starting to talk.

**Press images:** #1289425

### **Further information:**

[Overview of all features of the Bosch voice assistant \(with videos\)](#)

## **Bosch at CES 2018:**

- **PRESS CONFERENCE:** In Ballrooms B, C, and D, Mandalay Bay Hotel, Las Vegas **South Convention Center, Level 2**, from **8:00 to 8:45 a.m. local time on Monday, Jan 8.**
- **BOOTH:** **Tuesday to Friday, Jan 9–12**, in the Central Hall, booth #14028
- **FOLLOW** the Bosch CES 2018 highlights on Twitter: **#BoschCES**
- **PANELS WITH BOSCH EXPERTS:**
  - **Tuesday, January 9, 1:30 – 3:15 p.m.** (local time)  
“[Connect2Car: Next-Gen Automobility](#)” session with Kay Stepper, Vice President of Bosch in North America, head of driver assistance and automated driving, Las Vegas, Convention Center, North Hall, N256
  - **Wednesday, Jan 10, 1:45–2:30 p.m.** (local time)  
“[Connected Vehicles in Connected Ecosystems](#)” session with Mike Mansueti, President Bosch North America, Smart Cities Conference, Westgate.
  - **Thursday, Jan 11, 11:30 a.m to 12:30 p.m.** (local time)  
“[The Future of Robots at Work and Home](#)” session with Phil Roan, Senior Engineer Robotics, BSH Hausgeräte GmbH, Las Vegas Convention Center, North Hall, N258

## **Contact persons for press inquiries:**

Annett Fischer,

phone: +49 711 811-6286

*Mobility Solutions is the largest Bosch Group business sector. In 2016, its sales came to 43.9 billion euros, or 60 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 390,000 associates worldwide (as of December 31, 2016). The company generated sales of 73.1 billion euros in 2016. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. 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 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 nearly every country in the world. The basis for the company's future growth is its innovative strength. At 120 locations across the globe, Bosch employs some 59,000 associates in research and development.*

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January 7, 2018

## **CES® 2018 Innovation Award: Bosch smart city solution Climo helps to manage air quality**

**Tiny box provides comprehensive real-time data at a fraction of the cost**

- ▶ Climo measures air quality in city of Las Vegas during CES 2018
- ▶ Intelligent data helps cities to take action on air pollution
- ▶ Ambient air quality a key objective for urban environmental planning
- ▶ Connected solution honored in the Smart Cities category
- ▶ Climo is one of multiple smart city solutions presented by Bosch at CES 2018

**LAS VEGAS** – Thanks to smart city technology, cities can now take action on the topic of air pollution. A first step towards improving air quality is the provision and management of data. At CES 2018, Bosch is presenting its micro-climate monitoring system Climo – a new solution, which helps cities around the world manage air-quality parameters in real time and at a much lower cost than existing technologies. The tiny box enables rapid and accurate measurement of data. It has been honored with a CES 2018 Innovation Award in the Smart Cities category. During CES 2018, Climo is monitoring air quality in the city of Las Vegas.

“Sensors throughout the city provide a variety of valuable data. Climo gives cities quicker and easier access to this data, allowing them to take action on air quality,” said Mike Mansuetti, president of Bosch in North America at CES 2018. “The Bosch portfolio of sensors, software and services – combined with a wealth of cross-domain expertise – position us to be a partner for cities to solve challenges and positively impact quality of life of its inhabitants.”

The Climo system, developed by Bosch in collaboration with [Intel](#), enables the rapid and accurate measurement of air-quality parameters. It combines sensors and software to deliver a range of air-quality data, covering key air pollutants including: particulate matter, carbon monoxide, nitric oxide, nitrogen dioxide,

sulphur dioxide and ozone. It also provides data from environmental parameters such as temperature, relative humidity, light, sound, pressure – and even pollen.

