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**BOSCH**

January 5, 2016  
RF262-e kr

**Invented for life:**

**Bosch solutions for a simply connected world**

Dr. Volkmar Denner,

Chairman of the board of management of the

Bosch Group,

at the Bosch Press Conference, CES 2016, Las Vegas, NV

January 5, 2016

Check against delivery.

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Good morning, everyone. A very warm welcome to the Bosch press conference. I'm really thrilled to be here at the center of the consumer electronics universe. Let's have a look at some of the innovations that are going to shape our lives in the years to come.

It's an environment in which I feel right at home. After all, we at Bosch are fond of saying that we have innovation written in our corporate DNA. It's been an essential part of our identity for nearly 130 years now.

What's important to understand, though, is that our founder, Robert Bosch, wasn't interested in innovation for innovation's sake. Instead, he believed, and I quote, that "improvements in the world of technology and business should always also be beneficial for mankind." It's thus not by chance that "Invented for life" has become the strategic imperative for our work. It's evident in the products we're showcasing here at CES.

I'd like to introduce you to one of those products right now – a new touchscreen we've developed. It's really extraordinary. And we're not the only ones who think so: it won a "CES 2016 Innovation Award" in the in-vehicle audio and video category. Although it looks like a normal vehicle display, when touched, the screen responds with haptic feedback as well as visual and acoustic signals. Running your fingers over the screen, you can actually feel the individual keys. To trigger an action, you press down firmly, as if you were pressing a real button.

Want to try it out for yourself? We're featuring it at our booth in the North Hall in a show car. It's certainly cool, but it also has real implications for safety: to operate your radio or navigation system, you barely need to take your eyes off the road. In the best possible sense, it's "Invented for life."

Before I tell you more about the other solutions we're exhibiting, I'd like to give you just a few key facts about Bosch. Worldwide, we employ some 380,000 people in more than 60 countries.

This includes a strong presence in North America: we now employ over 30,000 people and have more than 100 locations across the continent. I'm also pleased to tell you that our business here is doing very well: in 2015, Bosch recorded year-on-year sales growth in North America of 7 percent in dollar terms. This is considerably higher than we expected.

As you know, we're a leading global supplier of mobility solutions and some of you might have household appliances or power tools from us at home. But we're also one of the leading suppliers of industrial technology such as packaging machinery, and of energy and building technology, which encompasses everything from security to heating systems. In all of these areas, we're pursuing innovation in electrification, automation, energy efficiency, and not least, connectivity.

As a company, our strategic aim is to create solutions that make life easier, safer, more comfortable, and more eco-friendly – across the globe. And we believe that new solutions have to focus first and foremost on users and their needs. One of the keys to achieving this is making them connected – "Simply.Connected."

Unlike many traditional hardware companies, though, at Bosch we recognized the potential of the internet of things very early on, and began building up our expertise accordingly. Of the 55,000 associates we currently employ in research and development at more than 100 locations worldwide, one-third are software engineers are concerned solely with the internet of things – a figure that we expect to rise.

Today, Bosch is the only company that is active on all three levels of the IoT: sensors, software, and services. We're more than just a solutions provider for the internet of things – we're a fundamental enabler of it. And we're better positioned than almost any other company in the world to take advantage of the opportunities it brings. The result is connected solutions for smart homes, cities, mobility, and industry – the four areas of application we're showcasing here.

To better facilitate this work, we've become a company of two speeds. In areas where absolute reliability and safety are required, development according to traditional processes remains essential. However, where agility and flexibility are needed, we apply faster approaches like the scrum method. What is commonly used in software development is now increasingly valuable for hardware as well.

In this way, we are combining the requirements of the worlds of industry and IT. Even in our automotive business, we're supplying new players such as Google and Tesla. It remains to be seen whether this business will develop in an evolutionary or disruptive way, but one thing is clear: Bosch is already part of it.

With this in mind, we're actively promoting entrepreneurship within the company. For example, two years ago we established our own start-up platform, which is designed to rapidly make research findings outside our core business ready for the market. This has given rise to a number of start-ups so far: one has developed the Bonirob, an agricultural robot

capable of identifying plants and weeds, thus minimizing the use of fertilizers and pesticides. Another focuses on solutions for warehouse logistics. And a start-up based in Palo Alto is working on domestic robots.

That said, a start-up culture is nothing new for us. We have several successful businesses that started as spinoffs. One great example is our subsidiary Bosch Sensortec. We set up this company as a start-up ten years ago to provide MEMS sensors for consumer electronics applications. MEMS stands for micro-electro-mechanical systems. Three out of every four smartphones worldwide now feature a Bosch MEMS sensor. Statistically, that means three-quarters of you have a Bosch product in your pocket right now.

But these innovative sensors are not just for cell phones. They're used in a wide variety of domains, and we're the leading global supplier. Since we started producing them for automotive applications in 1995, we've manufactured nearly seven billion, and currently ship four million a day.

These sensors are the crucial element behind a lot of our most innovative products and services. But before I introduce them, I'd like to tell you more about the sensors themselves. They quite literally form the bedrock upon which the IoT is being built.

They're small parts, but they have a big impact: they save lives, increase driving comfort, and help conserve energy. MEMS sensors are the eyes and ears of many mobile electronic devices, measuring things like acceleration, sound, temperature, and air quality. They make billions of things smart, enabling them to share information about themselves and to communicate with one another. They're in cars, computers, game consoles, wearables, appliances, and many more smart objects. Our product showcase offers you the chance to experience the many ways in which these sensors improve our everyday lives.

This year we're exhibiting a number of important new additions to our sensor portfolio. We have a 9-axis sensor with possible applications in areas like augmented reality and robotics. We also have a new cross-domain development kit for professionals. Here, we're taking a sensor platform we've been using ourselves and making it available to anyone, thus enabling the development of completely new IoT applications and reducing their time to market.

As I mentioned before, we're focusing our innovation on four main domains: homes, cities, mobility, and industry. Let me introduce you to each one individually.

## **1. Smart home**

First, the smart home. We've been collectively dreaming about smart homes for decades. Something about the idea of a home that anticipates our needs resonates deep within us.

But what does a smart home look like in the real world? Let me paint you a picture. A smart home is one in which you never have to wonder if you locked the door on your way out, or whether you left the upstairs windows open before a rainstorm, because the doors and windows are equipped with sensors. It is always the perfect temperature inside because the heating system automatically checks the weather forecast, and adjusts itself to maintain your preferences. It's one in which various systems work together to cut your energy use by up to 40 percent. A smart home is one in which every light switch, and every appliance, can be controlled with the touch of a button on your smartphone – from anywhere you might happen to be.

This may sound like a fantasy, but it's not. According to recent estimates, around 15 percent of all households worldwide, some 230 million, will be equipped with smart home technology by the end of this decade. As for

the technology, Bosch is ready to supply it – and more importantly, we know how to put it to use.

Our new Smart Home System, for instance, brings together all our expertise. Featuring one platform, one app, and one user interface, it connects all compatible home-related devices, including those of other manufacturers. To simply and quickly operate electronics, appliances, and lighting in your home, all you need is a central control device and a smartphone or tablet.

In our own portfolio, too, we already have connected devices in every product category: from ovens and refrigerators to washing machines, to heating and security systems. These and many other smart-home solutions are showcased in an interactive display at our main booth at the Sands.

We're also inviting other companies to collaborate on our platform. For example, we've joined forces with Philips to create connected, self-learning lighting. And last year, we launched mozaic operations, a joint venture with ABB and Cisco. Our goal here is to establish a B2B software platform for the smart home, which will be open to suppliers from widely differing sectors. Ultimately, we believe that no company will be able to create the connected world alone.

## **2. Smart city**

But we're not content with just making homes smart. We want to increase the intelligence of entire cities. Today, nearly four billion people live in cities around the world. By 2050, this number is set to reach almost six and a half billion. Smart, connected cities offer the potential to provide a higher quality of life for everyone.

Imagine a city in which multiple modes of transportation are linked up, and can be booked and paid for with the tap of a finger: bus, subway, train, shared car. Imagine a city that intelligently regulates its street illumination at night, turning off lights where they're not needed in order to reduce its carbon footprint. Imagine a city where a sensor in a street light detects cars and optimizes traffic flow accordingly.

We already offer a basic building block for the smart city of the future: the software that gives it brains. The Bosch IoT Suite provides the technological basis for internet of things applications. It integrates every feature required for connecting devices, users, and services. Applied to a smart city, our technology can connect people with things like vehicles, charging stations, traffic lights, energy systems, the transportation infrastructure – even libraries and restaurants. It also connects all these things with each other.

We currently have smart city projects running across the globe, in places like Spain, England, Germany, and the United States. Here in the U.S., we've also recently launched a related initiative together with Carnegie Mellon University to develop, test, and realize a connected campus environment. The intelligent campus buildings will help improve efficiency and comfort by optimizing temperature, air quality, and lighting.

Two specific smart city solutions we're showcasing at CES help drivers find parking in urban areas more easily. The first solution is our active parking lot management system. Here, sensors embedded in the

pavement recognize whether a space is occupied. This solution can also help parking garage operators utilize their capacity better. The second solution is what we call community-based parking. It relies on cars equipped with parking assistance systems, which automatically identify and measure the gaps between parked cars as they drive past.

In both cases, sensors transmit information about available parking spaces to a central server, which our algorithms use to create a real-time parking map. Drivers can then access this map via their smartphones or in-car internet connection. This will help them quickly find a suitable parking space. Since up to 30 percent of all urban traffic is caused by the search for parking, imagine the benefits this technology will bring in terms of saving time and reducing CO<sub>2</sub> emissions.

### **3. Connected mobility**

Since we're on the subject of cars and parking, let's move into the third Bosch domain – connected mobility. Nowhere is connectivity set to revolutionize our lives as much as with connected driving. Connected vehicles are safer and more efficient, and make drivers' lives easier.

These days, we can hardly imagine a life without the internet – and soon that will be true of the internet in the car as well. Connected cars are able to see ahead – further than any sensor, and with much more up-to-date information than any map.

Our connected horizon does exactly this. It helps drivers identify hazards before they appear and can even slow down the car automatically in case of danger. This function combines current vehicle position and locally stored map data with real-time information from the cloud. On the one hand, this boosts efficiency, enabling navigation systems to optimize routes and electrified vehicles to implement predictive driving strategies. In this way, CO<sub>2</sub> emissions can be reduced by ten percent or more.

On the other hand, it contributes to vehicle safety. For example, imagine that several vehicles report an intervention by the ESP system at the same point. The system could then reference weather information and conclude there is black ice present, and warn approaching cars. So: time and fuel saved, and safety increased.

