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CES 2019: Bosch extends its position as a leading IoT company

Connected solutions for the mobility and homes of the future

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- ▶ IoT and AI: “Only with the help of artificial intelligence will we be able to unleash the full potential of the IoT.”
- ▶ IoT on the road: Bosch presents connected mobility of the future
- ▶ IoT in the home: connected appliances make home owners’ lives noticeably easier
- ▶ IoT #LikeABosch: Bosch launches global IoT image campaign

Las Vegas, NV – More and more, the internet of things (IoT) is changing our world. At CES 2019 in Las Vegas, Bosch is showing what it is already capable of today. From a concept for a shuttle vehicle that makes a new kind of mobility tangible, to fridges with connectivity that give advice on food storage, to smart lawn mowers that learn by doing – the spectrum of solutions Bosch is presenting at the world’s largest consumer electronics show is huge. “Bosch recognized the huge opportunities of the IoT early on. We have been actively shaping the connected world for nearly ten years now,” says the Bosch board of management member Dr. Markus Heyn. “Today, we are a leading IoT company. Step by step, we have extended our software and IT expertise.” Using its own IoT cloud, the company has already carried out more than 270 projects in field such as mobility, smart homes, smart cities, and agriculture. The number of sensors and devices connected over the Bosch IoT Suite has risen nearly 40 percent since last year, and now stands at 8.5 million.

One of the keys to further growth and new business opportunities on the internet of things is artificial intelligence (AI). This is also a field in which Bosch is playing a decisive part in driving developments. “We will best be able to unlock the potential of the IoT if we combine it with AI, and take our IoT and AI activities

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forward in parallel,” Heyn says. In his view, the relationship between the two fields is complementary: “The IoT needs intelligence. The use of connected things to gather data can be a decisive boost for the development of AI. It is only through AI that connected things become intelligent and learn to draw their own conclusions. Above all, we aim to achieve concrete improvements in people’s real, everyday lives – things such as more time, more security, more efficiency, and more convenience.” Here, Heyn cites the example of video-based fire detection: by using intelligent image analysis, security cameras are able to identify fires within a few seconds, even before the system’s sensors detect heat and smoke. In this way, fires can be detected considerably earlier than with conventional fire or smoke alarm systems. This saves valuable minutes in which lives can be saved.

A second key to success on the path to the IoT age is partnerships. Here, Bosch is opting for a mix of traditional and new players. The alliance recently agreed with the Canadian platform provider [Mojo](#) has already resulted in the first integrated IoT platform for connected vehicles: in the event of an accident, a special Bosch algorithm can identify where and when the accident happened, and how severe it is. Via the Mojo cloud, the data are transmitted without any delay to the Bosch emergency service center, which automatically sends an emergency call to local rescue services. At the same time, a message is sent to a predetermined list of recipients, either as a text message or via the Mojo app. “Together with Mojo, we are connecting vehicles directly with the cloud. This means rescue services can get to the scene of an accident even faster than before,” says Mike Mansuetti, the president of Bosch North America. From the middle of next year, the IoT emergency solution will be available for nearly a million drivers in North America and Europe.

IoT on the roads: Bosch presents connected mobility of the future

With the [concept shuttle vehicle](#) it developed in-house, Bosch is celebrating a world first at CES. In this vehicle, the company is presenting solutions for the automation, connectivity, and electrification of vehicles, and is giving visitors the chance to experience at first hand a new kind of mobility: driverless shuttles, which will soon be a feature on the streets of the world’s cities. “This will pay into our vision of mobility that is as emissions-free, accident-free, and stress-free as possible,” Heyn says. For shuttle-based mobility such as this, Bosch will be supplying not only components and systems, but also a complete range of mobility services, such as reservation, sharing, and connectivity platforms, as well as parking and recharging services. Bosch believes that such connected services are essential for the shuttle-based mobility of the future. The forecast market volume for these services is also high: while it was 47 billion euros in 2017, it is estimated that it will be as much as 140 billion euros by 2022 (source:

PwC). Bosch also wants to have a share in this, and aims for significant double-digit growth with the solutions it offers. For Heyn, there is no doubt: “In the future, every vehicle on the road will make use of Bosch digital services. We will consolidate them into a smart, seamlessly connected ecosystem.”

One of the final obstacles for putting shuttle-based mobility into practice is the automation of vehicles in complex urban environments. Here, Bosch believes partnerships are the answer: [In the second half of this year, San José in California’s Silicon Valley is set to become the pilot city for testing a fully automated, driverless ridesharing service provided by Bosch and Daimler.](#) The three parties have already signed a letter of intent to this effect. With their development alliance, Bosch and Daimler want to improve urban traffic flows, enhance road safety, and provide an important building block for the traffic of the future. Their aim is to develop a driving system for fully automated driverless driving (SAE level 4/5) that is ready for production by the beginning of the next decade.

IoT in the home: connected appliances make home owners’ lives noticeably easier

It’s not just on the roads that connected products and services that make user’s lives easier are in demand. “We’re working on the idea of a connected home, and on appliances that think autonomously and understand what users want,” Heyn says. At CES, for example, the company is presenting a new function for web-enabled fridges that can recognize types of food and provide recommendations on storage. The interior camera automatically recognizes some 60 kinds of fruits and vegetables and suggests the ideal place to store them by means of an app. As a result, food is stored in the best possible way, stays fresh for longer, and doesn’t have to be thrown away so often.

Another new development is the PAI projector, which can project a virtual user interface onto a kitchen counter top. An integrated 3D sensor captures any hand movements, allowing touch-screen operation of the interface. In this way, users can conveniently call up recipes online and make phone calls over the internet while they are cooking and baking. Designed especially for the kitchen environment, PAI does not have to be used with as much care as a smartphone or tablet. Even with sticky fingers, the projector can still be controlled perfectly. PAI is set to debut in China in February 2019, to be followed by market launch in the United States.

Bosch is also presenting the Indego S+, its new robot lawn mower with internet connectivity, at CES. It is one of the first robot lawn mowers in the market to offer voice control by Amazon Alexa. It is also the only robot lawn mower that

can use weather forecasts on the web to automatically decide when best to mow the lawn again. Bosch is using artificial intelligence to improve the way its robot lawn mower recognizes obstacles on the lawn by evaluating data such as motor flow, acceleration, motor speed, and direction. “We are using AI to make lawn care even easier and more convenient. Our vision is an Indego that adapts to its garden in order to mow the lawn perfectly every time,” Heyn says.

IoT #LikeABosch: Bosch launches digital IoT campaign

Bosch is also using CES 2019 to premiere its new IoT image campaign. The main plank of the campaign is a hip-hop video clip featuring a protagonist who is a savvy IoT user. Bosch is entering new territory with its “Like a Bosch” campaign; the decidedly different approach and tone marks a new departure for the company, which was founded in 1886. This PR move capitalizes on a rash of “like a boss” videos and memes that have gone viral on the internet, attracting tens of millions of clicks. These videos feature everyday people who stage bizarre stunts or find their way out of predicaments with technical finesse. The IoT image campaign changes a few letters in order to put a fresh spin on this internet phenomenon. The protagonist in the Bosch video is a young man who is always on top of things, thanks to connected solutions from Bosch. Smartphone in hand, he operates his car, lawn mower, or coffee machine in a cool, smart, and confident way – he’s in charge of things “like a Bosch.”

Bosch at CES 2019

- **PRESS CONFERENCE:** In Ballrooms B, C, and D, Mandalay Bay Hotel, Las Vegas **South Convention Center, Level 2**, from **9:00 to 9:45 local time on Monday, January 7, 2019.**
- **BOOTH: Tuesday to Friday, January 8–11, 2019**, in the Central Hall, booth #14020
- **FOLLOW** the Bosch CES 2019 highlights on Twitter: **#BoschCES**
- **PANELS WITH BOSCH EXPERTS:**
 - **Wednesday, January 9, 2019, 9:00 to 10:00** (local time)
“[Connected home innovations](#)” with Anne Rucker, Global Head of Digital Strategy, Venetian, Level 4 Marcello 4405
 - **Wednesday, January 9, 2019, 9:00 to 10:00** (local time)
“[Technology, Jobs, and the Future of Work](#)” with Charlie Ackerman, senior vice president of human resources North America, Las Vegas Convention Center, North Hall N258
 - **Wednesday, January 9, 2019, 14:15 to 15:15** (local time)
“[IoT to the max, thanks to 5G](#)” with Davie Sweis, Vice President of Global Digital Business at Bosch in North America, Las Vegas Convention Center, North Hall N256

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The Bosch Group is a leading global supplier of technology and services. It employs roughly 402,000 associates worldwide (as of December 31, 2017). The company generated sales of 78.1 billion euros in 2017. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life." The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiary and regional companies in 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company's future growth is its innovative strength. At 125 locations across the globe, Bosch employs some 64,500 associates in research and development.

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

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



BOSCH

January 7, 2019
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IoT “Like A Bosch”:

How we’re turning our vision of a better tomorrow into reality today

Dr. Markus Heyn,

Member of the board of management

of the Robert Bosch GmbH,

and Mike Mansuetti,

President of Bosch in North America

at the Bosch Press Conference, CES 2019, Las Vegas,

Nevada (USA), January 7, 2019

Check against delivery.

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Good morning, everyone. Thank you for joining us! It's great to see so many seats filled at this, our seventh press conference here at CES!

Today actually marks the global premiere of our new IoT campaign "Like A Bosch". We're very excited to be able to launch it here, since what better platform could there be than our press conference at CES, the beating heart of the IoT universe? I can imagine, though, that a few of you are scratching your heads about one thing. What exactly is IoT "Like A Bosch"?