### **Benefits for citizens in real time**

Ambient air quality is a key objective for urban environmental planning. The data provided by the Climo system can be utilized by cities in a variety of proactive approaches such as traffic-flow management. It can also serve to proactively message the local population with tips and information. For example, citizens who are asthmatic or suffer from allergies can instantly know whether it is better to stay indoors or avoid a certain part of the city. It is also a source of data generation for cities to make other decisions, such as future policy and planning. In rural or park areas, the system can also provide an early warning for fires.

### **Wireless sensors that can connect over Wi-Fi and cellular networks**

The ability to enable micro-climate data collection comes via the connection of compact wireless sensors. Secure remote calibration and monitoring is enabled through both wireless (Wi-Fi and 3G) as well as a wired connection. The Climo system is powered with Intel IoT technologies and features cloud-based analytics, data management and visualization software.

Units are pre-configured by location and can be further configured using over-the-air updates. The easy update capabilities are part of the Climo design to scale with future technologies, such as 5G, as they become available.

### **Hundred times smaller, ten times more cost-effective**

While air-quality monitoring systems can often require large infrastructure investments and are complex to operate, the Climo system was designed for simple deployment and management. It measures 1/100<sup>th</sup> the size and 1/10<sup>th</sup> the cost of a traditional air quality monitoring system. Climo was designed to withstand a variety of weather conditions. Climo units feature options for power via either 110/220 V or 12V DC. This makes it an interesting solution for cities and countries around the globe – in different weather zones and with different economic environment. Originally, it was developed by Bosch engineers in India.

### **Real time data of air quality in Las Vegas during CES 2018**

At CES Unveiled in Las Vegas, Bosch will present a live demonstration utilizing Climo that shows air-quality measurements from cities around the world – including Las Vegas. It will also show an updated management interface for Climo that provides an even more comprehensive view for city officials.

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Las Vegas Convention Center, North Hall, N258

## **Contacts:**

Agnes Grill

+49 711 811-381 40

[Agnes.Grill@bosch.com](mailto:Agnes.Grill@bosch.com)

Tim Wieland

+1 248-876-7708

[Tim.Wieland@us.bosch.com](mailto:Tim.Wieland@us.bosch.com)

## **About Bosch**

*The Bosch Group is a leading global supplier of technology and services. The company employs roughly 390,000 associates worldwide (as of December 31, 2016) and generated sales of 73.1 billion euros (\$80.9 billion) in 2016. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected industry. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to create solutions for a connected life, and to improve 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 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, engineering, and sales network covers nearly every country in the world. The basis for the company's future growth is its innovative strength. At 120 locations across the globe, Bosch employs 59,000 associates in research and development.*

*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 upfront 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](http://www.bosch.com), [www.bosch-press.com](http://www.bosch-press.com), <http://twitter.com/BoschPresse>.

Exchange rate: 1 EUR = \$1.1069

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## Salut Paris! Bosch's e-scooter sharing service COUP launches in France

May 18, 2017

PI 9675 BBM IEh/af

- ▶ Bosch's shared mobility platform COUP launches in Paris
- ▶ 600 rentable e-scooters will be available in France's capital starting summer 2017
- ▶ Bosch board of management member Dr. Markus Heyn: "Paris is the perfect place for us to expand the Coup service."

Salut Paris! Greater freedom and riding enjoyment instead of traffic jam: the e-scooter sharing service known as COUP is set to roll out another option for urban transport in the French metropolis starting summer 2017. Instead of squeezing into the overcrowded Metro, searching for a parking spot for hours, or getting stuck in a congestion nightmare around the Arc de Triomphe, Parisians will be able to make their way quickly and flexibly through the city's hectic traffic. Starting this summer, 600 rentable scooters from Coup will hit the streets of the city on the Seine. Reserve, book, and ride off: for Paris, the electric speedsters are an easy-to-use alternative to public transportation, your own car, or a taxi.

The expansion to France marks another step for Bosch in its efforts to establish itself as a provider of connected mobility solutions. The e-scooter sharing provider Coup, which is a wholly owned subsidiary of Robert Bosch GmbH, launched a new business field in the Mobility Services operating unit in the past year in Berlin. The opportunity to experience the city with greater flexibility and less fuss on two wheels has proved popular. "Coup's launch has surpassed expectations. The success has given us the confidence to expand the sharing service to another European city," said Dr. Markus Heyn, a member of the board of management of Robert Bosch GmbH.