And speaking of safety, I'm very proud to be able to introduce a new solution that will doubtless save lives: the market's first retrofit eCall. Our new device can be easily retrofitted to any type of car, and works in conjunction with an app on the driver's smartphone. If its sensors detect a forceful enough impact, retrofit eCall automatically contacts a call center. There, an operator will attempt to contact the driver and, if necessary, dispatch emergency roadside assistance to the scene of the accident. Bosch offers eCall services already in 30 countries around the world.

As you can see, Bosch is a provider of both technology and services, which is again an advantage for us in the connectivity business. Another service that will offer a boost to safety is a cloud-based wrong-way driver alert system. It relies on a software module which compares the movement of a vehicle on a freeway with the permitted direction of travel. If these two factors differ, it alerts the driver and oncoming cars automatically – and does so in seconds rather than minutes. The service will be available in the U.S. and other countries later this year.

As the driving experience becomes more connected, the human-machine interface continues to gain importance. Progress here has the potential to increase both safety and convenience. For one thing, it will give drivers the right information at the right time, minimizing the distraction that causes ten percent of the fatal crashes on U.S. roads. For another, it will allow drivers to control their car via gestures and voice commands.

You can experience Bosch's vision for the car-driver interface of the future in our show car in the North Hall. It features large, curved displays that

can be controlled with a combination of gestures, and eye movement – as well as our touchscreen with haptic feedback I told you about earlier.

Connectivity is also the key to realizing automated driving. Our motivation for developing automated driving is first and foremost to make traffic safer. Each year, about 1.3 million people around the world are killed in road accidents. In some 90 percent of cases, the accident can be attributed to human error. In critical traffic situations, the right technology can save lives.

We believe that automated driving will arrive in stages, as a result of progress in driver assistance systems. For work on these systems alone, we employ some 2,000 engineers. Today, our driver assistance systems are already performing many functions, such as helping drivers change lanes, stay in their lane, and brake when encountering an obstacle. Our sales in this field will exceed one billion euros this year.

On the road to fully automated driving, we plan to have achieved fully automated parking – or valet parking, as we call it – by 2018. With automated valet parking, all you'll have to do is leave your vehicle at a designated drop-off zone inside a parking garage. From there, the car will find a vacant space on its own, saving time and fuel.

By 2020, the Bosch highway pilot will be ready for production. This is a highly automated function that will assume control of the car freeways. We've been driving our automated test vehicles on public roads in the U.S. and Germany since 2013.

In the U.S., we are the first automotive supplier to have driven an automated prototype exit to exit on freeways. And we're not just focusing on the vehicle – we're also collaborating with TomTom to develop the extremely accurate maps needed for automated driving.

In the mobility business as well, Bosch benefits from its diverse industrial expertise. No other company in the automotive industry is in a better position to connect the dots between different domains. What if your connected car could communicate with your smart home? In one current test scenario, our engineers have enabled a vehicle's navigation system to automatically turn up the central heating shortly before arrival. Looking across domains opens up a seemingly infinite number of innovative and beneficial possibilities.

#### **4. Industry 4.0**

That brings me to our fourth and last domain, manufacturing. The factory of the future is flexible, networked, and smart, and it will see people, machines, and products all communicating with each other and working together. In particular, we see tremendous potential in harnessing connectivity to make manufacturing less resource-intensive and more cost-effective. This connected paradigm is also known as Industry 4.0. Bosch is active here on a number of levels, both as a leading provider and a leading user.

At present, the Bosch Group has more than 100 ongoing projects relating to Industry 4.0, in places like China, India, Germany and here in the United States. For example, associates at our plant in Anderson, South Carolina, now use smartwatches to monitor several production lines. These devices promptly notify line operators if a machine malfunctions, thus reducing or even preventing downtime.

Across our operations, Industry 4.0 applications are enabling us to achieve a reduction in inventory of up to 30 percent, and as much as a 10-percent gain in productivity. Especially in high-cost countries like Germany and the U.S., this is a huge benefit. By 2020, we expect to have achieved annual savings in our own global production of several hundred million dollars as a result.

In addition to connectivity, an integral part of tomorrow's manufacturing will be a new way of using automation: in collaborative work with people. A solution we developed specifically for the factory of the future is the APAS family of mobile production assistants. These collaborative robots can take over dangerous, strenuous and monotonous tasks, leaving people free to do the more pleasant work.

They also enable rapid and flexible adjustments to production. Most importantly, they're safe: thanks to its special sensor skin interface, the APAS assistant is the first system to be officially certified for direct human-machine collaboration. They also, as it turns out, make a great "cup of joe": come visit the APAS coffee bar at our booth in the Sands and taste one for yourself.

## **Conclusion**

Ladies and gentlemen, all-encompassing connectivity is no longer wishful thinking – it's here. And when it comes to harnessing the potential of the connected world, Bosch has an advantage that few other companies possess. From the sensors that form the basis of the IoT, to the connected objects that communicate over it, to the software that orchestrates it, to the beneficial services it's unlocking – wherever you look, you find our technology. Bosch's portfolio of solutions is truly comprehensive. But not only that – we're enabling the connected world at the most fundamental level. And this means we're in the position to actively shape this trend and its technology into something that will make life tangibly better for everyone.

But please, go and see for yourselves. Visit our booths at the Sands Expo and North Hall this week, and experience for yourself Bosch's simply connected and life-enhancing solutions for the homes, cities, mobility, and industry of tomorrow.

Thank you.



## CES 2016 (January 6 to 9), Las Vegas **When cars help out in the kitchen: For Bosch, “Simply.Connected.” is the name of the game** Smart solutions that improve convenience and safety

January 5, 2016  
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- ▶ Bosch CEO Denner: “We want to make people’s lives better and easier with intelligent solutions. Connectivity is the key to this.”
- ▶ Bosch offers cross-domain solutions and is connecting mobility with energy, building, and industrial technology
- ▶ World premiere: first emergency eCall adapter for vehicle retrofits

Las Vegas, Nevada – At [CES 2016](#) in Las Vegas, Bosch is showcasing technology that is “Invented for life”: innovations for the home, city, car, and workplace. The supplier of technology and services is committed to driving forward connectivity via the internet of things. “Our aim is to provide safer, more convenient, and more efficient solutions for energy, mobility, industry, and the smart home. We want to make people’s lives better and easier, and the key to this is connectivity,” said Bosch CEO Dr. Volkmar Denner, speaking at the company’s press conference at CES 2016 in Las Vegas. Bosch is using the slogan “Simply.Connected.” to highlight this approach at CES, where the company is presenting solutions for smart homes, smart cities, connected mobility, and Industry 4.0.

In the connectivity business, Bosch benefits from its broad product portfolio and in-depth industry expertise based on decades of experience. “Bosch can connect mobility with energy, building, and industrial technology to offer cross-domain services – something no other company can,” Denner said.

He gave the example of connected cars. These can communicate with the smart home via the navigation system, so drivers can for instance preheat the oven for dinner before they even arrive home.

In the field of connected mobility, Bosch is presenting a world first: Retrofit eCall. The eCall automatic emergency notification system, launched in 2012, had previously been available solely as standard equipment on new vehicles, but now

it is also available as a retrofit solution. Plugged into the car's cigarette lighter, the sensor unit is designed to detect collisions and send the relevant information to a service center. Depending on the severity of the accident, the service center either contacts the driver directly or notifies the nearest emergency services.

### **Expertise in sensors, hardware, and software**

Besides a major expansion in its service portfolio, Bosch is building on its expertise in sensors and software. One reason is that the company is the globally leading manufacturer of micromechanical sensors, known as [MEMS sensors](#). Every day, more than four million of these high-tech sensors leave the wafer fab in Reutlingen, Germany – Bosch has manufactured a total of over six billion MEMS since 1995. Three out of four smartphones today are fitted with the tiny Bosch sensors, as are many other consumer electronics devices, including wearables such as fitness wristbands and smartwatches. Bosch expects particularly robust growth in the wearables segment: from 76 million units in 2015, production is expected to more than double to 173 million by 2019.

Another reason is Bosch's strong position in the software sector. Of its approximately 55,000 researchers and developers worldwide, about one third work in software development and more than 3,000 on the internet of things. This know-how is supplemented by comprehensive hardware expertise: Bosch is one of the world's leading manufacturers across many sectors, from the automotive supply industry and industrial technology to energy and building technology and consumer goods. "Bosch combines the best of both worlds – industry and IT. Regardless of whether this business develops in an evolutionary or disruptive way, we will continue to be part of it," Denner said in Las Vegas.

### **Smart homes offer greater convenience and safety**

Bosch is also hard at work on the smart home. Are the windows closed? Did the stove get turned off, is there enough milk for breakfast tomorrow? Bosch technology has made these worries a thing of the past. The latest studies indicate that by 2020, some 230 million households worldwide – 15 percent of the global market – will feature smart home technology. By consolidating its smart home activities in a new company at the start of the year, Bosch has already taken a crucial step in driving the smart home forward: in the future, the company will offer a host of products and services for the connected home from a single source. The portfolio will include a smart home system that can report break-ins and also helps manage the heating more efficiently.

### **Smart cities improve quality of life**

"Bosch is not content with just making homes smart," Denner said. "We are currently involved in five projects around the world that are increasing the

intelligence of entire cities. This improves people's quality of life as well as the city's economic efficiency." According to a UN study, two-thirds of the global population will be living in cities by 2050. This calls for an intelligent networking of power grids, traffic infrastructure, and buildings. One of the basic building blocks of the smart city is the Bosch IoT Suite. This is a software platform that integrates all the functions necessary for connecting devices, users, and services.

Parking is another headache that Bosch is looking to eliminate. Drivers trying to find a parking space account for 30 percent of urban congestion. One way to combat this is to equip cars or parking spaces with sensors that detect and notify drivers when a space is free. Bosch has implemented this idea in its community-based parking concept: as cars drive around, they detect and measure free parking spaces between vehicles parked at the curb. This information is entered into real-time maps that can be called up on a smartphone or in the car's navigation system. Drivers looking for parking in residential or urban areas can then find a space without too much circling around. This reduces wear on the drivers' nerves, saves time and money, and is better for the environment.

### **Bosch solutions for the connected mobility of tomorrow**

At the interface between smart cities and connected vehicles is fully automatic parking, which Bosch plans to realize by 2018. The idea is for drivers to simply leave the car at the entrance to the parking lot or garage. The car then finds an available space and parks itself. When it's time to go, the car drives itself back to the drop-off point in the same way.

Bosch is also working on a highway pilot, an electronic chauffeur that drives on the freeway. As of 2020, it is expected that vehicles equipped with the pilot will be capable of driving on the freeway themselves. This primarily increases safety, but it makes motorists' lives easier as well: when the highway pilot is on, the driver becomes a passenger – able to lean back and relax or attend to other things. Bosch is testing automated driving on public roads in Germany, the U.S., and Japan.