Well, it's simple, really. These days, a lot of companies are trying to position themselves as an IoT leader, an IoT expert. And with good reason: by next year, IoT market volume is forecast to reach 250 billion dollars, an annual increase of 35 percent. And by 2025, it's estimated that there will be 55 billion IoT devices globally, and an aggregate IoT investment of nearly 15 trillion dollars.

Still, when you look closely, you'll see that not all IoT companies are created equal. "Like A Bosch" refers to what sets us apart – to how we do things differently. It refers, for example, to the emphasis we place on the beneficial aspects of our innovations – after all, we put humans at the heart of our solutions, not technology. Behind every solution we develop is the question: "How is this going to improve someone's life?" For us, that's not a nice-to-have, it's non-negotiable.

Here at CES, we're showcasing some of our latest technological answers to this very question in two key domains: mobility and the home.

"Like A Bosch" also refers to the sense of responsibility we demonstrate to our customers, our communities, and the environment that drives our innovation. And just as important, it refers to our unwavering commitment to treating our customers' data with care, and giving them full control over how it's used.

Essentially, “Like A Bosch” is how we translate our “Invented for life” ethos into our IoT activities. We want to enable people to live more easily, efficiently, and safely in a connected world. And that’s exactly what we offer with our solutions – solutions that reflect our unique perspective on the IoT.

IoT is firmly rooted at Bosch

Over the past few years, Bosch has evolved from an industrial enterprise into a leading global IoT company. Of Bosch’s more than 400,000 associates worldwide, 27,000 are software engineers, nearly 20 percent of whom are working exclusively on the IoT. We have technical expertise across the entire spectrum: in addition to having more than 130 years’ experience with hardware and manufacturing, today we are a leading provider on all three levels of the IoT – sensors, software, and services.

For example, our Bosch IoT Suite now connects 8.5 million sensors, devices, and machines with users and company applications – an increase of nearly 40 percent over last year. Among these are four million cars, whose connectivity and over-the-air updates are enabled by our software platform. We also have our own IoT cloud, which hosts more than 270 IoT projects in various areas, such as mobility, smart cities, and agriculture.

You could even say that where Silicon Valley connects the digital world, Bosch connects the real world. But not only that: we also enable connectivity at the most fundamental level.

We’re the leading global producer of micro-electro-mechanical sensors, or MEMS. Since 1995, Bosch has produced more than ten billion of them. Semiconductors in general are an extremely fast-growing market and reached some 450 billion dollars in global sales last year. After all, no vehicle can drive without them these days. These sensors supply a vehicle with important information regarding its handling, such as if the vehicle is braking, accelerating,

or skidding. The electronic stability program then uses this information to keep cars, trucks, and even motorcycles safely on track and in their lanes.

And as a key technology for the IoT, sensor applications extend far beyond mobility. Bosch MEMS sensors appear in more than half of all smartphones worldwide, as well as in millions of health, fitness, and smart-home devices.

To open up even more possibilities for these tiny wonders, we're working with various partners like California-based SiTime Corporation to develop next-generation MEMS timing technology. Stable, reliable MEMS timing devices are needed for the successful operation of next-generation electronics, and will enable things like the higher speeds of 5G communications, longer battery life for IoT devices, and increased reliability for driver assistance systems.

The IoT is opening up one of the newest technological frontiers: artificial intelligence. We see tremendous potential in this technology and we believe that AI solutions hold the key to bringing down the number of road deaths worldwide, reducing energy costs in factories, making agriculture greener, and keeping ourselves and our living spaces safe, secure, and healthy, to name just a few examples.

This is why we're on the forefront of AI research. Our center for artificial intelligence employs 170 experts at four locations: Renningen, near our headquarters in Stuttgart, Germany; Bangalore, India; Pittsburgh, Pennsylvania, and Sunnyvale in Silicon Valley. We plan to increase the number of experts to at least 400. Our aim is that within ten years, all Bosch products will either have AI integrated into them, or will have been produced or developed using it. For example, we're currently applying AI to video-based fire detection. Here, security cameras use smart image analysis to identify fires within a few seconds. This is far faster than conventional fire or smoke-detection systems, in which

precious minutes are often lost before heat or smoke reaches the system's sensor. It's a great example of what we mean by technology "Invented for life."

We're also pursuing numerous partnerships in this field. For example, we're partnering with Pittsburgh-based Astrobotic Technology Inc. to send experimental sensor technology to the International Space Station as early as May of this year. Onboard the ISS, we'll be using machine learning to analyze the noises emitted by machinery, with the goal of identifying whether something needs to be repaired or replaced before it breaks.

Now let's take a look at some of the specific innovations we're showcasing in the domains of connected mobility and connected living.

Connected mobility – Move "like a Bosch"

First, let's look at mobility. Or as we would now say, moving "like a Bosch." Around the globe, how we get from A to B is changing on a fundamental level. At Bosch, we're working toward a vision of mobility that is as accident-free, stress-free, and emissions-free as possible. We also want to make it accessible and affordable. To achieve this, we're harnessing our innovation leadership in the automotive domain to develop pioneering technologies and business models for the mobility of the future.

Let me tell you how we see it. Imagine this: it's a few years from now. You want to head downtown to do some shopping, so you pull out your smartphone and bring up the app to call a shuttle. With the press of a button, you've booked one and paid for the trip; a couple minutes later the shuttle pulls up outside your door.

With the press of another button, the car unlocks and you step inside. You're alone, but an automated voice greets you by name and informs you of your

journey time – it’s just enough time to check your email and catch up on the news.

Thanks to its electric drive, the shuttle is whisper-silent at full speed. Despite the number of vehicles on the road – many of them shuttles like yours – there is no congestion anywhere. That’s because they’re all in constant communication with one another and with the infrastructure, which keeps traffic flowing like clockwork.

Before you know it, you’ve reached your destination. The car lets you out in a drop-off zone at the shopping center’s entrance. In years past, a similar journey in downtown traffic would have left you frazzled, on-edge, and probably running late. Today, though, you’re relaxed and caught up on the day’s news as you head inside to do your shopping.

This scenario is just around the corner. In the U.S., Europe, and China alone, some one million on-demand shuttles are expected to be in service by 2020. By 2025, that number is forecast to rise to 2.5 million, and many of those will also be fully electric and self-driving. This new kind of transportation will bring numerous benefits: not only will city-dwellers of all ages enjoy increased freedom of movement, but everyone will benefit from the shuttles’ reduced ecological footprint, increased safety for all road users, and improved traffic flow.

And as it happens, Bosch already has most of the technologies needed to realize such shared, self-driving urban shuttles. And we’re working to put them on city streets tomorrow. What’s more, we want to make them completely electric and fully connected to the internet. And to prove it to you, we’re showing you what this kind of mobility could look like in an actual concept shuttle at our booth.

Every square inch of this concept shuttle contains existing Bosch solutions – from our **e-axle**, an electric powertrain that’s compact, efficient, and affordable, to **360-degree surround sensors** for automated driving, to our **connectivity control unit** for full V2X connectivity and state-of-the-art **vehicle computers**.

It also features the system we call **Perfectly keyless**. This CTA honoree can gain or grant access to your car with the touch of a button on your phone. With our system, user identification happens via a digital fingerprint on each individual smartphone. Compared with keyless entry systems already on the market, this offers a major advantage in terms of security. Here at CES, we’re also offering a separate demo of Perfectly keyless in a Ford Mustang – come by and try it out for yourself!

Importance of mobility services

Bringing this vision to life will take more than just developing sophisticated hardware and systems. When it comes to getting around in the future, services are going to be a central element of the mobility landscape. Worldwide, their market volume is projected to grow to 160 billion dollars by 2022 – an annual increase of more than 25 percent. At Bosch, we’re so convinced of the importance of digital mobility services that we set up a division dedicated to developing and selling them.

Our current portfolio encompasses everything from **road condition services**, which notify automated cars in real time about conditions along the route, to **predictive diagnostics**, which help minimize servicing time and breakdowns in fleet vehicles, to **automated valet parking**, to **over-the-air software updates** that enhance vehicles’ capabilities and keep them secure.

Worth a special mention is our new suite of **convenience charging services** for electric vehicles, which offer real-time information on range and recommendations for recharging. With these, we’re ensuring it will be as easy to

recharge the shared electric shuttles of the future as it is to refuel a conventional car today.

Another example of our service offerings is a web-based ridesharing service, thanks to our acquisition of the U.S. startup **SPLT**. This service offers a platform for employers to coordinate ridesharing offers for their employees. We're also exploring its potential to benefit other groups as well. For instance, the startup was recently awarded a grant from the state of Michigan to develop a pilot project focused on transporting the elderly in rural areas.

We're also pleased to announce the first service resulting from our partnership with **Mojo**, which provides a cloud platform and software solutions for connected cars. By combining our advanced crash-detection algorithm and emergency call services with Mojo's cloud platform service, we can connect any type of vehicle directly with the cloud. This means help will arrive quicker in case of an accident.

Looking ahead, there is of course one final obstacle that still needs to be surmounted before shuttles like the one we're showcasing can become reality. That's the self-driving technology to cope with complex urban environments. Well, we're getting awfully close to overcoming this challenge, too. We're partnering with **Daimler** to bring driverless vehicles to urban streets within the next decade. As soon as the second half of this year, we plan to launch a pilot on-demand ride-hailing service with automated vehicles on selected routes in **San José**, California. The field testing of this project will take us one step closer to improving traffic flow and road safety in cities.