### Greater mobility and freedom in urban traffic

Paris is one of the most densely populated cities in the world. For years, the city has had to contend with high levels of particulate pollution, a lack of parking spots, and traffic jams. Scooters are increasingly becoming established as a

Robert Bosch GmbH  
Postfach 10 60 50  
D-70049 Stuttgart

Email Inga.Ehret@de.bosch.com  
Phone +49 711 811-16476  
Fax +49 711 811-5187718

Corporate Communications,  
Brand Management, and Sustainability  
Senior Vice President: Dr. Christoph  
Zemelka  
[www.bosch-presse.de](http://www.bosch-presse.de)

practical means of transportation. Through electric vehicles available on demand as part of a sharing model, Coup aims to further reduce urban traffic and make it far more eco-friendly. “Paris is the perfect place for us to expand the Coup service. By taking this step, we aim to be a pioneer of efficient urban mobility,” Heyn said. Young people in particular want to hit the city streets without any stress, but they do not necessarily want to own a vehicle. “Urban mobility is going to change radically over the next few years. Bosch wants to help shape this transformation with mobility and service solutions – and understand users’ requirements with regard to these services,” Heyn said.

### **On the road – efficiently**

Anyone who is over 21 years old and has a Class B driver’s license or an international driver’s license can use the service. Through the service’s app, users can locate, reserve, and book the closest e-scooter without any hassle – and then simply set off. No key is necessary. A helmet and two replaceable batteries are located under the seat. Coup takes care of charging the batteries, which means customers do not have to worry about a thing. The scooters are powered by green electricity and can travel at speeds of up to 45 kph. Users can park the scooters in specially designated zones within Coup’s business territory. COUP makes it easy for users to calculate their rides with their pricing model, four Euros per 30 minutes and one Euro for every ten minutes thereafter.

Connected services are part of the corporate strategy in the Mobility Solutions business sector – and are becoming an integral element of Bosch’s business. For example, Bosch is already developing solutions for a connected parking lot management system, for a cloud-based fleet management system, as well as for an app-based mobility assistant targeting the multimodal use of various means of transportation. The Coup sharing service represents another building block in the Mobility Solutions business sector.

### **Contact person for press inquiries:**

Inga Ehret

Phone: +49 711 811-16476

*Mobility Solutions ist der größte Unternehmensbereich der Bosch-Gruppe. Er trug 2016 mit 43,9 Milliarden Euro 60 Prozent zum Umsatz bei. Damit ist das Technologieunternehmen einer der führenden Zulieferer der Automobilindustrie. Der Bereich Mobility Solutions bündelt seine Kompetenzen in den drei Domänen der Mobilität – Automatisierung, Elektrifizierung und Vernetzung – und bietet seinen Kunden ganzheitliche Mobilitätslösungen. Die wesentlichen Geschäftsfelder sind: Einspritztechnik und Nebenaggregate für Verbrennungsmotoren sowie vielfältige Lösungen zur Elektrifizierung des Antriebs, Fahrzeug-Sicherheitssysteme, Assistenz- und Automatisierungsfunktionen, Technik für bedienerfreundliches Infotainment und fahrzeugübergreifende Kommunikation, Werkstatt-konzepte sowie Technik und Service für den Kraftfahrzeughandel. Wichtige Innovationen im Automobil wie das elektronische Motormanagement, der Schleuderschutz ESP oder die Common-Rail-Dieselseltechnik kommen von Bosch.*