Another important aspect of making driving even safer and more convenient is the communication between people and technology. "Delivering the right information at the right time minimizes driver distraction," Denner said. Visitors to CES 2016 can experience this new kind of communication in the Bosch show car. For example, if a pedestrian approaches from the right, a lighting sequence is triggered to alert the driver.

Bosch is also presenting a touchscreen with haptic feedback, for which the company received a CES Innovation Award at the end of 2015. The product is

unique in that the keys displayed on its screen feel like actual buttons, so drivers can often operate applications in the infotainment system, such as navigation, without looking. That means they need to take their eyes off the road much less, which makes driving safer.

#### **Industry 4.0: the factory of the future is flexible, connected, and smart**

To turn a lot of innovations into reality as quickly as possible, production has to become more flexible. “The factory of the future is flexible, connected, and smart, and it enables people, machines, and products to communicate with each other,” Denner said. “This is another area where we are better positioned than almost any other company, since we are both a leading provider and a leading exponent of Industry 4.0.”

Looking at Bosch’s more than 250 plants worldwide, Denner estimates that Industry 4.0 will save the company hundreds of millions of euros annually in the years leading up to 2020. Two of the factors that will help achieve this goal are Bosch hardware and its software solutions for assessing data in real time. The mobile APAS production assistant, which the company is also showcasing at CES, ensures both flexibility and safety in production processes. Thanks to its sensor skin, APAS can safely work with people. And it has a hidden talent: at CES 2016, it will be serving coffee to visitors at Bosch’s booth in the Sands Expo.

**Press photos:** 1-BCDS-21830, 1-AE-20855, 1-BBE-21802, 1-BBE-21871, 1-PA-21575, 1-RB-21067, 1-BST-21812, 1-BBM-21371, 1-BBM-21857, 1-BBE-21873, 1-RB-21891, 1-RB-21892, 1-RB-21898, 1-RB-21899, 1-RB-21890

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## **Simply.Connected.**

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

### **Tuesday, January 5, 2016** (all times local)

- **8:00 to 8:45 a.m.**  
**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.

### **Thursday, January 7, 2016**

- **11:00 a.m. to 12:00 p.m.**  
**Keynote panel** "[Beyond Smart Cities: The Future of Urban Mobility](#)"  
Dr. Volkmar Denner, chairman of the board of management of Robert Bosch GmbH, Westgate Theater. Other panelists to include U.S. Secretary of Transportation Anthony Foxx.
- **11:30 a.m. to 12:30 p.m.**  
**Conference track:** The Internet of MEMS and Sensors  
**Panel:** "[Wearables and Smart Sensors Advancing User Interface](#)"  
Dr. Horst Muenzel, CEO and general manager, Akustica Venetian, Level 4, Marcello 4404
- **2:15 to 3:15 p.m.**  
**Conference track:** The Internet of MEMS and Sensors  
**Panel:** "[Technology Trends for the IoT](#)"; Dr. Stefan Finkbeiner, CEO and general manager, Bosch Sensortec, Venetian, Level 4, Marcello 4404

### **Friday, January 8, 2016**

- **10:15 to 11:15 a.m.**  
**Conference track:** Exploring Tomorrow's Automotive Mobility Ecosystem  
**Panel:** "[Implications for Players in Tomorrow's Mobility Ecosystem](#)"  
Dr. Rolf Nicodemus, project vice president, Connected Parking, Robert Bosch GmbH, Las Vegas Convention Center, North Hall, Room N261

### **Wednesday, January 6 through Saturday, January 9, 2016 – Bosch booths**

- **Focus on smart homes, smart cities, and Industry 4.0** in the Smart Home Marketplace, Sands Expo Center, booth #71517
- **Focus on connected mobility** in the North Hall, booth #2302

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

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CES 2016 (January 6 to 9), Las Vegas  
**“Simply.Connected.” – Smart Bosch solutions  
at CES 2016**

December 17, 2015

PI 9120 RB B6/SL

Overview of the Bosch exhibit: Sands Expo / North Hall

- ▶ The smart home: a central control point for all intelligently connected devices
- ▶ Smart cities: Bosch software and solutions for the city of tomorrow
- ▶ Connected mobility: Improved safety, convenience, and efficiency through connectivity
- ▶ Industry 4.0: production assistants for flexible and efficient manufacturing
- ▶ Tiny sensors allow new applications

Las Vegas, Nevada – At [CES 2016](#), Bosch is presenting connected technology and services at two booths. **At the Smart Home Marketplace, Sands Expo** (booth #71517), the supplier of technology and services is showcasing the smart home, smart cities, and Industry 4.0. In the **North Hall**, the space devoted to automakers, Bosch is offering a look at the topic of connected mobility (booth #2302).

**Smart homes: visitors get a peek inside the home of the future**

*Sands Expo*

Smart-home system: Controlling all the connected devices in a home via one platform – this will soon be possible with the [Bosch smart-home system](#). Designed for use in conjunction with a corresponding app for smartphone and tablet, the Bosch smart-home controller is the command center of the smart home. Lighting, heating, smoke alarms, doors, windows – everything can communicate with everything else. When the occupant leaves the house and closes the front door, the system automatically switches off the lights and turns down the heat. The first products for the connected home that Bosch is presenting at CES include the Bosch smart-home controller, smart thermostats, door and window contacts, and the “Hue” lighting solutions by its partner Philips. Other products are already in the pipeline.

[Connected household appliances](#): Bosch is presenting a comprehensive portfolio of connected household appliances, such as refrigerators with interior cameras. Owners of these refrigerators can use their smartphones at the supermarket to quickly and conveniently check if there are still tomatoes in the crisper or enough eggs for breakfast.

[“Smart mowing 2.0”](#): The [Bosch Indego Connect](#) mows the lawn when the conditions are right: not too hot, not too wet, and not too cold. The system is nonetheless flexible: Users can opt to set certain times during which the mower should not operate, or they can make use of the app’s newly integrated weather forecast feature to decide when the mower should go into action. Using the Bosch Smart Gardening app, the Indego Connect can be operated simply and conveniently from anywhere via smartphone or tablet. The result: maximum control and convenience while getting the same lawn area mown at least 30 percent faster than robotic lawnmowers that mow at random.

[TrackMyTools](#): Workers who use Bosch’s server-based TrackMyTools solution know where their tools are at all times and can check to see if they have everything they need for site visits. TrackMyTools optimizes workflows, saves time, increases a company’s productivity, and is easy to operate from anywhere using a smartphone app.

## **Sensor technology: innovations and sample applications**

*Sands Expo*

Bosch MEMS sensors (MEMS stands for microelectromechanical systems) can be found in vehicles, smartphones, games consoles, and tablets, as well as in countless other devices. Without them, a whole host of applications – in consumer electronics, but also in cars – would not be possible at all. Although only tiny, their impact is enormous: they help save lives and energy, and make driving more relaxed. Bosch MEMS sensors are the eyes and ears of billions of electronic devices.

[Intelligent acceleration sensors](#): Smartphone and tablet apps present sensors with increasingly difficult challenges. They have to be ready for use at the drop of a hat and fulfill a whole host of different functions – without compromising battery life. To meet these demands, Bosch has developed the first acceleration sensors with integrated intelligence. They open up the possibility of new functions, such as gaming and fitness applications. At CES, Bosch is demonstrating the first acceleration sensors to feature integrated intelligence and be compatible with Android while also being particularly energy saving.

[High-performance yaw-rate sensors](#): Yaw-rate sensors are necessary for many different applications, including gaming, augmented reality, virtual reality, and optical image stabilization. The two new triaxial Bosch yaw-rate sensors were developed especially for applications in these areas. Their low operating costs, low noise, and high image stability are especially noteworthy. Despite their high performance, the two sensors have the lowest power consumption of any discrete yaw-rate sensors in the market. In this way, they help prolong the battery life of mobile devices.

[Bosch Ambient Sensor](#): Bosch's Ambient Sensor is a smart sensor solution capable of measuring, analyzing, and communicating environmental conditions in buildings. These conditions include air quality, lighting conditions, and noise levels. The built-in sensor can help create better climatic conditions in offices and living spaces, for example by sending its readings to the facility manager's smartphone and recommending changes to a room's ventilation, temperature, or humidity. Its long battery life is a further advantage. The Ambient Sensor can not only be integrated into building automation systems, but also operated as a standalone solution.

[XDK sensor platform for developing new IoT solutions](#): What if someone has an idea for an IoT (internet of things) application, but does not have a technical platform for building it? Bosch now offers a solution for this in the shape of its XDK sensor platform, a comprehensive hardware and software platform featuring different types of sensors as well as Bluetooth and wi-fi connections. It features a range of components including an acceleration sensor, a yaw-rate sensor, a magnetometer, and sensors to measure atmospheric pressure, air temperature and humidity, noise levels, and digital light. Companies can use this in developing their own IoT solutions – whether large or small. The XDK sensor platform is easy to install and to adapt to each application. In addition, developers are invited to join the [XDK community](#). There, members can share their knowledge about functions and features, get inspired with new ideas for projects, present their work at exciting events, and win prizes. With its XDK sensor platform, Bosch helps its customers get new IoT business ideas ready for full-scale production as quickly as possible.

**Smart cities: software and parking solutions for the city of tomorrow**  
*Sands Expo*

[Bosch IoT Suite](#): Bosch's IoT Suite is a software platform for interconnecting a city's various applications, services, municipal authorities, and companies. At CES, Bosch is presenting visualized scenarios to demonstrate how the IoT Suite

can connect power grids, lighting systems, traffic infrastructure, and buildings, helping to improve cities' economic and energy efficiency.

Active parking lot management: Bosch's active parking lot management makes it easier for drivers to find a parking space and helps parking garage operators improve capacity utilization. Bosch sensors installed in the pavement detect whether a parking space is occupied. The sensors wirelessly relay this information to a server, where the data is incorporated into a real-time map. Drivers can then access this map over their smartphones or the internet, allowing them to pick out an available space and navigate to it.

Community-based parking: In residential and inner-city areas, on-road parking spaces are a scarce commodity. Bosch community-based parking makes the search for suitable spaces easier. As the car drives around, it detects and measures free parking spaces between vehicles parked at the curb. The information is transferred to a digital road map. Powerful Bosch algorithms then corroborate the data to supply a prediction of the parking situation. Vehicles in the vicinity can access the digital map in real time, allowing drivers to navigate to a suitable spot.

Fully automated parking: Automated valet parking is a Bosch function that not only relieves drivers of having to search for a parking space, but also enables the vehicle to park itself. Drivers simply drop off their vehicle at the entrance to a parking garage. Using a smartphone app, they instruct the car to find itself a place to park. They instruct the car to return to the drop-off point in exactly the same way. Fully automated parking will require several things, including an intelligent parking garage infrastructure, on-board vehicle sensors, and connectivity for both. The car and parking garage communicate with each other: occupancy sensors identify where available parking spaces are located, so that the car knows where to go. Bosch is developing all the necessary components for fully automated parking in-house.