These partnerships demonstrate the value of collaboration . Only by pooling our expertise will we succeed in bringing about a true revolution in mobility. And this is true for how we work with traditional car manufacturers, as well as with newer players, such as Tesla, Rivian, and Byton and even completely new

mobility customers, such as service providers and cities. In order to better harness the huge business potential here, Bosch just established a dedicated unit in Silicon Valley. Via this new unit, we will be stepping up our partnership activities with new mobility players across the globe.

And also on the topic of partnerships, we recently entered into a promising one with U.K.-based Ceres Power, a leading player in the development of solid-oxide fuel-cell technology (SOFC). Together, we're exploring the use of next-generation fuel cells as the basis of connected, decentralized, low-emissions power supply. In the mobility sphere, applications for these cells include large-scale facilities like vehicle charging stations. Beyond that, they could be used to power commercial buildings, industrial applications, and data centers.

The IoT needs a resilient energy supply, and we believe that fuel cells will play a key role in facilitating this, while also contributing to a CO₂ reduction in energy systems overall. For example, data centers alone account for about two percent of U.S. electricity use [source: U.S. Department of Energy's Lawrence Berkeley National Laboratory], and this technology could allow them to someday unplug from the power grid entirely.

Connected living – Live “like a Bosch”

And just as exciting are the changes coming to life within our own four walls: connected living – or in other words, living “like a Bosch.” Did you know that by 2020, some 230 million households worldwide are expected to feature intelligent connectivity? That's approximately 15 percent of all households.

At Bosch, we're working toward a vision of homes that can think for themselves, that get to know their occupants, and can anticipate what they want. What if your home could make you an extra-strong cup of coffee in the morning when you've had a restless night, help you reduce food waste by reminding you of

what's about to expire in your fridge, or recognize when you're not at home and automatically close any doors or windows left open?

In this domain as well, our solutions are designed to measurably improve life by meeting real needs and offering real benefits. For one, our smart home technologies help maximize energy efficiency and minimize resource consumption. And we're constantly getting better: since the beginning of this century, we've improved the energy efficiency of our household appliances by up to 68 percent. For another, our solutions take over many of our most monotonous and time-consuming household chores, helping you reclaim your time for the things that matter. And just as important, they provide peace of mind that your property is secure and your loved ones are healthy and safe from harm.

In developing all these solutions, we make it as easy and intuitive as possible to integrate them into your daily life, and we also design them to be future-proof. That means we build them to remain on the technological cutting edge: by harnessing their connectivity, we can send security and functional upgrades as well as innovative new features to the products you already own. Our motto here is "smart today, smart tomorrow."

For example, we're regularly rolling out new features for our expanding range of **Home Connect** appliances –features that save you even more time and resources. Take our smart fridges with internal cameras. They now offer what we call **smart food storage**, where your fridge automatically identifies dozens of different food items and helps you store them properly so they stay fresh longer.

And since we're in the kitchen already, let's talk about cooking. Whether you enjoy doing it or not, cooking is a messy affair. Well, you'll never have to worry about sauce splatter on your phone or tablet again thanks to our solution called

PAI. Essentially, it's a projector mounted over any work surface which turns your countertop into a touchscreen. It registers your hand movements and lets you look up recipes, watch videos, or even have a Skype call while you cook. And it doesn't take up any space on your counter, so you have more room for cooking equipment!

As I mentioned, our household solutions are also designed to relieve you of time-consuming housework. One way we're enabling this is by equipping them with artificial intelligence. For example, the latest model of our **Indego** robot lawnmower incorporates AI for improved obstacle recognition. With every cut, Indego collects and analyzes sensor-based data until it knows every square inch of your lawn – so you can spend your free time enjoying your perfectly-mowed grass rather than tending to it.

Of course, no discussion about smart-home solutions would be complete without addressing what for many people is the elephant in the room – namely, what happens to all the information they collect. Your information. Before we wrap up, I want to say a few words about our approach to data protection and privacy. Unlike many companies, we've put this issue at the top of our agenda in all our IoT activities.

In a nutshell, making responsible use of people's personal data is a top priority for Bosch. That includes being open about what information we store and process, and what we use it for. When it comes to all of our smart solutions, you as the user have full transparency and control over the data they collect – if you don't want it leaving your premises, it won't.

Conclusion

Ladies and gentlemen, we live in exciting times. Thanks to connectivity, the world we live in and the way we interact with it is changing on a fundamental level. At Bosch, we believe connectivity holds the key to a safer, more efficient,

and less stressful life for everyone. As you can see, we're working hard on translating this belief into solutions that enable people to move and live better than ever before. Or as you could also say, to move and live "Like A Bosch."

Please stop by our booth in Central Hall this week and see for yourself how we're already turning our vision of a better tomorrow into reality today. Thank you.



CES 2019: The smart solutions Bosch will be presenting in Las Vegas

Bosch booth: Central Hall #14020 / Twitter #BoschCES

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- ▶ World first: Bosch debuts a driverless electric concept shuttle with integrated services
- ▶ CES 2019 Innovation Awards®: six honorees for Bosch solutions
- ▶ Mobility of the future: less stress, improved safety and efficiency
- ▶ Smart help: assistants in the home and in the garden make life easier by learning for themselves

At CES 2019 in Las Vegas, **Central Hall, booth #14020 from January 8 to 11, 2019**, Bosch is presenting technological answers to today's challenges, including urbanization, population growth, and climate change. The supplier of technology and services will be highlighting innovative solutions and services for the mobility of the future and for the smart home.

World first: Bosch concept vehicle for a new kind of mobility

At CES, Bosch wants people to experience a new kind of mobility in the form of a **driverless electric concept shuttle with integrated services**. This kind of mobility will soon feature on streets in major cities around the world: whisper-silent, driverless shuttles that are seamlessly connected with their surroundings. Bosch will provide the necessary hardware, software, and new digital services that will enable users to book vehicles, pay for their ride, or share it with other passengers.

CES Innovation Awards: a total of six honorees for Bosch

In the run-up to CES 2019, Bosch received a total of **six CES Innovation Awards**. The CES Innovation Awards are an annual program run by the Consumer Technology Association (CTA) covering 28 categories, and serve as an indicator of future trends. This year, awards went to the following Bosch products and solutions:

1. All-in-one principle for vehicle connectivity:

For the future of connected, automated driving, vehicles need the ability to communicate smoothly both among themselves and with their environment. To this end, Bosch has developed a **universal connectivity unit** for all Wi-Fi-based and cellular network-based transmission technologies used in vehicle-to-everything (V2X) communication. This enables vehicles to communicate with each other and with traffic infrastructure, regardless of the country or manufacturer. Software produced by the Portuguese startup Veniam handles the complex task of managing the data connections. It constantly searches for the best transmission technology for each requirement and switches automatically between the available options.

2. Trucks with no exterior mirror:

The new Mercedes-Benz Actros is the first production truck to feature a camera system in place of conventional main and wide-angle mirrors. Known as **Mirror Cam**, this system offers better 360-degree vision. In addition to increasing safety, having compact digital cameras instead of mirrors improves the truck's fuel consumption thanks to the cameras' considerable aerodynamic advantages. Two cameras, fitted left and right on the roof of the driver's cab, feed real-time images to two high-resolution 15-inch displays mounted on the A-pillars inside the cab. The system adjusts the monitor display to match the driving situation. Overall, Mirror Cam greatly improves the truck's aerodynamics, safety, and vehicle handling. Daimler's development partners for the Mirror Cam system are Bosch and Mekra Lang.

3. The smartphone as car key:

The Bosch **Perfectly Keyless access system** will soon let car drivers, car-sharing fleet operators, and logistics companies manage their vehicle keys digitally. They can use a smartphone app to decide at any given time who should have access to cars or trucks and when. The ingenious feature of this Bosch system is that it makes the connection between smartphone and vehicle more secure than ever. Perfectly Keyless can pinpoint the authorized smartphone like a digital fingerprint. For CES 2019, Bosch has installed the system in a demonstration vehicle based on a Ford Mustang.

4. Radar-based assistance systems prevent motorcycle accidents:

Blind-spot detection, collision warning, and adaptive cruise control: giving **motorcycles radar as a sensory organ** enables new motorcycle assistance and safety functions while providing an accurate picture of the vehicle's surroundings. As a result, these assistance functions not only increase safety, they also enhance enjoyment and convenience by making life easier for riders. According to Bosch accident research estimates, radar-based assistance systems could prevent one in seven motorcycle accidents. These electronic assistants are always vigilant and, in emergencies, they respond more quickly than people can. They are based on a combination of radar sensor, brake system, engine management, and HMI.

5. App for connecting e-scooters:

A new app turns **e-scooters** into **connectivity pros**. As well as displaying key information such as the e-scooter's current battery charge, it allows rider-vehicle communication and the option to connect with other users via social networks. This makes it easy for users to find out which of their friends are in the area. In addition, there is a connected helmet holder on the e-scooter's handlebar which is controlled by app. Whenever the e-scooter is parked, this provides a storage solution for the helmet while also protecting the vehicle against theft and its display against vandalism.

6. Retrofit solution for more efficient machinery and households:

Bosch has developed the **Phantom algorithm** to help small and medium-sized enterprises assess and greatly increase the energy efficiency of their machinery. This retrofit solution, which takes just a few minutes to install, uses sensors to measure the load on each device in the customer's energy consumption network to provide valuable insights into usage and potential faults. This enables users to improve the machinery's operations and efficiency. In homes, too, Bosch Phantom can tell how much power each device is using. This energy transparency makes it possible to save electricity.