*Die Bosch-Gruppe ist ein international führendes Technologie- und Dienstleistungsunternehmen mit weltweit rund 390 000 Mitarbeitern (Stand: 31.12.2016). Sie erwirtschaftete im Geschäftsjahr 2016 einen Umsatz von 73,1 Milliarden Euro. Die Aktivitäten gliedern sich in die vier Unternehmensbereiche Mobility Solutions, Industrial Technology, Consumer Goods sowie Energy and Building Technology. Als führender Anbieter im Internet der Dinge (IoT) bietet Bosch innovative Lösungen für Smart Home, Smart City, Connected Mobility und Industrie 4.0. Mit seiner Kompetenz in Sensorik, Software und Services sowie der eigenen IoT Cloud ist das Unternehmen in der Lage, seinen Kunden vernetzte und domänenübergreifende Lösungen aus einer Hand anzubieten. Strategisches Ziel der Bosch-Gruppe sind Lösungen für das vernetzte Leben. Mit innovativen und begeisternden Produkten und Dienstleistungen verbessert Bosch weltweit die Lebensqualität der Menschen. Bosch bietet „Technik fürs Leben“. Die Bosch-Gruppe umfasst die Robert Bosch GmbH und ihre rund 440 Tochter- und Regionalgesellschaften in rund 60 Ländern. Inklusiv Handels- und Dienstleistungspartnern erstreckt sich der weltweite Fertigungs- und Vertriebsverbund von Bosch über fast alle Länder der Welt. Basis für künftiges Wachstum ist die Innovationskraft des Unternehmens. Bosch beschäftigt weltweit rund 59 000 Mitarbeiter in Forschung und Entwicklung an 120 Standorten.*

*Mehr Informationen unter [www.bosch.com](http://www.bosch.com), [www.iot.bosch.com](http://www.iot.bosch.com), [www.bosch-presse.de](http://www.bosch-presse.de), [www.twitter.com/BoschPresse](https://www.twitter.com/BoschPresse).*



## **Bosch and Daimler demonstrate driverless parking in real-life conditions**

### World premiere in parking garage of the Mercedes-Benz Museum

July 24, 2017

PI 9743 BBM joe/af

- ▶ Automated, smartphone-based parking service launched as a pilot project at the Mercedes-Benz Museum parking garage.
- ▶ Bosch supplies infrastructure; automotive technology from Daimler.
- ▶ Driverless parking saves time and reduces stress.

Stuttgart, Germany – Manual parking is now a thing of the past. At the Mercedes-Benz Museum parking garage in Stuttgart, Bosch and Daimler have made automated valet parking a reality. With a command from a smartphone, drivers can now automatically park cars in their assigned spots without having to monitor the vehicles' movements. Automated valet parking is an important milestone on the road to autonomous driving. The pilot solution at the Mercedes-Benz Museum parking garage is the world's first-ever infrastructure-based solution for a fully automated valet parking service in real conditions, with and without drivers at the wheel. From early 2018, visitors will be able to experience the convenient service for themselves in the museum's garage, and save the time they would have spent parking.

“Autonomous driving will be with us faster than many realize. Driverless parking at the museum impressively demonstrates how advanced the technology already is,” said Dr. Michael Hafner, the head of automated driving and active safety development at Mercedes-Benz Cars. “The use of intelligent parking garage infrastructure and its connectivity with vehicles has allowed us to make driverless parking a reality much earlier than expected,” said Gerhard Steiger, the president of Bosch's Chassis Systems Control division.

#### **As if by magic: driving automatically to parking spaces and back**

Using a smartphone, anyone can book a car by app. The journey starts when the vehicle autonomously drives up to the pick-up area. Returning the car is just as

easy: the customer leaves the vehicle in the garage's drop-off area and returns it using the smartphone app. Once the parking garage's intelligent system has identified the vehicle, the car starts and is guided to an assigned space.

This driverless parking is made possible by the interplay between intelligent parking garage infrastructure supplied by Bosch and Mercedes-Benz automotive technology. The sensors installed in the parking garage monitor the driving corridor and its surroundings while guiding the vehicle. The technology in the car safely converts the commands from the parking garage infrastructure into driving maneuvers and, if necessary, stops the vehicle in good time. The sensors for the parking garage infrastructure and the communications technology come from Bosch. Daimler is providing the privately owned museum parking garage and pilot vehicles. Together with Bosch, it will define the interface between infrastructure and the vehicle, and make the necessary modifications to the vehicles' sensor technology and software.