## **Connected mobility: more safety, convenience, and efficiency**

*North Hall*

Touchscreen with haptic feedback: In advance of the trade show, Bosch received a [CES 2016 Innovation Award in the In-Vehicle Audio/Video category](#) for this screen. Haptic elements supplement the visual and acoustic interaction with the screen. The simulation of various surface textures makes it possible to recognize individual elements by touch. Users place a finger on what appears to be a button, or key. They then have to press more firmly on the virtual button to

activate it. This reduces driver distraction, as they no longer have to visually check what they are doing. In terms of appearance, the haptic touchscreen looks no different from a standard display.

Connected Horizon: Even today, the electronic horizon provides data on inclines and the sharpness of bends to complement navigation data. The connected horizon will build on this by adding current, dynamic data relating to traffic jams, accidents, and mobile construction sites. This solution enables drivers to travel more safely and with an even better picture of the road ahead.

Bosch mySPIN is an appealing smartphone integration solution that smoothly integrates the smartphone into the vehicle, ensuring safe in-car use. This means drivers can continue to use their favorite apps safely and in the usual way, both for iOS and Android smartphones. The apps are pared down to show relevant information only, and displayed and managed via the vehicle display. To ensure minimum disruption and maximum safety, they have been specifically tested for use while driving.

Wrong-way driver alert: In Germany alone, some 2,000 warnings about wrong-way drivers are broadcast each year. In most cases, however, the warning comes too late, since such incidents generally end after an average of 500 meters – in the worst case with fatal consequences. Bosch is developing a new cloud-based solution designed to provide a warning within ten seconds or so. As a pure software module, this alert function can also be inexpensively integrated into existing infotainment systems or apps.

Highway pilot: The highway pilot takes over driving on freeways. Sensors monitor the vehicle's surroundings, and the car combines this information with extremely accurate and up-to-date map data. This allows the driver to sit back and relax on most freeway routes while the car drives with a high degree of autonomy. Bosch is already testing this technology on public roads in the U.S., Germany, and Japan, so the highway pilot could be ready for mass production by 2020.

Retrofit eCall: Using the sensor-supported Retrofit eCall adapter, anyone can retrofit their cars with the automatic emergency eCall service. The adapter is suitable for all vehicle types; it plugs into the car's cigarette lighter and connects with a smartphone app. If the integrated sensor registers a crash, it sends data such as the car's current location to the app, which passes it on to a control center. A further practical feature is that the adapter's USB slot can be used to charge devices such as smartphones and tablets.

## **Industry 4.0: automated assistants for production**

*Sands Expo*

APAS assistant: Normally, the mobile APAS assistant would be stationed on the shop floor, as it has been designed to work with people there. But at CES 2016 it is adopting an entirely new function: serving coffee to visitors at the main Bosch booth at the Sands Expo. Thanks to its patented “sensor skin,” the robot immediately stops whenever someone gets too close.

APAS safeskin and APAS speedswitch: The mobile production assistants in the APAS family work hand in hand with people, and unlike other robots, without a safety barrier. This is possible thanks to a robot arm studded with 120 sensors and equipped with a three-finger gripper. An integrated laser scanner monitors the robot’s surroundings. If the robot recognizes that people are nearby, it slows down its working pace accordingly. As soon as there are no people in close proximity, the robot can ramp up to full speed. This increases productivity without endangering any workers.

IoT shopfloor solutions: automation software for connected factories: In Las Vegas, Bosch is presenting its IoT shopfloor solutions, an automation solution for managing production and logistics chains in a connected factory. The system includes software modules that help experts flexibly control and monitor production data, quality data, and logistics processes according to the customer’s specifications. Intuitive user interfaces make it easy to work with the machine. They make it possible for manufacturing workers, even those without previous programming knowledge, to define rules; for example, to automatically recognize problems and resolve them in good time. Further features allow companies to connect machines around the world and analyze production data in near real time. The IoT shopfloor solutions also include a new augmented reality app. It supplies the on-site experts with the latest production data or operating instructions and allows them to look inside the machine without having to open it.

**Press photos:** 1-RB-21870-e, 1-BBE-21802, 1-BBE-21803, 1-BBE-21804, 1-BBM-21371, 1-BBM-21513, 1-BCDS-21829, 1-BST-20778, 1-BST-21215, 1-CM-21773, 1-PA-21575, 1-PT-21482, 1-PT-21536, 1-RB-20995, 1-RB-21067

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## **Simply.Connected.**

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

### **Tuesday, January 5, 2016** (all times local)

- **8:00 to 8:45 a.m.**

**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.

### **Thursday, January 7, 2016**

- **11:00 a.m. to 12:00 p.m.**

**Keynote panel** "[Beyond Smart Cities: The Future of Urban Mobility](#)"

Dr. Volkmar Denner, chairman of the board of management of Robert Bosch GmbH, Westgate Theater. Other panelists to include U.S. Secretary of Transportation Anthony Foxx.

- **11:30 a.m. to 12:30 p.m.**

**Conference track:** The Internet of MEMS and Sensors

**Panel:** "[Wearables and Smart Sensors Advancing User Interface](#)"

Dr. Horst Muenzel, CEO and general manager, Akustica Venetian, Level 4, Marcello 4404

- **2:15 to 3:15 p.m.**

**Conference track:** The Internet of MEMS and Sensors

**Panel:** "[Technology Trends for the IoT](#)"; Dr. Stefan Finkbeiner, CEO and general manager, Bosch Sensortec, Venetian, Level 4, Marcello 4404

### **Friday, January 8, 2016**

- **10:15 to 11:15 a.m.**

**Conference track:** Exploring Tomorrow's Automotive Mobility Ecosystem

**Panel:** "[Implications for Players in Tomorrow's Mobility Ecosystem](#)"

Dr. Rolf Nicodemus, project vice president, Connected Parking, Robert Bosch GmbH, Las Vegas Convention Center, North Hall, Room N261

### **Wednesday, January 6 through Saturday, January 9, 2016 – Bosch booths**

- **Focus on smart homes, smart cities, and Industry 4.0** in the Smart Home Marketplace, Sands Expo Center, booth #71517
- **Focus on connected mobility** in the North Hall, booth #2302

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**CES 2016 (January 6 to 9), Las Vegas**  
**Bosch in North America: robust sales growth in 2015**  
**Overview of activities in the region**

January 5, 2016  
PI 9143 RB BÖ/af

Las Vegas, Nevada – Bosch’s North American business continues to develop well: in 2015 the company achieved year-on-year nominal sales growth of 20 percent in the region. Adjusted for currency effects, the increase in sales is expected to amount to some 7 percent. Bosch announced these figures at [CES 2016](#) in Las Vegas. The company employs a total of over 30,000 people in North America, some 17,000 of them in the United States. For Bosch, North America is a global driver of innovation and plays a major part in the company’s aim of offering technology that is “Invented for life” worldwide. Bosch has had a presence in the United States since 1906.

Expansion of activities / capital expenditure: In 2015, Bosch invested nearly 400 million dollars in the United States. One important investment was the acquisition of [U.S. start-up Seeo Inc. \(Hayward, CA\)](#). Bosch sees potential to combine its newly acquired expertise with its own developments in the field of batteries in order to more than double energy density by 2020 while significantly reducing costs. In addition, Bosch acquired the Michigan-based company [Climatec](#) last year. Climatec is a leading supplier of energy efficiency, building automation, and security solutions. In addition, Bosch expanded its U.S. packaging activities in 2015 through its [acquisition of Osgood Industries Inc.](#) in Florida and the [planned acquisition of Kliklok-Woodman Corporation](#) in Georgia.

Research and development: Bosch employs some 2,000 researchers and developers in North America. In 1999, Bosch’s corporate research and advance engineering opened its first branch outside Germany, the Research and Technology Center (RTC) in Palo Alto. Today, this is where some 100 highly qualified associates are exploring the potential of current research trends in areas of future promise. These include web technologies, automated driving systems, and robotics. The associates also collaborate on research with leading U.S. educational institutions such as Stanford University. A Bosch start-up launched in 2015 and based in Palo Alto is working on developing robots for household use.

**Press photos:** 1-INT-21376, 1-INT-21377, 1-INT-21378, 1-INT-21379

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## CES 2016 (January 6 to 9), Las Vegas More safety and convenience from a single source **Bosch sets up new company for the smart home** Presentation of first smart-home devices at CES 2016

November 26, 2015

PI 9121 RB Ho/SL

- ▶ New Bosch smart-home system allows things such as heating and lighting to be controlled using just one app
- ▶ Focus on data protection and data security
- ▶ Stefan Hartung: “An important strategic step toward pooling and expanding our range of solutions for the smart home.”

Stuttgart, Germany – Bosch is strengthening its business in solutions for the smart home. From January 1, 2016 the newly founded subsidiary Robert Bosch Smart Home GmbH will bring together the company’s smart-home activities, including related software and sensor-system expertise. In the future, the new company will offer many products and services for connected homes from a single source: for example a new solution that can report break-ins and help control the heating to save energy. From January 2016, customers will be able to order the first Bosch products in this field online. These include the Bosch smart home controller, a smart thermostat, and a contact for doors or windows. The premiere will take place at the [CES 2016](#) in Las Vegas. Bosch’s smart-home solutions are aimed at a giant market: according to market experts, by 2020 alone some 230 million homes worldwide – almost 15 percent of all households – will feature smart-home technologies.

### **Major business potential**

“Setting up the Bosch smart-home subsidiary is an important strategic step toward pooling and expanding on our range of solutions for the smart home. Smart homes facilitate new services that make their occupants’ lives easier, and they offer major business potential,” says Dr. Stefan Hartung, the member of the board of management of Robert Bosch GmbH responsible for the Energy and Building Technology business sector.

“The Bosch smart-home system is easy to install and operate: one system, one app, one user experience. Our solutions relieve users of tiresome routine tasks while offering them more convenience and safety,” adds Dr. Peter Schnäbele, the future managing director of the Stuttgart-based Robert Bosch Smart Home GmbH.

### **Data protection and data security given top priority**

Bosch smart-home solutions meet the highest standards of data protection and data security. These standards are taken into account right from the start of the product development process. To this end, Bosch has also set up a center of competence for product security. Customers and users have full transparency and decide for themselves how their data are used.

### **New services and an app make life easier**

Bosch smart-home system solutions mean that a single platform is sufficient to interconnect the heating, lighting, smoke alarms, and appliances in a home. All these can then be operated simply using a smartphone or tablet. The core of the system is the Bosch smart-home controller, a central control unit that connects the components with each other and to the internet. In the future, users will be able to use the Bosch smart-home app to combine the basic functions of unrelated devices. For example, the door and window contact solution reports whether a window is open. When this happens, the system can automatically turn down the heating in the relevant room, in line with the user’s preference settings. What is more, users can check their smartphone anytime, anywhere to see whether doors and windows are open or closed. In future versions of the door and window contact solution, the system will sound the alarm if a window or door is broken open when the occupant is absent – meaning there will no longer be any need for a separate alarm system.