Mobility of the future: selection of solutions and services

Driving electric, yet stress-free – that is the goal of Convenience Charging, the Bosch service that the company is presenting at CES 2019 in a demonstration vehicle based on an Audi A3 e-tron. This **integrated charging and navigation solution** enhances the everyday benefits of electromobility. In the future, the service will tell electric cars precisely when their power will run out, but also where they can find the next charge spot. To this end, Convenience Charging combines information from the electric powertrain with both vehicle and environment data to produce a reliable range forecast. The service uses state-of-the-art route planning to determine charging opportunities based on the driver's

personal preferences. In the future, drivers of electric cars will be able to order food for delivery directly to their pre-booked charge spot, so they can make the best use of the charging time. Using the Convenience Charging app, drivers will also be able to plan the charging stops they need in the comfort of their own home, with the app then seamlessly transmitting the suggested routes between charge spots to the vehicle.

Safe use of cell phones when driving:

The **mySPIN smartphone integration solution** makes it safe for drivers to use smartphone apps while they are on the road. Now, mySPIN also supports the MirrorLink vehicle communication standard. In the future, it will take just a simple adapter for the vehicle's infotainment system or instrument cluster to enlarge mySPIN-compatible apps and display a reduced set of their key functions. Drivers will then be able to operate the apps by touch or using the vehicle's rotary push button. Bosch is also developing mySPIN smartphone integration for commercial vehicles, motorcycles, scooters, and powersports vehicles.

Lifesavers from the data cloud:

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 has developed a **cloud-based solution** that sends a warning to **wrong-way drivers** and all road users at risk within ten seconds. Some 15 radio and navigation apps already use Bosch wrong-way driver warning technology to reach people in 13 European countries. The service relies on a software module for integration into existing infotainment systems and apps.

Making the electronic horizon even more accurate:

Today, the **electronic horizon** provides data on road inclines and the sharpness of bends to complement navigation data. Because the system enables vehicles to think ahead, it enhances both safety and convenience. Bosch is now working on the next-generation electronic horizon, which will be even more accurate and up to date. In addition to information on road classifications, bends, and vertical profiles, it will provide vehicle systems and navigation systems with geometries for each and every traffic lane as well as infrastructure data with 3D objects. This will help automated vehicles determine their precise location within the lane.

A seat-of-the-pants feel for automated vehicles:

Bosch **predictive road-condition services** will allow self-driving vehicles to determine how road conditions will develop over the course of a journey, based on weather data provided by the company's partner Foreca. As a sufficient number of connected vehicles take to the roads, Bosch will supplement its predictive road-condition services with vehicle data. This will increase the safety, availability, and convenience of automated driving functions.

Automated driving in cities:

San José in California's Silicon Valley is set to become the pilot city for an **automated ridesharing service** provided by Bosch and Daimler. The three parties have already signed a letter of intent to this effect. Bosch and Daimler plan to offer the app-based service with automated Mercedes-Benz S class vehicles to selected customers. The test area is centered on the San Carlos Street / Stevens Creek Boulevard traffic artery between Downtown and West San José. Bosch and Daimler are working together on solutions for automated driving in cities. Their aim is to develop a driving system for fully automated driverless driving (SAE level 4/5) that is ready for production by the beginning of the next decade.

Integrated security solution for connected vehicles:

Since April 2018, all newly registered vehicles are automatically connected vehicles – thanks to the automatic Emergency Call system. This makes it increasingly important to have integrated security concepts for connected vehicles. At CES, ESCRYPT will be presenting **CycurACCESS**, a security solution for keyless vehicle access systems. State-of-the-art cryptographic methods make these digital keys particularly secure. What's more, the Bosch subsidiary is presenting an all-in-one solution for **secure over-the-air software updates**, Featuring efficient key and certificate management to guarantee end-to-end encryption from the car's ECU to the vehicle manufacturer's IT systems.

Intelligent assistants: solutions for the smart home

Food recognition for smart storage:

Connected devices offer their owners tangible benefits both on the road and at home – for instance when it comes to optimizing how food is stored. Now, Bosch connected refrigerators with interior cameras offer a new function: **food recognition with storage recommendations**. The device automatically recognizes some 60 kinds of fruits and vegetables and suggests the ideal place to store them via an app. By storing food in the best possible way, it stays fresh for longer and doesn't have to be thrown away so often.

Cooking without sticky touchscreens:

PAI is a Bosch **projector** that is mounted over the kitchen counter, turning the whole worktop into a touchscreen. An integrated 3D sensor records when users touch the surface, making touch control possible. That means users can access a wide variety of digital services while cooking or baking, for instance to pull up recipes with ease or control connected appliances. Thanks to its robust design, the PAI's interface is easy to operate even with greasy fingers, unlike conventional smartphones or tablets. This approach also frees up space on the work surface.

Easy lawn care thanks to artificial intelligence:

Bosch is using machine learning to improve the way its **Indego robot lawn mower** recognizes obstacles on the lawn by evaluating data such as motor flow, acceleration, motor speed, and direction. Thanks to AI, Bosch is making lawn care even easier and more convenient by enabling the Indego to take over the chore of mowing. Each Indego adapts to its garden in order to mow it perfectly every time. And Bosch's new connected Indego S+ opens up new possibilities for users. It now supports voice control via Amazon Alexa, making it one of the first robot lawn mowers on the market to offer this function.

Turning shelves into personal assistants:

The new **BML100PI** interactive projection module lets users create smart shelves in their closets or wardrobes. A single module projects touchscreen functions onto the surface of as many as six shelves at a time. These projections enable a wardrobe to display weather forecasts, an individual's daily schedule, or reminders of upcoming events. This information forms the basis for daily outfit suggestions, which users can share on social media. Once clothing has disappeared from the shelves, users can use the virtual touchscreen to place an online order for something new or make an appointment with the laundry service. The interactive projection module turns any standard shelf into a personal assistant to make everyday life more convenient.

Recognizing every movement:

The new **BMI270 sensor** is an intelligent inertial measurement unit (IMU) sensor with extremely low energy consumption which was designed for use in wearable electronic devices. The BMI270 improves the functionality of these wearables, including step counting and gesture recognition, and can distinguish between different activities, such as standing, walking, running, or cycling, in addition to detecting the transition from one activity to another. It can also detect where activities are taking place – for instance, whether it is inside a vehicle. What's more, the new sensor can detect movements such as bending or raising the arm and tilting the wrist, making it possible to operate wearables with intuitive

gestures. The gesture recognition is fully compatible with the wearables operating system Wear OS from Google. The IMU's high level of performance is the result of combining yaw-rate sensor technology used extensively in automotive applications with a significantly improved acceleration sensor.

Getting to grips with the interior climate:

The **AIR well-being sensor** offers innovative climate comfort for the home. It records and presents information on air quality, temperature, and humidity, as well as brightness and noise. Users can operate the well-being sensor even without a smartphone thanks to its easy-to-understand interface featuring traffic-light logic. In addition, the Bosch AIR app offers more detailed information about measurements over time and enables users to tailor the sensor's settings. By offering specific recommendations for how to improve indoor air quality and achieve a healthy interior climate, AIR helps people perform, concentrate, and feel better.

Voice control for heating systems:

The **.aino chatbot** lets users communicate with their heating system using plain language. Typing or saying "I feel cold" instructs the system to increase the room's temperature by two degrees Celsius. In addition, the chatbot even understands the difference between "a little cold" and "very cold," expressing that as different degrees of temperature change. The system also provides useful energy-saving tips, for instance based on the weather forecast, and suggests how to improve the efficiency of the heating system. On request, .aino sends weekly or monthly reports of energy consumption including a year-on-year comparison.

Bosch at CES 2019

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- **BOOTH: Tuesday to Friday, January 8–11, 2019**, in the Central Hall, #14020
- **FOLLOW** the Bosch CES 2019 highlights on Twitter: **#BoschCES**
- **PANELS WITH BOSCH EXPERTS:**
 - **Wednesday, January 9, 2019, 9:00 – 10:00 a.m.** (local time)
“[Connected Home Innovations](#)” with Anne Rucker, global head of digital strategy, Venetian, Level 4 Marcello 4405
 - **Wednesday, January 9, 2019, 9:00 – 10:00 a.m.** (local time)
“[Technology, Jobs, and the Future of Work](#)” with Charlie Ackerman, senior vice president of human resources North America, Las Vegas Convention Center, North Hall N258
 - **Wednesday, January 9, 2019, 2:15 – 3:15 p.m.** (local time)
“[IoT to the Max, Thanks to 5G](#)” with Davie Sweis, vice president of web business, Las Vegas Convention Center, North Hall N256

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Press photographs: #1728556, #1351421, #1713206, #1713295, #1714627, #1714648, #1714649

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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 upfront investments in the safeguarding of its future. Ninety-two percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a charitable foundation. The majority of voting rights are

held by Robert Bosch Industrietreuhand KG, an industrial trust. The entrepreneurial ownership functions are carried out by the trust. The remaining shares are held by the Bosch family and by Robert Bosch GmbH.

Additional information is available online at www.bosch.com, www.iot.bosch.com, www.bosch-presse.de, www.twitter.com/BoschPresse.