### **World's first operating approval for driverless parking**

The premiere will be followed by an intensive testing and start-up phase. From the start, the project has been overseen by local agencies – the Stuttgart regional administrative authority and the state of Baden-Württemberg's transportation ministry – and experts from TÜV Rheinland with the aim of assessing the operating safety of the automotive and parking-garage technology. The regulatory authorities must issue their final approval before driverless parking can be offered to customers, and the public can use automated valet parking, at the Mercedes-Benz Museum parking garage for the first time worldwide in early 2018. In this way, Bosch and Mercedes-Benz will gain experience in how users deal with automated valet parking. Existing parking garages can be retrofitted with the infrastructure technology. For parking garage operators, driverless parking will mean more efficient use of the parking space available: the same amount of space can accommodate up to 20 percent more vehicles.

**Press photos:** #1147917, #1147919, #1147920, #1147921, #1147922

**Related Link:** [www.bosch-connected-parking.com](http://www.bosch-connected-parking.com)

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

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## The cattle net

### In Brazil Bosch is connecting beef herds with the web

January 2018

PI 10006 RB

Cwi/BT

- ▶ Precision livestock farming increases ranches' productivity
- ▶ Sensor system records animal's weight and relays it to the rancher
- ▶ Lower environmental impact, greater customer benefit

Brasilia: Red dust blows across the broad and sweltering steppe, and there's a strong smell in the air. Forty thousand head of cattle can't help but give off a certain odor. These ones have no idea that they're pioneering the future of livestock farming. Thankfully for those sensitive to smell, Fazenda Santa Fé, one of Brazil's largest cattle farms, is situated far off in the Brazilian state of Goiás, some 400 kilometers southwest of the capital, Brasília. Despite its remote location, this farm could be key to shaping the future of agriculture — even far beyond Brazil. That's because the Bosch Precision Livestock Farming system is being used here for the first time. Gustavo Ferro, wearing a light-colored shirt, jeans, and ostrich leather cowboy boots, explains what this entails. "It takes a lot of time to weigh that many cattle. However, it's decisive to the economic success of a farm to frequently check the animals' weight, and to be as precise as possible in doing so. And we now offer a solution that does precisely that." Ferro has been working on the project since spring of 2014 – it now involves around 20 associates, including veterinarians, agronomists, and, of course, engineers from a variety of areas.

#### Each animal is recorded individually

Animals come to the fazenda ("plantation") to be fattened up about three months before they're ready for slaughter. "Depending on the breed, cattle should gain up to two kilos a day," says Ferro. "Up until now, we could only estimate if they actually did." Weighing all the cattle here posed a considerable challenge, even for experienced farmers. Moreover, adds Ferro, false estimates cost money. "If the breeder sends a bull to slaughter too early, they miss out on the profit that additional weight gain could have brought. If they send it in too late, they've spent

unnecessary money on feed and care.” That’s all coming to an end at Fazenda Santa Fé – at least, in the plots that have already been fitted with the Bosch system. The water trough is placed in one corner of these plots, and the feed is placed in another. A fence separates the two. There’s only one path between them, and a scale is installed there. Each time a bull walks over it, it’s weighed. A reader over the scale detects each bull individually; an RFID transponder is placed in each one’s ear. Sensor signals are processed and linked in a gray box on the scale. The energy to power this comes from an integrated solar panel, and the signals are transmitted to the farm management via antenna, without requiring the internet.