### **Compatible with other manufacturers’ devices**

When it comes to connectivity, Bosch believes open standards and open platforms will make the technology as user-friendly as possible. For this reason, the Bosch smart-home system is modular and expandable, and it is easy to connect compatible devices made by other manufacturers to it.

### **New webshop**

The first Bosch smart-home products can be ordered from January 1, 2016 at [www.bosch-smarhome.com](http://www.bosch-smarhome.com).

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

**Press photos:** 1-BBE-21802, 1-BBE-21803, 1-BBE-21804

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

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CES 2016 (January 6 to 9), Las Vegas

January 5, 2016

**Home, smart home:**

PI 9128 RB Ho/SL

**Bosch is making dwellings clever**

Intelligently connected devices help simplify life

- ▶ Bosch connects various household devices in an open smart-home system
- ▶ Devices communicate with each other to take care of tedious household tasks
- ▶ Data privacy and security have top priority

Las Vegas, Nevada – Smart homes have gone from being a pipedream to a reality, as visitors to [CES 2016](#) can experience at the Bosch booth. To make life at home even safer and more convenient, Bosch connects devices not only to the internet but also with each other, via a single system platform. This makes it easy to control devices using an app: in the future, people will no longer have to concern themselves with the tedious task of turning the lighting, heating, or appliances on and off.

“Rooms in smart homes are always at the ideal temperature with the perfect level of illumination, since the system receives information about the weather or open windows and automatically sets the heating and lighting accordingly. This increases comfort and saves energy and money,” said Bosch CEO Volkmar Denner, speaking at the company’s press conference at CES 2016 in Las Vegas. “By the end of the decade, we are expecting some 230 million homes worldwide to feature smart connectivity. This offers significant business potential, which we can harness thanks to our many years of experience in the areas of sensor, heating, and security systems as well as household appliances.”

### **Bosch smart-home controller: the brain of intelligent abodes**

At the core of the smart-home system is the Bosch smart-home controller. This central control unit connects the devices to the internet and with each other, allowing them to communicate. An app for smartphones and tablets makes it easy for users to monitor and operate all the devices connected to the controller

from anywhere. The system uses contact components to determine whether a window is open or closed, so it can regulate the heating in the relevant room in line with the user's preferences.

### **Compatible with other manufacturers' devices: partnership with Philips Hue**

When it comes to connectivity, Bosch believes open standards and platforms will make the technology as user-friendly as possible. For this reason, the Bosch smart-home system is modular and expandable, and it is easy to connect compatible devices built by other manufacturers to it. Bosch is working with Philips on lighting for the smart home. Users can control Philips Hue wireless lights using the Bosch smart-home app, enabling them to adjust the lighting to their personal preferences or to the current mood with a single click. Similar partnerships are being pursued for other types of devices as well.

### **Data privacy and data security have top priority**

Bosch smart-home solutions meet the highest standards of data privacy and data security. These standards are taken into account right from the start of the product development process. To this end, Bosch has also set up a center of competence for product security. Customers and users have full transparency and decide for themselves how their data will be used.

### **Smart homes firsthand at CES**

Visitors to the Bosch booth at CES can experience the smart home firsthand: alongside indoor climate and lighting solutions, Bosch is presenting scenarios that offer a glimpse of other smart-home system functions, for example an alarm system. In addition, the company will be showcasing its comprehensive portfolio of connected household appliances, which are easy to monitor and operate using a smartphone. One example is a fully automatic coffee machine that users can instruct to make the coffee specialty of their choice – perhaps a cappuccino or a latte macchiato – with the tap of a finger before they even get out of bed in the morning.

### **First products available online starting January 2016**

The first Bosch smart-home products will be available online at [www.bosch-smarthome.com](http://www.bosch-smarthome.com) starting in January 2016. These include the Bosch smart home controller, door-window contacts, smart thermostats, and Hue lights by partner Philips. The Bosch smart-home system is easy to operate using an app and can be installed on individual devices using QR codes. Bosch will offer these devices for sale first in Germany, and then in other European countries over the course of the year. In the United States, the first products are expected to be available starting in 2017.

**Press photos:** 1-BBE-21871, 1-BBE-21802, 1-BBE-21803, 1-BBE-21804, 1-BBE-21872, 1-BBE-21873, 1-BBE-21874, 1-BBE-21875, 1-RB-21876, 1-RB-21877

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**Simply.Connected.**

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**Tuesday, January 5, 2016** (all times local)

- **8:00 to 8:45 a.m.**

**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.

**Thursday, January 7, 2016**

- **11:00 a.m. to 12:00 p.m.**

**Keynote panel** "[Beyond Smart Cities: The Future of Urban Mobility](#)"

Dr. Volkmar Denner, chairman of the board of management of Robert Bosch GmbH, Westgate Theater. Other panelists to include U.S. Secretary of Transportation Anthony Foxx.

- **11:30 a.m. to 12:30 p.m.**

**Conference track:** The Internet of MEMS and Sensors

**Panel:** "[Wearables and Smart Sensors Advancing User Interface](#)"

Dr. Horst Muenzel, CEO and general manager, Akustica Venetian, Level 4, Marcello 4404

- **2:15 to 3:15 p.m.**

**Conference track:** The Internet of MEMS and Sensors

**Panel:** "[Technology Trends for the IoT](#)"; Dr. Stefan Finkbeiner, CEO and general manager, Bosch Sensortec, Venetian, Level 4, Marcello 4404

**Friday, January 8, 2016**

- **10:15 to 11:15 a.m.**

**Conference track:** Exploring Tomorrow's Automotive Mobility Ecosystem

**Panel:** "[Implications for Players in Tomorrow's Mobility Ecosystem](#)"

Dr. Rolf Nicodemus, project vice president, Connected Parking, Robert Bosch GmbH, Las Vegas Convention Center, North Hall, Room N261

**Wednesday, January 6 through Saturday, January 9, 2016 – Bosch booths**

- **Focus on smart homes, smart cities, and Industry 4.0** in the Smart Home Marketplace, Sands Expo Center, booth #71517
- **Focus on connected mobility** in the North Hall, booth #2302

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*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.*

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## CES 2016 (January 6 to 9), Las Vegas **Bosch makes cities smart** Connected mobility, energy, security, and infrastructure

January 5, 2016  
PI 9125 RB Ho/SL

- ▶ Bosch CEO Denner: “Smart cities improve city-dwellers’ quality of life.”
- ▶ Intelligent self-regulating lighting saves energy
- ▶ A substructure for smart cities: the Bosch IoT Suite software platform
- ▶ Safer streets and pleasant driving thanks to connected cars

Las Vegas, Nevada – Bosch technologies bring connectivity not only to apartments and houses but also to entire cities. At this year’s [CES](#), the supplier of technology and services is offering a taste of what life in a smart city might be like. In five pilot projects, Bosch is working to turn visions of the future into reality. By 2050 there will be six billion people living in cities. “Smart cities improve city-dwellers’ quality of life, as well as the economic efficiency of cities themselves. For this reason, we want to make cities more intelligent,” said the Bosch CEO Dr. Volkmar Denner, speaking at the company’s press conference at CES 2016 in Las Vegas. The focus of these efforts will be on mobility, infrastructure, energy, and security.

Whether it is a case of connecting various modes of transportation – such as trains, buses, and car sharing – or managing traffic signals and lighting in cities, the aim, he said, is to offer city-dwellers better quality of life, and thus more convenience and security, while also conserving resources. The best example of this is automatic lighting: if the street is empty, the streetlights dim, but as soon as people appear, the lights get brighter. This principle is similar to that of certain escalators, which start moving only once people step onto them. It is also expected that intelligent buildings that automatically adjust their temperature, air quality, and lighting will become the norm worldwide.

In the form of the Bosch IoT Suite, the company offers one of the building blocks for the smart city. This is a software platform that integrates all the functions necessary for connecting devices, users, and services – including power grids, lighting, traffic signals, and vehicles. It is also possible to connect the entire

infrastructure, such as public transportation or parking garages, to allow smart control via the IoT Suite.

### **One click and the vehicle will find its own parking space**

Mobility is the pulse of every city. But more and more conurbations are at risk of gridlock – as every driver who has spent hours stuck in a traffic jam or trying to find parking can confirm. Bosch helps smart cities and connected vehicles find where free parking spaces are, and how to reach them. The company is also relieving drivers of the task of parking their cars. Soon all it will take is the touch of a button for cars to make their own way into the parking garage. Once inside, vehicles will enter and leave parking spaces independently. All drivers will have to do is tap their finger on the relevant app.

### **Charge spots are part of the internet of things**

Drivers of electric or plug-in hybrid vehicles are already using apps to locate a free charge spot at which to recharge their batteries. And that's not all: just one more click and they can pay for the electricity they consume as well. Bosch has collaborated with an automaker to develop such an app, and now offers it to drivers of electric vehicles. The app covers almost all public charge spots in Germany, with charge spots in other countries regularly being added in.

**Press photo:** 1-RB-19905-e

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

Christian Hoenicke, phone: +49 711 811-6285

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## 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)<sup>TM</sup> 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.

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

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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-21773

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

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## CES 2016 (January 6 to 9), Las Vegas **Bosch is turning connected cars into personal assistants** Preview of the user interfaces of tomorrow

December 21, 2015

PI 9123 Ks/SL

- ▶ CES organizers single out Bosch haptic touchscreen for award
- ▶ Bosch showcases new solutions for automated driving and parking
- ▶ Booth exhibits hands-on innovations
- ▶ Show car uses entire dashboard as display

Las Vegas, Nevada – For drivers, having the internet in their car is more than just a convenient add-on. It makes driving even safer and more efficient. Bosch will be illustrating this at the [CES 2016](#) in Las Vegas with a series of connected functions and assistance systems. The company will also be demonstrating how easy these systems are to operate while keeping driver distractions to a minimum. The CES organizers have presented an award to Bosch for its latest development, a touchscreen that generates the sensation of real buttons by way of haptic feedback. The Bosch booth in Las Vegas will also be offering a live, hands-on preview of automated driving and smart vehicle connectivity.

### **The car: the driver's truly personal assistant**

Bosch will be offering a glimpse into the car of the future in the North Hall. Here, visitors to the Bosch show car will experience a new kind of interaction between humans and technology. "The way to minimize driver distraction is to provide the right information at the right time," said the Bosch CEO Dr. Volkmar. In the show car, the dashboard and central console have been transformed into an electronic display. The information shown on this giant display changes depending on the vehicle's current surroundings. If a pedestrian approaches from the right, a lighting sequence is triggered to alert the driver. Drivers' preferences as well as appointments in their diary are also taken into account. For example, if an appointment is cancelled, the car of the future will automatically indicate the route to the next appointment in the diary. Drivers will be able to activate the autopilot to free up even more time and make their journey more relaxed.