#LikeABosch: Bosch launches IoT image campaign Move to position the company as global IoT leader

January 7, 2019

PI 10837 RB DH/KB

- ▶ Bosch to underscore its IoT capabilities with hip-hop and humor
- ▶ Campaign kickoff on January 7 at the 2019 CES electronics fair in Las Vegas
- ▶ Head of brand management Boris Dolkhani: “When it comes to the internet of things, all roads lead to Bosch”

Stuttgart, Germany /Las Vegas, Nevada, U.S. – “Like a Bosch” is the tagline of a new global image campaign the supplier of technology and services launched at CES, the world’s largest consumer electronics fair in Las Vegas, on January 7, 2019. The campaign aims to get the message across that Bosch is the leading provider of connected products and solutions. The main plank of the campaign is a [hip-hop video clip](#) featuring a protagonist who is a savvy IoT user. Bosch is entering new territory with its “Like a Bosch” campaign; the decidedly different approach and tone marks a departure for the company, which was founded in 1886. This move capitalizes on a rash of “like a boss” videos and memes that have gone viral on the internet, attracting tens of millions of clicks. These videos feature everyday people who stage bizarre stunts, perform impressive athletic feats, or find their way out of predicaments with technical finesse. The corporate “Like a Bosch” campaign changes a few letters in order to put a fresh spin on this internet phenomenon. The young man in the Bosch video is always on top of things, thanks to connected solutions from Bosch. Smartphone in hand, he operates his car, lawn mower, or coffee machine in a cool, smart, and confident way – he’s in charge of things “like a Bosch.”

Sparking a viral IoT movement

“We’ve picked up on a global internet sensation and reinterpreted it with a humorous touch,” says Boris Dolkhani, head of brand management at Bosch. “Where the internet of things is concerned, all roads lead to Bosch. That’s the campaign’s clear message.” The company aims to spark a viral IoT movement, spreading this message across all the relevant communication channels in order to reach a mass audience. Bosch is counting on its 400,000 or more associates to further the cause by liking and sharing these videos. Further clips featuring

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products for the two IoT domains of connected mobility and connected living are to follow later in the year. The image campaign created by Jung von Matt, a Hamburg, Germany-based advertising agency, is to be rolled out across digital and social media channels.

A company on the move

Bosch continues to expand its position as a leading IoT company and sold 38 million web-enabled products in 2017. Today, 20 percent of its roughly 27,000 software developers focus exclusively on the IoT. Bosch expects the global IoT market to grow by 35 percent a year to reach an annual volume of 250 billion U.S. dollars by 2020. Those prospects have prompted the company to pursue ambitious goals, and it is now aiming to have internet connectivity in all its electronic devices by that time. Moreover, data-based services will be offered for each device, with artificial intelligence set to play a key role here.

Additional information on the “Like a Bosch” campaign

iot.bosch.com

Bosch at CES 2019:

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Bosch presents tomorrow's mobility today Debut of new concept shuttle at CES 2019 in Las Vegas

December 2018
PI 10814 BBM Fi/af

- ▶ Bosch management board member Dr. Markus Heyn: "In the future, every vehicle on the road will make use of Bosch digital services."
- ▶ The Bosch ecosystem of mobility services makes shuttle mobility flexible and suitable for everyday use.
- ▶ Bosch is developing systems and components for automating, connecting, and electrifying shuttles.

Stuttgart, Germany – A light, airy, minimalistic design, a futuristic outer shell made of display screens and glass, and a spacious interior – that is how architects might describe a novel structure, but in actuality the description also fits a completely new class of vehicle and a new kind of mobility: driverless electric shuttles that glide almost silently through city centers and are seamlessly connected with their environment. These will soon be a common sight on our city streets – whether they are transporting goods or people. Bosch provides components and systems for automating, connecting, and electrifying the shuttles, but shuttle mobility won't be possible without mobility services. In the future, the company will offer these services too, bundling them into a smart, seamlessly connected ecosystem. That will include booking, sharing, and networking platforms, parking and charging services, and software solutions for managing and maintaining the vehicles, as well as infotainment during the journey. "Bosch is developing a unique package of hardware, software, and mobility services for shuttle mobility of the future," says Dr. Markus Heyn, member of the board of management of Robert Bosch GmbH. At CES 2019 in Las Vegas, the world's biggest electronics show, Bosch will be presenting its solutions for this area of transportation with a concept shuttle, and visitors will be able to experience its full range of services.

Bosch services for users and shuttle operators

The emergence of the shuttle segment is a result of rising demand for ridesharing services: in Europe, the U.S., and China alone, about one million

such on-demand shuttle buses will be on the roads as early as the year 2020, growing to 2.5 million by 2025 (source: [Roland Berger](#)). Many of these vehicles, available 24/7, will be fully electric, and they will also be completely autonomous by the middle of the next decade at the latest. That's why Bosch has packed every square centimeter of its concept shuttle with the appropriate technology – from electric powertrains and 360-degree surround sensors to connectivity management and vehicle computers. Yet these components and systems go only part of the way towards shuttle mobility. To make on-demand vehicles suitable for flexible everyday use, they must be connected to mobility services. “In the future, every vehicle on the road will make use of Bosch digital services,” Heyn says. These services allow users to book the vehicles, share rides with other passengers, and pay for the journey. Charging, repairing, and maintaining the vehicles, plus route planning and administrative activities, also call for services that Bosch will offer shuttle fleet operators in a seamlessly connected ecosystem.

Booking and sharing

Users can easily book a shuttle via smartphone, regardless of whether they're relaxing on the sofa or sitting at their desk at work. Working behind the scenes, an algorithm identifies the vehicle closest to the requested location and finds other users who wish to travel a similar route. The more passengers a single shuttle can transport, the cheaper the journey for everyone. This approach also reduces the amount of traffic in cities and mitigates the impact on the environment. Bosch is developing the necessary software platforms to make this a reality. When the shuttle pulls up to the requested pick-up point, users again use their smartphones to identify themselves – thanks to Bosch's [Perfectly Keyless](#) digital access service. It recognizes the owner's smartphone as unmistakably as a digital fingerprint and opens the vehicle only for them. Every passenger always gets the seat that they reserved.

Moving forward: electrified and automated

Bosch's electric axle drive makes the shuttles especially efficient yet affordable as they wend their way through the city. And the company's [Convenience Charging service](#) knows just how long the battery charge will last and where to recharge the vehicle. This service means that even today, drivers no longer need to worry about being stranded with a dead battery. It also links vehicle information, such as the current state of battery charge or how much energy the heating and air-conditioning systems are consuming, with environmental data such as congestion and weather forecasts, so as to predict vehicle range with particular accuracy. Furthermore, Convenience Charging finds the ideal charging station and can reserve it in advance. And thanks to a standardized access and payment system, charging is easier than ever.

Driverless e-shuttles provide users with transportation that is not only nearly emissions-free, but also very safe. For automation, Bosch develops and makes its own radar, video, and ultrasonic sensors, braking control systems, and power steering, to name a few examples. Smart digital services are indispensable here, too: Bosch [predictive road-condition services](#) let automated vehicles know in advance what environmental conditions to expect. They can thus adapt their driving style as needed so as to ensure maximum safety throughout the journey. The [Bosch road signature](#) is a map-based localization service with which automated vehicles can accurately determine their position in the lane down to a few centimeters – another crucial prerequisite for the safety of automated shuttles.

Comfortable interior

Bosch has designed the interior of its concept vehicle to provide space for four passengers, seating them across from one another to maximize legroom and comfort. Infotainment is provided on screens that can be used either by each passenger individually or in groups; for example, a family can watch a movie together as they travel somewhere for the weekend, or colleagues can work on a presentation on their way to the office. Smartphones use the on-board Wi-Fi and can integrate seamlessly with the infotainment system, thanks to Bosch connectivity technology. Its [concierge service](#) turns the shuttle into a personal assistant. With all kinds of information at its disposal, the shuttle can provide passengers with recommendations, advance bookings, weather reports, and travel tips at any time. Once the shuttle has arrived at its destination, the passengers can pay for their journey with Bosch's e-payment service.

Maintenance and administrative activities

But Bosch services do not end when a rideshare journey is over: the company's camera-based system for the vehicle interior checks whether anyone has forgotten their phone or handbag. If a passenger does forget something, the shuttle informs them directly via smartphone. The cameras can also detect gum on the seat or an overturned coffee cup – in other words, whether the shuttle needs cleaning – and can make the necessary arrangements immediately. This is so every passenger can start their journey in a clean shuttle. Bosch's [service for over-the-air updates](#) can determine whether the driverless shuttles have the latest software version. The service detects software updates as soon as they are available and executes them in the vehicle securely and reliably. Thanks to sensors installed in the vehicle, [predictive diagnostics](#) can monitor the condition of key components and notify the shuttle before a fault actually occurs, so it has enough time to drive itself to a repair shop. This prevents the car from suddenly breaking down, which is a boon to operators. In the future, Bosch will pool

updates from the data cloud and predictive diagnostics into a comprehensive [connectivity platform](#). This will give vehicle manufacturers and shuttle service operators a constant overview of the condition of their fleets, so they can ensure that their shuttles are always ready for action. And finally, the Bosch subsidiary ESCRYPT's security solutions handle vehicle security – whether for keyless access systems, data connectivity with the outside world, or software updates.

Press photos: #1715817, #1715818, #1715819, #171820, #1715821, #1716991, #1716992, #1728554, #1728556, #1728559

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Bosch at CES 2019

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Mobility Solutions is the largest Bosch Group business sector. According to preliminary figures, in 2017, its sales came to 47.4 billion euros, or 61 percent of total group sales. This makes the Bosch Group one of the leading automotive suppliers. The Mobility Solutions business sector pursues a vision of mobility that is accident-free, emissions-free, and stress-free, and combines the group's expertise in the domains of automation, electrification, and connectivity. For its customers, the outcome is 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 has been responsible for important automotive innovations, such as electronic engine management, the ESP® anti-skid system, and common-rail diesel technology.

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To learn more, please visit www.bosch.com, iot.bosch.com, www.bosch-press.com, twitter.com/BoschPresse.