Off beyond the fences, the cowboys are making their rounds. They’re wearing hats, spurs, and leather chaps, just like their forebears did a century ago. The only real difference is that today walkie-talkies hang from their belts instead of revolvers. Around midday, they all gather to eat at the farmhouse. Those who don’t have horses are picked up by the farm bus. The sky is endless, and the horizon shimmers way off in the distance. Today, Frederico Rosseto only has time for a small snack. This agronomist, who’s responsible for rearing cattle in Santa Fé, is sitting in front of a screen inside a spare, highly air-conditioned office. Software developed by Bosch now provides Rosseto with an overview of his herd unlike any he’s had before. “I can track each animal’s weight gain and calculate average values for specific plots. I can see if the animals are healthy or losing weight, and above all, I can link the data with the current market price and decide much more quickly when the time is right for slaughter.” Rosseto estimates that each bull with a Bosch chip in its ear will yield 45 more reals (currently just under €13) in profit than one of their non-networked peers. With more than 100,000 head of cattle running through the fazenda every year, that adds up to a hefty sum.

### **Precision livestock farming system increases ranches’ productivity**

Gustavo Ferro, who is descended from a family of Brazilian farmers himself and whose grandfather herded bulls through his village with a cane, is already setting his sights far beyond Santa Fé. “In Brazil alone there are almost 200 million bulls, there are around 50 million in Argentina, and in the United States. There are twice as many as that. The market is massive.” Ferro isn’t just thinking about business; he’s also considering the discourse regarding the environmental consequences of rearing cattle. “The Precision Livestock Farming system will boost farm productivity. That means individual bulls will probably require less feed and land.” The heavy bulls at Santa Fé, some of which are swaybacked, have now trampled over the Bosch scale 3.3 million times. “The reliability is incredible,” says agricultural expert Rosseto. “The system also works perfectly when it’s raining or when the mud is ankle-deep.” He and his colleagues spent months fine-tuning hardware, changing components, and exchanging materials.

They did some of this at the Bosch regional quarters in Campinas, and some out in the field, “always in close cooperation with future users,” says Ferro. The unsuspecting bulls at Santa Fé embody the Bosch 3S strategy: sensors, software, and services, all networked together. Incidentally, the idea to do something with cattle came directly from Regional President Besalviel Botelho. “Without the ongoing support of higher-ups, we wouldn’t have been able to accomplish this here so quickly,” says Ferro. Additional success factors include “an agile approach, design thinking, and a willingness to get our hands dirty.” The team now views the data pouring in, which may also influence the next generation of algorithms. “We expect that we’ll continually improve our understanding of how the individual factors in cattle fattening relate to one another, from the weather, to the feed composition, to the number of animals per plot, and so on and so forth,” says Ferro. “This will continually increase the benefits for our customers. And the strain on the environment will also be reduced as efficiency increases.”

It’s still rather unusual for Bosch customers to wear a cowboy shirt instead of a bespoke suit, and for their workplace to smell like cattle instead of diesel – but more and more projects in the company are being carried out to equip the world’s oldest industry with cutting-edge technology. From cultivating olives in Andalusia to harvesting oysters in Australia to growing asparagus in Germany, Bosch is incorporating agriculture into the Internet of Things.

Ferro, a farmer’s son and an industrial engineer who worked for many years in entirely different areas in Germany, is excited about the new business fields – as well as his return to his own roots. “I never thought that I’d work with cattle at Bosch, or that we’d develop a solution that could shape the industry, no less. That’s a huge motivation for me.” And he’s doesn’t mind having to clean off his boots in the evenings after work, either.

**Press photo:** # 1306070, #1306071, #1306072, #1306073

**Contact:**

Christiane Wild-Raidt,  
phone: +49 711 811-6283

*The Bosch Group is a leading global supplier of technology and services. It employs roughly 400,500 associates worldwide (as of December 31, 2017). According to preliminary figures, the company generated sales of 78.0 billion euros in 2017. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected industry. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group’s strategic objective is to create solutions for a connected life, and to improve 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 Bosch Group comprises Robert Bosch GmbH and its roughly 450 subsidiaries and regional companies in some 60 countries. Including sales and service partners, Bosch’s global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company’s future growth is its innovative strength. At 125 locations across the globe, Bosch employs 62,500 associates in research and development.*

*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](http://www.bosch.com), [www.iot.bosch.com](http://www.iot.bosch.com), [www.bosch-press.com](http://www.bosch-press.com), [www.twitter.com/BoschPresse](https://www.twitter.com/BoschPresse).*