But tomorrow's connected cars will also be capable of much more. With a connection to the smart home, they will enable household functions such as heating or security systems to be operated at any time. For example, should a courier attempt to deliver a package with no one at home, all it will take is the tap of a finger on the vehicle's display to allow the courier to deposit the package inside the house and confirm receipt. Interaction with technology really will be able to take such varied forms, and offer such safety and convenience. Connected infotainment will let drivers navigate not just through the traffic but through their whole day. They will be able to use it to access online services and smartphone apps – and they will be able to control it using gestures and speech, just as if they were talking with a passenger. This will turn the car into the driver's truly personal assistant.

### **A touchscreen that feels like it has real buttons**

In advance of the trade show, Bosch has received a CES 2016 Innovation Award in the In-Vehicle Audio/Video category for a new touchscreen. This device can generate different surface textures, allowing elements to be felt on the display. This haptic feedback makes it easier to operate infotainment applications such as navigation, radio, and smartphone functions. Often drivers will not even need to look at the information on the screen to control it – instead, they can keep their eyes on the road. The screen generates the feel of rough, smooth, and patterned surfaces to indicate different buttons and functions; to make a selection, a button needs to be pressed more firmly. What makes this special is that the touchscreen looks no different from an ordinary display – and yet it gives users the impression that they are pressing real buttons.

### **No need to fear wrong-way drivers: a guardian angel in the cloud**

Connectivity makes driver information more up to date than ever before. This is particularly important when it comes to wrong-way drivers. In general, it takes several minutes for radio stations to issue warnings over the airwaves, but a third of wrong-way driving incidents finish after just 500 meters. Bosch is currently developing a new cloud-based wrong-way driver alert that will let drivers know of any danger just ten seconds after it arises. As a pure software module, it can be integrated at low cost into existing smartphone apps or infotainment systems. In order to detect wrong-way driving, the cloud-based function compares actual, anonymized vehicle movement on freeways with the permitted direction of travel. If there is a discrepancy, wrong-way drivers are warned of their error in a matter of seconds. At the same time, nearby cars traveling in the opposite direction are alerted to the danger. Starting in 2016, the new function will be available as a cloud service.

### **The highway pilot will increase road safety from 2020**

Highly automated driving will further increase the safety of road traffic. This development will come to freeways in 2020. According to forecasts made by Bosch accident researchers, increasing automation can significantly reduce accident numbers – by up to a third in Germany alone. At CES 2016, Bosch will be showcasing the systems and sensors necessary for automated journeys in another demo vehicle at the Sands Expo. Visitors will also learn how the highway pilot works, a highly automated system that assumes all the driver's tasks and responsibilities on freeways. This technology is already being tested on public roads. Bosch is testing automated driving on freeways not only in Germany and the United States but now also in Japan.

In the future, cars will also be able to see around bends and be aware of possible danger spots, thanks to a stream of real-time information from the internet on the location of traffic jams, construction sites, and accidents. This data will serve as an electronic “connected horizon” and give cars an even better picture of what lies ahead – further increasing safety and efficiency.

### **It's up to cars, not drivers, to find a parking space**

Every journey ends with parking. To make this job easier, Bosch is developing a new function called automated valet parking. This solution does more than relieve drivers of the task of finding a vacant space in a parking garage: it enables cars to park themselves. Drivers can simply leave the car at the entrance to the parking garage. Using a smartphone app, they then instruct their car to find a space for itself. When ready to leave, they call the car back to the drop-off point in the same way. Fully automated parking relies on smart infrastructure in parking garages plus the vehicle's on-board sensor systems – and connectivity for both. Sensors in the pavement provide up-to-date information on where free parking spaces are located, so cars know where to go. Bosch is developing not only the fully automated parking function but also all the necessary components in-house.

### **Further information:**

[Press release on the CES 2016 Innovation Award](#)

**Press photos:** 1-BBM-21856, 1-BBM-21857, 1-BBM-21858, 1-BBM-21371, 1-RB-21878-e

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[additional international press contacts](#)

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December 2, 2015  
PI 9122 BBM Ks/Na

## Cars are becoming an active part of the internet **Bosch hardware, software, and service solutions for the connected car**

### Connectivity is the key to electrified and automated driving

- ▶ Service solutions open up a wide array of business opportunities for Bosch
- ▶ With sensors, software, and services, Bosch serves all levels of the IoT
- ▶ Connectivity control units connect cars, trucks, two-wheelers, and trains
- ▶ Connected solutions reduce service times and down times

The car of the future is connected. It uses up-to-the-minute information from the internet to get vehicle occupants to their destination even more safely, efficiently, and conveniently. This integration into the internet of things also unlocks a host of vehicle-related services. “Connectivity is clearly revolutionizing the way we drive,” says Dr. Dirk Hoheisel, the Bosch board of management member responsible for this area. “Bosch delivers the necessary hardware and software, and is developing a range of attractive services.” The company’s strategy is opening up business opportunities as well. This is borne out by existing studies on the internet of things, all of which indicate that there is enormous market potential in the mobility sector. Hoheisel goes on to note that “the number of services in particular will rise considerably.” Thanks to its comprehensive systems expertise and product portfolio, Bosch is already in a solid position to tap that potential. The technology company addresses all levels of the IoT with its sensors, IoT software, and a diverse range of services. And this is true not just of Bosch’s mobility business, but of all the company’s other business sectors as well.

A few weeks ago, Bosch premiered a cloud-based alert that warns drivers within ten seconds if there is a wrong-way driver approaching. The warning system, which is scheduled to go into production in 2016, is a connected lifesaver in the true sense of the word. As early as 2012, Bosch began operating an enhanced



eCall service and a mobile information service on behalf of several automakers. The service provides accident assistance and also lends support on all other issues. And finally, several fleet operators are already using a connected fleet management solution that Bosch launched in 2014.

### **Bosch technology puts the car online**

To connect the car with the internet, Bosch pursues two main approaches. First, it makes full use of the driver's smartphone. Using the integrated mySPIN solution, drivers can link their Android and iOS devices to the vehicle's infotainment system. Selected apps can then be conveniently operated from the vehicle's central display. This technology has been featured in Jaguar and Land Rover models since 2014. Use of it in Asia is spreading, driven by contracts with two other automakers in China plus an alliance with the Chinese internet company Tencent.

Bosch's second approach constitutes equipping the vehicle with connectivity hardware in the form of a connectivity control unit, or CCU. The CCU receives and transmits information using a wireless module equipped with a SIM card. It can also determine the vehicle's position using GPS if desired. Bosch offers devices specifically adapted to cars, commercial vehicles, motorcycles, off-highway vehicles, and even railway freight cars. Just a few weeks ago, for example, Bosch won a contract to optimize the logistics processes of the Swiss rail freight operator SBB Cargo.

Connected to the vehicle's electrical system via the OBD interface, the CCU is available both as original equipment and as a retrofit solution. This makes it possible for fleet operators to retrofit their existing vehicles as well. The Bosch subsidiary Mobility Media also markets this solution for private users under the name Drivelog Connect. A smartphone connected to the CCU can display vehicle data, offer tips on fuel-efficient driving, and, in the event of a breakdown, immediately contact a towing service and the garage if required.

### **A connected car drives more proactively than any person**

Information on traffic jams, black ice, and wrong-way drivers is available in the cloud. When combined with infrastructure data from parking garages and charge spots, this provides a broader perspective – the “connected horizon”. As Hoheisel puts it: “In the connected vehicle, the driver can see over the top of the next hill, around the next bend, and beyond.” Because future cars will warn drivers in plenty of time about sudden fog or about a line of cars stopped behind the next bend, driving will be safer. Connectivity also enhances vehicle efficiency. For example, precise data about traffic jams and the road ahead makes it possible to optimize charging management in hybrid and electric vehicles along



the selected route. And because the car thinks ahead, the diesel particulate filter can be regenerated just before the car exits the freeway, and not in the subsequent stop-and-go traffic. Connectivity improves convenience as well, as it is a prerequisite for automated driving. It is the only way to provide unhurried braking in advance of construction zones, traffic jams, and accident scenes.

### **Predictive diagnostics cut service times**

Along with driving data and information on the vehicle's surroundings, the connected car also captures data on the operation of individual components. Running this data through sophisticated algorithms permits preventive diagnostics. For example, the data collected from an injection nozzle can be put through distributed algorithms in the cloud and in the vehicle in order to predict the part's remaining service life. The driver or fleet operator can be notified immediately and an appointment made with the workshop in good time. In this way, it is often possible to avoid expensive repair and down times, especially for large commercial vehicles.

Yet connectivity doesn't stop at the entrance to the repair shop. Mechanics can use transmitted vehicle data to price spare parts and labor much more quickly. In the future, their repairs will benefit from Bosch augmented reality solutions, which use a tablet computer to provide a sort of X-ray vision. When a mechanic takes the tablet and holds it under the hood, for example, the tablet's camera image is overlaid with comprehensive additional information and repair instructions for precisely the area being displayed. The mechanic can manipulate the overlaid objects via the touchscreen and call up additional information. This makes poring through service handbooks a thing of the past. A Bosch server provides all the detailed data online.

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**Press photos:** 1-BBM-21513, 1-CM-21209, 1-CM-21824

**Contact persons for press inquiries:** Stephan Kraus, phone +49(711)811-6286

*Mobility Solutions is the largest Bosch Group business sector. In 2014, its sales came to 33.3 billion euros, or 68 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.*

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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.

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**Press photo:** 1-CM-21209

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## CES 2016 (January 6 to 9), Las Vegas **Bosch APAS production assistant makes a fine barista** Powerful support for automated manufacturing

January 5, 2016  
PI 9124 RB Res/SL

- ▶ Bosch is leading provider and leading exponent of Industry 4.0
- ▶ Hundreds of millions of euros in cost savings by 2020
- ▶ Software solution for control of entire manufacturing and logistics chain
- ▶ APAS family makes manufacturing flexible and efficient

Las Vegas, Nevada – One focus for Bosch at [CES 2016](#) in Las Vegas is on Industry 4.0, also known as connected production, and the company is providing some insights into the manufacturing of the future. “Tomorrow’s production is smart, flexible, and connected. We are both a leading provider and a leading exponent of hardware and software for Industry 4.0,” said Bosch CEO Volkmar Denner, speaking at the company’s press conference at CES 2016 in Las Vegas. More than 100 such projects are currently underway at Bosch’s 250 plants worldwide, including in the U.S, China, India, the Czech Republic, and Germany. Looking at its global manufacturing network, Bosch expects Industry 4.0 to save the company hundreds of millions of euros annually in the years leading up to 2020. Connected, automated manufacturing increases companies’ competitiveness and also allows them to produce very small batches or even individually customized products.