Bosch system is the “key” to preventing digital car theft

December 2018
PI10834 BBM Fi/af

Perfectly Keyless is as secure as a fingerprint

- ▶ Bosch division president Harald Kröger: “Our Perfectly Keyless system revolutionizes keyless entry systems.”
- ▶ With Perfectly Keyless, there is no more trade-off between convenience and safety in keyless entry systems.
- ▶ Using data transmission with a built-in digital security lock, the owner’s smartphone is accurately identified.
- ▶ Secure digital key management for car-sharing fleets, cars, and commercial vehicles.

Reutlingen, Germany – It takes less than five seconds for a hacker to compromise a standard keyless vehicle entry system. Among experts, this is known as a relay station attack. A Bosch key app is going to change all that. “Our Perfectly Keyless system revolutionizes keyless entry systems. It is the ‘key’ to preventing digital car theft,” says Harald Kröger, president of the Bosch Automotive Electronics division. The special thing about the solution is that the Bosch technology works with a virtual key stored in the smartphone. Sensors installed in the car recognize the owner’s smartphone as securely as a fingerprint and open the vehicle only for them. Digital key management links the app and the vehicle via the cloud. With Perfectly Keyless, Bosch is thus doing something that no other keyless entry system has done before, namely offering both convenience and security. The new smartphone-based key can be used in cars, entire car-sharing fleets, and commercial vehicles. Bosch believes this system with its built-in security lock has huge market potential worldwide.

Bosch revolutionizes keyless entry

With conventional keyless entry systems, the car key still needs to be carried in a jacket or suit pocket, for example. To open the door and start the engine, it communicates with the car using a radio signal in the low frequency (LF) or ultra

high frequency (UHF) range. In the race against thieves, the automotive industry is constantly refining existing systems. It's like a marathon. "Now, with Perfectly Keyless, Bosch is launching into a sprint in the development of digital vehicle entry systems. Our motto is revolution, not evolution," Kröger says. Instead of transmitting data via low or high frequency radio technology, the Bosch system uses the smartphone as virtual key and Bluetooth as the transmission technology. This means that the car key can stay at home. And thanks to its decades of experience in semiconductors, Bosch is in a position to make this connection as secure as a fingerprint. Every smartphone contains tiny microchips to manage communication via Bluetooth, and these play a key role in the Bosch solution. Together with sensors installed in the vehicle and a special control unit, they form a system that opens the door only for the smartphone containing the virtual key that fits in the Perfectly Keyless system's digital lock. The system blocks signals from other smartphones or from electronic devices that manipulate the radio transmission. In this way, Perfectly Keyless protects against unauthorized access.

A keyless journey

Virtual vehicle keys on smartphones have long been a feature of car-sharing fleets. These vehicles don't move until their operator authorizes entry via the cloud; only then can a user unlock the vehicle, start it, and lock it again using an app. This conversation between the phone and the vehicle uses near-field communication (NFC), a wireless protocol for sharing data over distances of a few centimeters. For this to work, users must take out their smartphone before each journey and hold it up to a marked area on the vehicle. Only then can the system recognize the user and unlock the doors. With Bosch Perfectly Keyless, the smartphone can also stay in its pocket. This means greater ease of use for drivers, and carsharing users benefit from the added convenience. The Bosch solution also works in trucks and for entire fleets of commercial vehicles. That means no more manual administration of vehicle keys, physical handover, or hassle when a key is lost or stolen. If the smartphone is lost or stolen, and the Perfectly Keyless app with it, the digital key can be simply deactivated online, thus blocking access to the vehicle.

Additional information:

ADAC tests keyless entry systems for cars and motorcycles (German only):

<https://www.adac.de/infotestrat/technik-und-zubehoer/fahrerassistenzsysteme/keyless/default.aspx>

Press photos: #1713212, #1807399, #1807400, #1807402, #1807403, #1807404

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Bosch at CES 2019

- **Monday, January 7, 2019, from 9:00 to 9:45 a.m.** local time, in the Mandalay Bay Hotel, **South Convention Center, Level 2**, Ballrooms B, C, and D
- **BOOTH: Tuesday to Friday, January 8–11, 2019**, in the Central Hall, booth #14020
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Bosch and Veniam ensure seamless vehicle-to-everything connectivity

December 2018
PI10760 BBM Fi/af

- ▶ Dr. Dirk Hoheisel: “Bosch is taking a multi-standard approach when it comes to V2X.”
- ▶ All-in-one principle: Bosch connectivity unit communicates using all of the world’s popular transmission technologies.
- ▶ Smart connection management software from Veniam always selects the best communication standard.
- ▶ Bosch and Veniam have been selected as CES 2019 Innovation Award Honorees.

Hildesheim, Germany / Mountain View, USA – What is true for people is also true for cars: communication works best with a common language and a good connection. To enable connected and automated driving in the future, vehicles must be able to easily communicate with one another as well as with their surroundings. There is currently no globally standardized technical basis for this exchange of data, which is known as vehicle-to-everything communication, or V2X. Instead, vehicles will in future communicate using the wide variety of different standards implemented by countries and vehicle manufacturers around the world. “Bosch is taking a multi-standard approach when it comes to V2X. We have developed a universal connectivity unit capable of communicating using all of the transmission standards implemented in connected automobiles,” says Dr. Dirk Hoheisel, Member of the Board of Management at Robert Bosch GmbH. The neat thing here is that Bosch has combined connectivity units and telematics units, which – individually – are only capable of a single transmission technology, to create an all-in-one central control unit for V2X data communication. Cars can then use the Wi-Fi networks available in cities, while elsewhere they can communicate using, for instance, cellular networks. The complex task of managing these diverse communication options is handled by a software solution from the Silicon Valley-based start-up Veniam. It continuously searches for the best transmission technology that suits the particular requirements and switches automatically between the available alternatives. The software therefore

maintains continuous and seamless vehicle connectivity, ensuring cars can, for example, reliably alert one another to accidents and passengers can enjoy uninterrupted music streaming.

Bosch develops a connectivity unit for all standards

It is expected that the number of connected vehicles on the roads in Europe, the United States, and China alone will exceed 470 million by 2025 (source: PwC). Initially, most vehicles will connect directly to the cloud; but, thanks to V2X, increasing numbers of vehicles will in future also be able to communicate directly with one another as well as with traffic signals, road construction sites, pedestrian crossings, and buildings, etc. They will then be able to alert one another to potential hazards like the approaching tail end of a traffic jam, accidents, and icy conditions. Vehicles will also be able to take advantage of the green wave, because they will know when the next set of traffic lights is going to turn green. The vehicles can then adjust their speed accordingly. This ensures the traffic, particularly in cities, flows more smoothly. There is, however, no globally harmonized standard for V2X communication currently on the horizon. While China primarily uses Cellular-V2X technology (C-V2X), which is based on mobile communications, Europe and the United States are planning to additionally introduce transmission standards based on Wi-Fi (DSRC and ITS- G5) alongside C-V2X. A mishmash of standards is therefore emerging internationally, which may lead to vehicle communication issues. However, that will not be the case in the future when cars are equipped with the universal connectivity unit from Bosch. Equipped vehicles will be able to communicate with one another as well as with their surroundings regardless of the vehicle make or the country in which they are used. This will make V2X communication even more secure and reliable. “Thanks to Bosch’s all-in-one principle for connected vehicles, as many drivers as possible around the world can benefit from the added safety, comfort, and convenience provided by V2X,” says Dirk Hoheisel.

Software ensures the best connection

The software from Veniam is the connection enhancer for the connectivity unit from Bosch. As well as keeping an eye on which V2X communication technologies are currently available for use, the software also closely monitors the costs and data transmission latency of each alternative connection option, since not every technology is suitable in every situation. For example, when it comes to alerting a driver to another vehicle that is about to pull out in front of them from a side street, every millisecond counts. This kind of critical information must be communicated in real time using highly reliable technology that is always ready for use – even if that means the resulting data transmission costs are greater. Software updates from the cloud or a navigation system map update, on the other hand, can be put on hold in that sort of situation until a low-cost

stationary Wi-Fi network becomes available. Large volumes of data can be transmitted via Wi-Fi in a short space of time, though a downside is that public or home Wi-Fi hotspots are not always available. Veniam's software is familiar with the pros and cons of each of the communication types and always establishes the optimal connection. "The unique combination of Veniam's smart networking software and Bosch's connectivity unit boosts the vehicle's data-handling capacities dramatically, paving the way for innovative cloud services and much safer future mobility," says João Barros, founder and CEO of Veniam. On the occasion of the world's biggest consumer electronics trade show, CES 2019 in Las Vegas, Bosch and Veniam have been selected as CES 2019 Innovation Award Honorees in the "Vehicle Intelligence and Self-Driving Technology" category for their jointly developed solution.

Bosch tests V2X in Europe, the United States, and China

In the biggest European field trial to date (simTD, Safe Intelligent Mobility – Test Field Germany), V2X communication has proven its suitability for daily use under everyday conditions and in lab simulations. Bosch has played a significant role in this joint project. Since February 2017, Bosch and Vodafone have been performing trials of the V2X communication with the first 5G test modules – the first companies in Europe to do so. The A9 freeway in Bavaria north of Munich is the location for the field tests, which focus on [real-time warning systems](#) during lane changing maneuvers on the freeway or in case the vehicle in front brakes suddenly. V2X will also be able to make driver assistance functions even more comfortable, like [adaptive cruise control \(ACC\)](#). In the summer of 2018, Bosch tested secure, direct communication between vehicles and roadside infrastructure, cameras, and sensors in Detroit. The test showcased Wi-Fi- based DSRC technology, where equipped vehicles were provided with in-vehicle notifications about the status of traffic signals ahead and pedestrians crossing the street – functions designed to enhance safety in city traffic. ESCRYPT, a subsidiary in the Bosch Group, provided the cybersecurity technologies behind these V2X demonstrations. In China, Bosch is testing ad hoc communication using Wi-Fi as well as cellular technology. The tests are focusing on alerts that help the driver when overtaking or negotiating complex intersections.

