# Press release

## Quantum technologies: Bosch aims to use sensors to take a leading position

Areas of application from medicine to mobility

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- Dr. Stefan Hartung: “We want to take a leading position in quantum sensors for medicine and mobility.”
- Medicine: Bosch quantum sensors could help save lives in the future.
- Mobility: Ultra-precise navigation in the air, on the road, and on water.
- Miniaturization: Bosch is working to integrate quantum sensors onto chips.

Stuttgart, Germany – Quantum technologies have great potential, but most of this potential is still a distant dream at present. Following ten years of research in this field, Bosch is now planning to work with the first pilot customers in the medical and mobility industries on specific applications over the next two years. At the startup Bosch Quantum Sensing, established at the beginning of 2022, some 30 associates are currently focusing on this. Bosch estimates the annual global market potential of applications for medicine and mobility will reach the mid-single-digit billions by the middle of the next decade. One potential area of application for quantum sensors, the brain-computer interface (BCI), will on its own be worth more than five billion dollars annually in the long term, according to the company’s calculations. One example of its future use is sensors that record nerve impulses in order to control artificial limbs and thus improve patients’ quality of life. “The quantum sensors we are creating in medical technology are a perfect fit for our ‘Invented for life’ ethos. By the end of the decade, we want to take a leading position with our technology,” says Dr. Stefan Hartung, chairman of the Bosch board of management.

### Small is beautiful: Bosch is a leader in miniaturization

When it comes to size, the technology company is already a frontrunner: in terms of its measurement accuracy, the Bosch sensor prototype is the smallest currently available – about the size of a cell phone. Its compact design offers considerable advantages wherever space is at a premium – for example, in

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industrial applications, in vehicles, in aircraft, or even in hospital emergency rooms. The smaller the sensor, the greater the benefits: smaller sensors are portable, cheaper to produce, and more scalable as a result. “Our goal is to miniaturize quantum sensors to the point where they can be integrated onto a chip,” says Dr. Katrin Kobe, who is responsible for sensor commercialization at Bosch Quantum Sensing. This could lead the way to additional sensor applications.

**Quantum sensors as potential lifesavers**

In medicine, Bosch quantum sensors could help save lives in the future: by measuring the heart’s natural magnetic field and enabling simple measurements over a longer period of time, they can provide far more data than today’s electrocardiography (ECG). An ECG machine is applied directly to the skin by means of electrodes; if they slip, measurements are inaccurate. Moreover, in an emergency, attaching the ECG machine uses up precious time. Quantum sensors, by contrast, can be incorporated into things like items of clothing or mattresses. This not only speeds up diagnosis in the emergency room, but also makes monitoring at home easy and precise. The prospect of contactless early detection of atrial fibrillation – one of the causes of life-threatening strokes, heart failure, and dementia – is thus within reach for the first time. In other words, early diagnosis with the help of quantum sensors could, in the best case, lead to the prevention of fatal strokes.

**Ultra-precise navigation in the air, on the road, and on water**

In addition to medical technology, quantum sensors could also be used in mobility. One example is navigation. A global positioning system (GPS) is susceptible to interference, whereas quantum sensors are resistant to external influences, since they work by measuring the earth’s unchanging magnetic field. This paves the way for ultra-precise navigation in the air, on the road, and on water. There may also be scope for considerable additional benefits in electromobility. In the future, quantum sensors could be used there to precisely measure the magnetic field of the electric current and thus determine the exact charge level of the battery. The result would be more reliable determination of the remaining range, allowing trips to be planned better.

**Press photos:** #e1f26ac7, #11ac8482, #d7a7c425, #d5d786ef, #88449bde

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*The company was set up in Stuttgart in 1886 by Robert Bosch (1861–1942) as "Workshop for Precision Mechanics and Electrical Engineering." The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant up-front investments in the safeguarding of its future.*
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