At CES 2016, the supplier of technology and services is showcasing the Bosch APAS family. This includes automated production assistants that make manufacturing flexible and efficient. Designed especially for use in Industry 4.0 applications, they offer powerful support in automated production. The assistants take on strenuous and dangerous tasks but also monotonous ones. For example, they can join workpieces together or unpack crates. This gives the human workforce more time for tasks that add value.

### **Highest levels of precision and safety: APAS serves coffee**

At CES, Bosch is demonstrating just how versatile this production assistant can be. At the Bosch booth at the Sands Expo, the “APAS assistant” is showing off its talent as a barista, serving coffee to visitors who place their order using an app. Each cup is inscribed by the “APAS marker” before being filled with coffee. The focus is on precision and quality: the APAS serves up each cup with millimeter accuracy, as it would a workpiece on a production line. Connectivity with the coffee machine means APAS can announce when a refill of water or coffee is needed. All the APAS robots at the booth can be monitored via a screen, which shows if any problems occur. The APAS assistant is the first industrial robot system to be certified for collaborative operation by the German employers’ liability insurance association. It works hand in hand with people without a safety barrier. Thanks to a patented skin with over 120 sensitive sensors, it stops as soon as a worker gets too close.

### **APAS family for fast, flexible production**

There are additional APAS family members for the world of manufacturing: the “APAS inspector” carries out quality control, checking surfaces using a high-resolution camera and a 3D measuring technique. This enables it to detect hairline cracks in metal components. The “APAS speedswitch” uses a laser scanner to monitor the area around the APAS assistant. If there are no people nearby, it ramps up the speed. This makes it more productive than many other systems, but without compromising human safety. Finally, the “APAS flexpress” precisely assembles component parts or subjects them to further processing, such as pressing, shaping, stamping, or punching. All these production assistants can work as standalones or in combination with one another.

### **All manufacturing activities on one dashboard**

Bosch optimizes processes in its own production by analyzing big data in real time; it also offers the necessary IT manufacturing solutions to its customers. All production and quality data as well as logistics processes can be managed using the company’s IoT shopfloor solutions, which are being showcased at CES. The central control element is a dashboard that displays the data in real time. This allows users to prevent interruptions to the manufacturing process, thereby improving productivity.

**Press photos:** 1-BST-20778, 1-CR-21640, 1-CR-21642, 1-PA-21574, 1-RB-19624, 1-RB-20863-d, 1-RB-20864-d, 1-RB-20867, 1-RB-20995, 1-RB-21044, 1-RB-21063, 1-RB-21067

**Internet:**

Details about APAS:

<http://bit.ly/1Zaqc8K>

Industry 4.0 in practice at Bosch:

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

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**Thursday, January 7, 2016**

- **11:00 a.m. to 12:00 p.m.**

**Keynote panel** "[Beyond Smart Cities: The Future of Urban Mobility](#)"

Dr. Volkmar Denner, chairman of the board of management of Robert Bosch GmbH, Westgate Theater. Other panelists to include U.S. Secretary of Transportation Anthony Foxx.

- **11:30 a.m. to 12:30 p.m.**

**Conference track:** The Internet of MEMS and Sensors

**Panel:** "[Wearables and Smart Sensors Advancing User Interface](#)"

Dr. Horst Muenzel, CEO and general manager, Akustica Venetian, Level 4, Marcello 4404

- **2:15 to 3:15 p.m.**

**Conference track:** The Internet of MEMS and Sensors

**Panel:** "[Technology Trends for the IoT](#)"; Dr. Stefan Finkbeiner, CEO and general manager, Bosch Sensortec, Venetian, Level 4, Marcello 4404

**Friday, January 8, 2016**

- **10:15 to 11:15 a.m.**

**Conference track:** Exploring Tomorrow's Automotive Mobility Ecosystem

**Panel:** "[Implications for Players in Tomorrow's Mobility Ecosystem](#)"

Dr. Rolf Nicodemus, project vice president, Connected Parking, Robert Bosch GmbH, Las Vegas Convention Center, North Hall, Room N261

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**Contact persons for press inquiries:**

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[additional international press contacts](#)

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*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.*

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## CES 2016 (January 6 to 9), Las Vegas **Bosch high-tech components for the internet of things** Tiny sensors, big impact

January 5, 2016  
PI 9142 RB Ho/SL

- ▶ A wide range of automotive and consumer electronics applications
- ▶ Bosch MEMS sensors can be found in three out of four smartphones
- ▶ Retrofit emergency call adapter for cars
- ▶ New environmental sensor solution: improving air quality in any building
- ▶ XDK sensor platform makes developing IoT solutions easier
- ▶ New sensors for smartphones, wearables, and virtual reality

Las Vegas, Nevada – They are the eyes and ears of modern technical systems. Nearly everyone has them in their smartphone or tablet: Bosch microelectromechanical systems (MEMS) sensors are small, robust, smart, and energy saving. They can be found in vehicles, smartphones, games consoles, and tablets, as well as in countless other devices. Without them, a whole host of applications – in consumer electronics, but also in cars – would not be possible at all. “They might be tiny, but they have a big impact. They help save lives, conserve energy, and make driving more relaxed: Bosch MEMS sensors are the eyes and ears of billions of electronic devices,” said the Bosch CEO Dr. Volkmar Denner, speaking at the company’s press conference at CES 2016 in Las Vegas. “Sensors make our daily lives more relaxed, safer, and more exciting.”

For example, it is thanks to MEMS sensors that a smartphone knows which way to orient the information on its display when it is turned. The sensors also enable fitness trackers to count steps. And in cars, they are the centerpiece of the ESP anti-skid system, where they help ensure the vehicle remains safely on track in critical situations. At [CES 2016](#), Bosch is showcasing new acceleration and yaw-rate sensors, an environment sensor solution, a development platform for internet of things (IoT) applications, and the world’s first retrofit emergency call service adapter for cars.

### **New sensor applications – from the smart home to Industry 4.0**

Bosch's comprehensive sensor portfolio is definitive proof that the company doesn't know the meaning of standing still. Bosch is making the sensors not only smaller, but also smarter, as well as making them as energy efficient as possible. It is doing all this to be able to offer smart home applications that make consumers' lives easier, and to pave the way for companies to join Industry 4.0. Future plans include systems that draw energy from their environment through a process called energy harvesting.

In 2015 alone, 1.44 billion new smartphones were sold. Then there is the rocketing popularity of smartwatches and fitness armbands: some 76 million arrived on the market in 2015, and that number is set to reach 173 million by 2019. All these devices feature sensors that evaluate all kinds of information. "For Bosch, this means huge potential business," Denner said.

### **Retrofit emergency call service for cars: sensors are smart guardian angels**

At CES 2016, Bosch is unveiling the Retrofit eCall Adapter – a brand new version of eCall, the automatic emergency call service. This new adapter connects to the car's cigarette lighter socket to offer genuinely exceptional services: a speed sensor registers the collision and places an emergency call. A smartphone app passes on information such as the car's position. Even the severity of the crash is analyzed, and that information is used to determine the next automated step. In the case of a relatively serious accident, the control center attempts to make contact with the driver to establish whether a recovery truck or an ambulance is needed. If the driver does not respond, paramedics are dispatched immediately. Automakers have already fitted the standard, non-retrofit version of eCall in some 1.5 million vehicles. Connected to Bosch service centers, the emergency call system is available in 16 languages and over 30 countries.

### **New environment sensor solution: giving buildings a climate makeover**

Bosch's Ambient Sensor is a smart sensor solution capable of measuring, analyzing, and communicating ambient conditions in buildings. The variables it measures include air quality, lighting conditions, and noise levels. The integrated sensor helps improve the climate in office spaces and private homes. It sends its readings to the facility manager's smartphone, for example, and can recommend changes to things such as ventilation or lighting. Its long battery life is a further advantage. The Ambient Sensor can not only be integrated into building automation systems, but also operated as a standalone solution.

### **XDK sensor platform makes developing IoT products easier**

XDK is a sensor platform that allows users to develop prototypes and new applications for the internet of things. The hardware platform provides access to

various MEMS sensors and connectivity options; the software can be tailored to fit the given application and complements the hardware components perfectly. It features a range of components including an acceleration sensor, a yaw-rate sensor, a magnetometer, and sensors to measure atmospheric pressure, air temperature and humidity, noise levels, and digital light. Other features include Bluetooth and wi-fi connections, a microcontroller, integrated antennas, a microSD card reader, and a battery. The [XDK Community](#) gives developers the chance to exchange ideas, collaborate on new project ideas, and take part in events. Bosch helps its customers get new IoT business ideas ready for full-scale production as quickly as possible.

### **New motion and yaw-rate sensors for mobile gaming, wearables, and virtual reality**

People expect sensors to be not only as small and energy efficient as possible, but also to deliver even better performance. Apps for smartphones and tablets are a particularly daunting challenge in this regard: the battery has to last as long as possible, but it is also crucial that users can quickly access the app they want. At CES, Bosch is demonstrating the first acceleration sensors to feature integrated intelligence and be compatible with Android while also being particularly energy saving. Bosch's new yaw-rate sensors have been developed especially to meet the requirements of mobile gaming, augmented reality, and virtual reality applications. What is more, they combine low operating costs with high picture stability.

### **Bosch – pioneer of MEMS technology**

When it comes to MEMS sensors, Bosch is both a pioneer and the world's leading manufacturer. The company developed the underlying semiconductor manufacturing process in house, and has been producing the sensors on an industrial scale for over 20 years now. Bosch holds more than 1,000 patents and patent applications relating to MEMS technology. To date, more than six billion MEMS sensors have left the company's state-of-the-art wafer fab in Reutlingen, Germany – with more than four million emerging every day. Today's vehicles feature more than 50 MEMS sensors. Bosch sensors can be found in three out of four smartphones worldwide, and 75 percent of Bosch MEMS sensors are now used in consumer electronics applications.