Press photos: #1713652, #1714739, #1714740, #1713653, #1714753, #1714754

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Bosch at CES 2019

- **PRESS CONFERENCE: Monday, January 7, 2019, 9:00 a.m. – 9:45 a.m.**
(local time) in the Mandalay Bay Hotel, **South Convention Center, Level 2**; Mandalay Bay Ballrooms B, C, and D
- **TRADE SHOW BOOTH: Tuesday to Friday, January 8 – 11, 2019** in the Central Hall, booth #14020
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About Bosch:

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About Veniam:

Veniam is accelerating future mobility by delivering intelligent networking software for connected cars and autonomous vehicles. With an IP portfolio of more than 160 patents, Veniam's data networking platform makes the most out of all available networks to improve quality of service and reduce the costs of moving massive amounts of data between vehicles and the cloud. Working closely with the world's largest Auto OEMs and Tier 1 suppliers, Veniam aims to improve the lives of millions of people by securely managing the data flows of a new and emerging mobility ecosystem – the Internet of Moving Things – where vehicles move people and goods efficiently but also expand Internet coverage, deliver new human experiences and gather valuable data for smart city applications.

Named by CNBC and NASDAQ as one of the 50 most disruptive companies in the world, Veniam is a global company with its headquarters in Mountain View, California, Engineering Center in Porto, Portugal and sales offices in Detroit, Munich and Tokyo.



Bosch and Daimler: San José targeted to become pilot city for an automated on-demand ride-hailing service

November 8, 2018
PI 10797 CC joe/af

- ▶ Test area will be San Carlos/Stevens Creek corridor between downtown and west San José
- ▶ The on-demand ride-hailing service app will offer an automated driving experience to a selected user community.

Stuttgart/San José – Located on the southern shore of San Francisco Bay in Silicon Valley, and with more than one million inhabitants, San José is the third biggest city in California. It is planned to be the pilot city for trials, targeted to begin during the second half of 2019, of the highly and fully automated driving (SAE Level 4/5) on-demand ride-hailing service recently announced by Bosch and Daimler. The three parties have signed a memorandum of understanding to pursue and finalize this activity. Using automated Mercedes-Benz S-Class vehicles, Bosch and Daimler propose to offer the service to a selected user community in the San Carlos/Stevens Creek corridor between downtown and west San José. With its population expected to grow 40 percent in the next two decades, the metropolitan area faces growing transportation challenges. Moreover, San José wants to prepare itself for a future in which autonomous cars hit the streets.

“The pilot project is an opportunity to explore how autonomous vehicles can help us better meet future transportation needs,” says Sam Liccardo, mayor of San José. “Since many years we consequently push autonomous driving. With this pilot we will generate valuable insights to connect fully automated vehicles in the best way with users of future mobility services,” says Dr. Michael Hafner, Vice President Drive Technologies and Automated Driving at Daimler AG. “We have to rethink urban transportation. Automated driving will help us complete the picture of future urban traffic,” says Dr. Stephan Hönle, senior vice president of the Automated Driving business unit at Robert Bosch GmbH.

The on-demand ride-hailing service app operated by Daimler Mobility Services will demonstrate how mobility services such as car sharing (car2go), ride-hailing (mytaxi), and multi-modal platforms (moovel) can be intelligently connected. The test operation will provide information about how highly and fully automated vehicles can be integrated into a multi-modal transportation network. The intent is to provide a seamless digital experience, in which a selected user community will have the opportunity to hail a self-driving car, monitored by a safety driver, from a designated pick-up location and drive automatically to their destination.

Automated vehicles make urban mobility more attractive

With their joint development work on highly and fully automated driving (SAE level 4/5) in urban environments, Bosch and Daimler aim to improve the flow of traffic in cities, enhance road safety, and provide an important building block for the way traffic will work in the future. Among other things, the technology will boost the attraction of car sharing. Without compromising driving safety, it will allow people to make the best possible use of the time they spend in their vehicles, and open up new mobility opportunities for people without a driver's license.

Bosch and Daimler associates share the same office space

Bosch and Daimler associates involved in the development project work together in teams in two regions: in the greater Stuttgart area in Germany and, in the United States, around Sunnyvale in Silicon Valley between San José and San Francisco. Since they share the same office space, rapid communication across working disciplines is ensured, and decision-making paths are short. At the same time, they can draw on the combined know-how of their colleagues in the parent companies.

The two companies' associates are jointly developing the concepts and algorithms for the highly and fully automated drive system. Daimler's task is to bring the drive system into the car. The company is providing the necessary development vehicles, test facilities, and vehicles for the test fleet. Bosch is responsible for the components specified during the development work, such as sensors, actuators, and control units. For test purposes, Bosch and Daimler use their laboratories and test rigs, plus their respective test sites in Germany. Since obtaining its Autonomous Vehicle Testing Permit from the California Department of Motor Vehicles in 2014, Mercedes-Benz has been testing automated vehicles in the Sunnyvale/California region. And since 2016, it has had similar approval for the greater Stuttgart area in Germany. In early 2013, Bosch was the world's first automotive supplier to test automated driving (SAE level 3) on public roads in Germany and the United States.

Press photos: #1703393, #1703394

Bosch at CES 2019:

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Safe automated driving from Bosch: centimeters make all the difference Bosch solutions for precise localization

November 27, 2018
PI 10789 CC joe/af

- ▶ Dr. Dirk Hoheisel: “Only when hardware, software, and services are combined can automated driving be safe.”
- ▶ Precise localization for automated vehicles is critical to safety.
- ▶ Bosch vehicle motion and position sensor reliably determines the vehicle’s exact position.
- ▶ Bosch approach serves as a redundant system for vehicle localization.
- ▶ Web special on [localization for automated vehicles](#)

Stuttgart, Germany – Automated driving is about more than just sensors, control units, and lots of computing power. It also requires a host of smart services, without which no vehicle will ever be able to drive autonomously. “Services are at least as important for automated driving as the hardware and software,” says the Bosch board of management member Dr. Dirk Hoheisel. “We must pursue all three paths simultaneously to get self-driving cars safely and reliably onto our roads.” Like barely any other global supplier of technology and services in the automotive industry, Bosch devotes significant effort into achieving a breakthrough in automated driving. In these efforts, it is creating integrated solutions. One area that demonstrates this is the safety-critical topic of localization. Self-driving vehicles can drive safely only if they know down to the nearest centimeter exactly where they are at any given time. To achieve this, Bosch offers a globally unrivaled localization package. Taken together, its hardware, software, and services serve as a redundant system for precisely determining the vehicle’s position.

Hardware: Bosch has developed its own motion and position sensor

Bosch has developed a sensor that allows automated vehicles to precisely determine their position: the vehicle motion and position sensor. This new sensor includes a high-performance receiver unit for global navigation satellite system (GNSS) signals, which an automated vehicle needs to determine its absolute

position. The challenge with satellite-based positioning lies in dealing with inaccuracies in the data. GNSS satellites orbit the earth at a distance of 25,000 kilometers and at speeds of 4,000 meters per second. As their signals make their way to the ground, they must pass through the ionosphere and layers of cloud in the troposphere, which disperse the signals and introduce errors. While the signals are still accurate enough for today's navigation systems, they do not meet the needs of automated driving. This is why Bosch makes use of correction data supplied by various providers, and why it set up the Sapcorda [joint venture](#) in 2017. With the help of a network of terrestrial reference stations whose positions are precisely known, these providers can correct for the inaccuracy of GNSS positioning information. The correction data reaches the car via a cloud or geostationary satellites. GNSS signals are not the only information the vehicle motion and position sensor receives: thanks to wheel-speed and steering-angle sensors, which are akin to the human sense of touch, it knows where the car is headed and how fast. What's more, the vehicle motion and position sensor features integrated inertial sensors – comparable to the inner ear in humans. Just as people can move around with the help of their senses of touch and balance, so the sensor can use this data to tell where the vehicle is going.

Software: smart Bosch algorithms determine the vehicle's position

The vehicle motion and position sensor brings together the GNSS position signals, the correction data, and the information from the inertial sensors, the wheel-speed sensors, and the steering-angle sensor. However, this information alone is not sufficient for the exact localization of automated vehicles. For precise positioning, the data needs to be processed using intelligent software. Only then can an automated vehicle reliably know exactly where it is within an area stretching several meters around it and calculate its driving maneuvers accordingly. An automated vehicle is localized primarily on the basis of the corrected GNSS signals. If the satellite connection is lost, for instance when the vehicle enters a tunnel, the vehicle motion and position sensor can continue to determine the vehicle's position for several seconds. This involves calculating the vehicle's position relative to the last known point for which absolute positioning information is available. If the GNSS signal is interrupted for a longer period and it is no longer possible for the vehicle motion and position sensor to determine the vehicle's position, the automated vehicle can refer to the Bosch road signature for localization information.

Services: Bosch road signature is based on surround sensors

The Bosch road signature is a map-based localization service based on the surround sensors in the vehicles of today and tomorrow. Bosch offers the service alongside its vehicle motion and position sensor-based localization solution.