**Press photos:** 1-BCDS-21829, 1-BCDS-21830, 1-BCDS-21831, 1-BST-21812, 1-BST-21813, 1-BST-21814, 1-BST-20778, 1-AE-20856-e, 1-AE-20855, 1-BST-21854

**For more information online:**

[Bosch Sensortec: from start-up to the world's leading provider of MEMS sensors for consumer electronics](#)

[Bosch sensors for automotive electronics](#)

[Bosch sensors for consumer electronics](#)

[Sensors – how technology maps the environment](#)

[MEMS: stars among sensors](#)

[Greater safety with peripheral sensors](#)

**Videos:**

[Bosch sensor solutions for wearables](#)

[Gyroscope for ESP: How it works](#)

[Pressure sensor: how it works](#)

[Acceleration sensor: how it works](#)

[MEMS sensor manufacturing](#)

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- **Focus on connected mobility** in the North Hall, booth #2302

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

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

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CES 2016 (January 6 to 9), Las Vegas  
Ambient Sensor, Retrofit eCall and XDK  
**Bosch Connected Devices and Solutions launches  
smart sensor devices for home, office, transportation  
and IoT applications**  
Making life safer and more comfortable

January 5, 2016

PI 9141 DF/Ho

- ▶ Ambient Sensor monitors environmental conditions in homes and offices
- ▶ Retrofit eCall detects crashes to improve driver safety
- ▶ XDK speeds up Internet of Things (IoT) product development

Las Vegas, Nevada – Bosch Connected Devices and Solutions launches three innovative new sensor-based products at the 2016 International [CES](#) in Las Vegas, USA. The new devices provide smart solutions for homes, offices and vehicles, to help improve comfort, convenience and safety, as well as helping developers to quickly create new Internet of Things (IoT) solutions.

### **Measuring environmental conditions**

To optimize the environment and improve living comfort in a smart home or connected office building, a smart sensor can integrate the monitoring of ambient conditions such as air quality, light and noise intensity with the building's HVAC and lighting systems. Bosch's new Ambient Sensor meets this need, in a small form factor with two-year battery life, making it easy to position anywhere.

It includes integrated sensors to determine the indoor air quality by VOC analysis (volatile organic compounds), and measuring temperature, relative humidity, barometric pressure, and light and noise levels. It can be operated independently or as part of a smart home ecosystem. Particularly in meeting rooms, concentration is often affected by poor air quality. The Ambient sensor alerts the participants and thereby helps to improve work productivity.

### **Improving automotive safety**

When a car has an accident, if it is fitted with an eCall system, this can automatically and quickly contact the emergency services – speeding up a response, and potentially saving lives.

The new Bosch Retrofit eCall plug is a smart sensor device that uses acceleration sensors and intelligent embedded algorithms to detect an accident and then send data to a smartphone app via Bluetooth. This data is sent to a back-end IT system that can determine actions, such as a call center calling the driver to provide assistance, or in extreme cases making an emergency call.

The Retrofit eCall is a cost-effective solution and plugs into a standard 12V DC socket, so can be easily and quickly retrofitted to any type of car.

### **Rapid prototyping and fast product development for IoT applications**

To save time in developing Internet of Things (IoT) projects, quickly creating a demo or proof of concept is key. Bosch's new XDK, or Cross Domain Development Kit, is a rapid prototyping tool that enables developers to bring their IoT designs to life swiftly and easily.

XDK is a fully integrated hardware and software product, including a MEMS accelerometer, magnetometer and gyroscope, as well as humidity, pressure, temperature, acoustic and digital light sensors. The kit includes Bluetooth and WiFi connectivity, a microcontroller, integrated antennas, a micro SD card slot and a rechargeable battery.

The software development environment offers access to different API layers which allow the user to program at their preferred depth. An algorithm library and sample applications are provided, as well as access to an online community to share information and support projects. The XDK was designed to allow users an easy transition from prototype to mass production by providing a clear road to product development.

### **Press Contact**

Press who would like to meet with Bosch Connected Devices and Solutions may contact embedded PR, Anja-Maria Hastenrath, phone: +49 89 64913634-11, email: ah[at]embedded-pr.de.

**Press photos:** 1-BCDS-21829, 1-BCDS-21830, 1-BCDS-21831

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**Simply.Connected.**

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

**Tuesday, January 5, 2016** (all times local)

- **8:00 to 8:45 a.m.**

**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.

**Thursday, January 7, 2016**

- **11:00 a.m. to 12:00 p.m.**

**Keynote panel** "[Beyond Smart Cities: The Future of Urban Mobility](#)"

Dr. Volkmar Denner, chairman of the board of management of Robert Bosch GmbH, Westgate Theater. Other panelists to include U.S. Secretary of Transportation Anthony Foxx.

- **11:30 a.m. to 12:30 p.m.**

**Conference track:** The Internet of MEMS and Sensors

**Panel:** "[Wearables and Smart Sensors Advancing User Interface](#)"

Dr. Horst Muenzel, CEO and general manager, Akustica Venetian, Level 4, Marcello 4404

- **2:15 to 3:15 p.m.**

**Conference track:** The Internet of MEMS and Sensors

**Panel:** "[Technology Trends for the IoT](#)"; Dr. Stefan Finkbeiner, CEO and general manager, Bosch Sensortec, Venetian, Level 4, Marcello 4404

**Friday, January 8, 2016**

- **10:15 to 11:15 a.m.**

**Conference track:** Exploring Tomorrow's Automotive Mobility Ecosystem

**Panel:** "[Implications for Players in Tomorrow's Mobility Ecosystem](#)"

Dr. Rolf Nicodemus, project vice president, Connected Parking, Robert Bosch GmbH, Las Vegas Convention Center, North Hall, Room N261

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*Bosch Connected Devices and Solutions GmbH was founded in 2013 and is a fully owned subsidiary of Robert Bosch GmbH. The company was set up to design, develop and market innovative connected devices and tailor-made solutions for the Internet of Things. Our competency in electronics, sensor technology and software enable new business models for global markets. Bosch Connected Devices and Solutions is headquartered in Reutlingen, Germany. In 2015 Bosch Connected Devices and Solutions opened offices in Chicago, USA and Shanghai, China.*

For more information, go to [www.bosch-connectivity.com](http://www.bosch-connectivity.com)

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CES 2016 (January 6 to 9), Las Vegas

January 5, 2016

PI 9136 TH/Ho

## **New generation of motion sensors Bosch Sensortec announces intelligent accelerometers and high performance gyroscopes at CES 2016**

### Embedded intelligence enables next generation of smart phones and wearables

- ▶ Intelligent features improve user experience and extend battery life time
- ▶ Meeting every requirement, from always-on step counting to demanding optical image stabilization (OIS)

Las Vegas, Nevada – Bosch Sensortec today announces new generations of intelligent accelerometers and high performance gyroscopes at the 2016 International [CES](#) in Las Vegas.

Aimed at smart phones, tablets and wearables, the new devices cover a wide range of requirements, from low power consumption for always-on applications such as step counting, to high performance optical image stabilization (OIS).

#### **Intelligent three-axis accelerometers - BMA422 and BMA455**

Today's applications running on modern mobile devices place many demands on motion sensors. These sensors are required to continuously sense motion, such as for step counting operations, while at the same time delivering a high level of performance without compromising battery lifetime.

To meet these challenges, the new sensors from Bosch Sensortec are the first to integrate embedded intelligence functionality into standalone accelerometers. Adding intelligent features to an accelerometer enables innovative applications, while minimizing power consumption by eliminating the need to wake up an application processor or an additional discrete sensor hub. Overall system power management and user experience can be improved by the accelerometer detecting and processing motions such as glance, pick-up and tilt.

Current consumption of the new accelerometers is kept very low to extend battery life time and the integrated Android 6.0 “Marshmallow” features minimize programming effort for customers. Each device delivers outstanding accelerometer performance, most importantly, low offset, low temperature coefficient offset (TCO) and low noise levels.

Two new accelerometers are being launched: the BMA422 "all-rounder" is ideally suited for standard applications, the BMA455 provides high performance for areas such as gaming and immersive activity-tracking. In addition the high level of performance enables the most demanding applications covering augmented reality, virtual reality, image stabilization and industrial measurement applications such as spirit leveling and inclination measurement.

### **High performance gyroscopes - BMG250 and BMG280**

Mobile devices require gyroscopes for many applications, including gaming, augmented reality, virtual reality and OIS. To provide the necessary performance, Bosch Sensortec’s new gyroscopes combine the most important parameters in a single device: low noise, low TCO and high bias stability.

Although delivering high performance, they do both feature the lowest power consumption of any standalone gyroscope in the market, thus helping to extend battery lifetime in mobile devices.

Today’s announcement includes two three-axis gyroscopes: the BMG250 provides low noise, low TCO and high bias stability, while the BMG280 delivers ultra-low noise optimized for OIS and includes a secondary interface for OIS, making it fit for use in camera modules. The BMG280’s secondary interface can be used in parallel with the primary user application interface, for example for simultaneous panorama creation and OIS.

### **Packages and availability**

The new devices are all provided in small packages. The BMA422 measures 2.0 x 2.0 x 0.95 mm<sup>3</sup>, while the BMA455 is 2.0 x 2.0 x 0.65 mm<sup>3</sup>. The BMG250 and BMG280 gyroscopes both measure 3.0 x 2.5 x 0.83 mm<sup>3</sup>.

Samples of the all sensors are available now, with mass production of the gyroscopes to commence in Q1 2016 and mass production of the accelerometers starting in mid-2016. For pricing, please contact Bosch Sensortec.

## **Press Contact**

Press who would like to meet with Bosch Sensortec may contact embedded PR, Anja-Maria Hastenrath, phone: +49 89 64913634-11, email: ah@embedded-pr.de.

## **Trademarks**

Android is a trademark of Google Inc.

**Twitter:** follow us on [#BoschMEMS](https://twitter.com/BoschMEMS)

## **Videos:**

[Bosch sensor solutions enable wearable devices](#)

[Bosch Sensortec: Sensational 10 years](#)

[Integrated sensor hubs](#)

[Integrated Environmental Unit BME680](#)

[Inertial Measurement Unit BMI160](#)

[MEMS sensor manufacturing](#)

[Acceleration sensor: how it works](#)

[Gyroscope: how it works](#)

## **For more information, go to:**

[Microphones for consumer applications from Akustica](#)

[Sensors – how technology maps the world around it](#)

[Bosch sensors for automotive applications](#)

## **Further press releases:**

[Hidden heroes: How Bosch is teaching things to feel – and changing everyday life](#)

[Bosch Sensortec: 10 years of MEMS sensors innovation](#)

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*Bosch Sensortec GmbH is a fully owned subsidiary of Robert Bosch GmbH, dedicated to the consumer electronics world offering a complete portfolio of micro-electro mechanical systems (MEMS) sensors and solutions that enable mobile devices to feel and sense the world around them. Bosch Sensortec develops and markets a wide portfolio of MEMS sensors and solutions for smart phones, tablets, wearable devices and IoT (Internet of Things) applications.*

*The product portfolio includes 3-axis acceleration, gyroscope and geomagnetic sensors, integrated 6- and 9-axis as well as environmental sensors and a comprehensive software portfolio. Since its foundation in 2005 Bosch Sensortec emerged as the technology leader in the addressed markets. The Bosch Group has been the global market leader for MEMS sensors since 1998 and has to date sold more than 6 billion MEMS sensors.*

*For more information, go to <http://www.bosch-sensortec.com/>*

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