Bosch meets high safety requirements by combining the satellite- and vehicle motion and position sensor-based approach with the road signature's map-based localization service. Video and radar sensors on board vehicles in motion generate the Bosch road signature by detecting stationary features on and by the road, such as lane markings, traffic signs, and guardrails. In this regard, radar sensors have a major advantage, since – unlike cameras – they can detect road features in the dark or when visibility is poor. Their detection range is also greater. A communication module in the car sends data relating to features on and by the road to the cloud. There, the features are used to generate an independent map level, which in turn forms part of a highly accurate map. For their part, automated vehicles detect the road features around them and consult the map to see whether the traffic signs or guardrails they have recognized match those recorded there. This comparison enables the cars to accurately determine their position in the lane – relative to the highly accurate map – down to the nearest centimeter.

Press photo: #1709800, #1709801, #1709802, #1709803, #1709805

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Bosch announces virtual touchscreen on every surface for smart homes and IoT

BML100PI Interactive Projection Module enables smart shelf solutions

January 07, 2019
PI 10810 SM/Ho

- ▶ Always-in-focus laser projection for simultaneous multi-layer touchscreens
- ▶ Complete ready-to-use solution for simplest integration
- ▶ Compact design: projection and interactivity combined in one small package
- ▶ Intuitive user experience thanks to reliable gesture and touch recognition
- ▶ Bosch at CES®: booth 14020

At CES® in Las Vegas, Nevada, Bosch Sensortec announced the BML100PI, an Interactive Projection Module that enriches smart homes with a virtual touchscreen on every surface – turning ordinary shelves into personal assistants.

The BML100PI module provides a complete, ready-to-use solution for interactive projection, enabling highly flexible virtual touchscreens. A generated laser beam creates a focus-free image on any surface and then scans it line-by-line to detect any gestures or finger movements. No calibration or adjustment is required for accurate gesture and touch recognition. Bosch Sensortec's Interactive Projection Module provides a touchscreen with a highly intuitive user experience for any smart home appliances as a fully flexible alternative compared to a static, physical screen.

Personal assistants in smart homes

Home device manufacturers can use the BML100PI to create 'smart shelves' consisting of several simultaneous projections on the individual shelves for example in fridges, cupboards, kitchen cabinets or wardrobes. One module can provide touchscreen functionality on up to six different surfaces. For example, a single module can project a weather forecast, the user's individual daily schedule as well as reminders of upcoming events on to a wardrobe. This information is processed and appropriate clothing is recommended to match the weather forecast and/or planned personal activities. The created look can then be shared with friends via social media – directly on the shelf surface. If an item of clothing is missing or in the laundry bin, the smart shelf can

suggest new clothing for the user to order in an online fashion store or it can schedule a date for the laundry service, which is directly synced with the user's calendar.

"With this Interactive Projection Module any regular shelf can easily be transformed into a personal assistant for the user, greatly enhancing the level of convenience in people's daily lives," said Dr. Stefan Finkbeiner, CEO of Bosch Sensortec.

The BML100PI is a compact plug-and-play solution that enables manufacturers of smart home appliances and furniture to create entirely new, exciting use cases. This creates a huge potential for product differentiation for manufacturers.

An allrounder for all environments

One key feature is that the module can project a sharp image on to any type of surface, regardless of whether it is dark, colored, wet, stepped or curved. It can thus provide interactive projection e.g. in bedrooms, home appliances or kitchen gadgets where suitable projection surfaces are often lacking.

Compact module – easy to integrate in any smart home appliances

The BML100PI offers low power consumption of typically 2 W. With its footprint of only 47 mm x 43 mm it is smaller than a credit card. This enables manufacturers to simply integrate it into practically all new and existing smart home appliances – significantly easier than existing projection or display solutions on the market.

In addition to the BML100PI module, Bosch Sensortec offers the BML100P variant, which provides the same projection features but without the touch functionality.

Availability

The BML100PI and BML100P will be available in the second quarter of 2020.

Press photo: #1713079, #1713080, #1715681, #1810838

YouTube: Watch the smart shelf in action! [Link](#)

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Bosch at CES 2019:

- **PRESS CONFERENCE:** In Ballrooms B, C, and D, Mandalay Bay Hotel, Las Vegas **South Convention Center, Level 2**, from **9:00 to 9:45 a.m. local time on Monday, January 7, 2019**.
- **BOOTH: Tuesday to Friday, January 8–11, 2019**, in the Central Hall, booth #14020
- **FOLLOW** the Bosch CES 2019 highlights on Twitter: **#BoschCES**

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Bosch Sensortec GmbH, a fully owned subsidiary of Robert Bosch GmbH, develops and markets a wide portfolio of microelectromechanical systems (MEMS) sensors and solutions tailored for smartphones, 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 sensors, environmental sensors, optical microsystems and a comprehensive software portfolio. Since its foundation in 2005, Bosch Sensortec has emerged as the MEMS technology leader in the markets it addresses. Bosch has been both a pioneer and a global market leader in the MEMS sensor segment since 1995 and has, to date, sold more than 10 billion MEMS sensors. More than every second smartphone worldwide uses a Bosch Sensortec sensor.

For more information, please visit www.bosch-sensortec.com, twitter.com/boschMEMS

The Bosch Group is a leading global supplier of technology and services. It employs roughly 402,000 associates worldwide (as of December 31, 2017). The company generated sales of 78.1 billion euros in 2017. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life." The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiary and regional companies in 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company's future growth is its innovative strength. At 125 locations across the globe, Bosch employs some 64,500 associates in research and development.

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

January 07, 2019

PI 10809 SM/Ho

Bosch launches smart ultra-low power IMU BMI270 optimized for wearables

Includes intuitive activity, context and gesture recognition

- ▶ Newest member of Bosch's next-generation BMI260 family of IMUs
- ▶ Optimized for wearable and hearable applications
- ▶ Strongly increased system battery life
- ▶ Available with context and activity recognition or gesture recognition
- ▶ Bosch at CES®: booth 14020

At CES® in Las Vegas, Nevada, Bosch Sensortec announced the BMI270, an ultra-low power smart Inertial Measurement Unit (IMU) specifically targeted at wearable applications. It offers a strongly improved accelerometer offset and sensitivity performance, enabled by the newest Bosch MEMS process technology.

The BMI270 is the latest member of Bosch Sensortec's BMI260 family of IMUs. It includes intuitive gesture, context and activity recognition with an integrated plug-and-play step counter, which is specially optimized for accurate step counting in wrist-worn devices. The IMU is also well suited for other types of wearable devices, such as hearables, smart clothes, smart shoes, smart glasses and ankle bands.

As an ultra-low power IMU, the BMI270 significantly extends system battery life by handling multiple activity tracking, step counting and gesture recognition functions independently of the main system processor, without having to wake it up. These processor-independent functions include tasks such as sending an interrupt when a certain number of steps is reached, or geofencing to activate GPS when the user stands up and starts walking.

Powerful, accurate gesture and activity recognition features therefore run in the ultra-low power domain, with current consumption of just 30 µA. This noticeably reduces power consumption and users can benefit from extended battery charging intervals.

"The BMI270 combines robustness, accuracy and ultra-low power consumption, making it ideal for wearables," says Dr. Stefan Finkbeiner, CEO of Bosch Sensortec. "It also features a dedicated set of functions developed for wrist-worn and other wearable

devices, giving wearable manufacturers and vendors the capability to develop differentiated products with a competitive edge."

Two versions: gesture and context/activity

Bosch Sensortec's smart IMU is available in two application-specific versions. The 'gesture' version, which detects gestures including flick in/out, arm up/down, and wrist tilt. This version is designed for Wear OS by Google™, ensuring a user-friendly and feature-rich experience for end users. The 'context and activity' version has advanced features for recognizing context activity and activity change, for example standing, walking or being in a vehicle.

The BMI270 is designed to provide maximum flexibility to customers. Manufacturers not only benefit from the excellent sensor performance of the IMU but can also customize it based on the specific use case with gesture and context/activity features.

Broad range of features

Building on the latest Bosch MEMS process technology, the BMI270 combines the automotive-proven gyroscope technology with a significantly improved accelerometer. The sensor includes a 2 kB FIFO.

Bosch's unique and motionless Component Retrimming (CRT) feature provides built-in gyroscope self-calibration without a rotation stimulus, which saves OEMs valuable time and costs during testing and manufacturing. The embedded plug and play features of the BMI270 help to substantially cut time to market.

The BMI270 measures only 2.5 x 3.0 x 0.8 mm³, and is pin-to-pin compatible with the BMI160, BMI260, BMI261 and BMI263.

Availability

The BMI270 will be available for distribution in the second quarter 2019.

Wear OS by Google is a trademark of Google LLC.

Press photo: #1712982, #1712983, #1712984, #1810837

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

YouTube: [link](#)

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- **PANELS WITH BOSCH EXPERTS:**
 - **Wednesday, January 9, 2019, 9:00 to 10:00 a.m.** (local time)
“[Connected Home Innovations](#)” session with Anne Rucker, Global Head of Digital Strategy, Venetian, Level 4 Marcello 4405
 - **Wednesday, January 9, 2019, 9:00 to 10:00 a.m.** (local time)
“[Technology, Jobs, and the Future of Work](#)” session with Charlie Ackerman, Senior Vice President of Human Resources North America, Las Vegas Convention Center, North Hall N258
 - **Wednesday, January 9, 2019, 2:15 to 3:15 p.m.** (local time)
“[IoT to the Max, Thanks to 5G](#)” session with Davie Sweis, Vice President of Web Business, Las Vegas Convention Center, North Hall N256

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