Press release
Bosch Sensortec

December 10, 2019
PI 11002 SM/HO

More than meets the eye: Bosch enables the next generation of smartglasses

Innovative Light Drive system for smartglasses creates the first transparent, lightweight, and stylish user experience

- World's first all-day transparency smartglasses solution
- Smallest Light Drive on the market: 30 percent less depth
- Highly efficient, lightweight system, weighing less than 10 grams
- Delivers high quality, bright images, even in direct sunlight
- Turnkey Light Drive display solution, for rapid integration
- Visit Bosch at CES®: LVCC, central hall, booth 12401

At CES® in Las Vegas, Nevada, Bosch Sensortec launches an innovative optical Light Drive system for smartglasses. The Bosch Smartglasses Light Drive module is a sole source, all-in-one technology stack consisting of MEMS mirrors, optical elements, sensors, and onboard processing. This integrated solution delivers a clean visual experience with bright images that are always in focus – even in direct sunlight.

The disruptive Bosch Light Drive technology revolutionizes all-day wearables with perceived total transparency for the user, and with radical social acceptance because it is nearly invisible to others. Additionally, the technology can also be applied to optimize performance of waveguide systems for which integration packages are in development.

There is no externally visible display or integrated camera, the two pitfalls that have alienated users of other smartglasses technologies. The smaller size allows designers to overcome the bulky, cumbersome characteristics of many of today's smartglasses. For the first time, a turnkey system enables smaller, lighter, more stylish smartglasses designs that meet the visual and comfort needs of everyone. The tiny module is also big news for those who wear eyeglasses for vision correction - a significant market, since six out of ten people use corrective lenses every day[1].

Robert Bosch GmbH
Postfach 10 60 50
D-70049 Stuttgart,
Germany

E-mail Silvia.Mayer@bosch-sensortec.com
Phone +49 7121 35-18453
Twitter @BoschMEMS

Corporate Department
Communications & Governmental Affairs
Executive Vice President: Prof. Christof Ehrhart
www.bosch-press.com

"The Smartglasses Light Drive system is the smallest and lightest product on the market today and is, therefore, able to turn almost any regular spectacles into smartglasses," says Dr. Stefan Finkbeiner, CEO of Bosch Sensortec. "By eliminating distracting phone usage, smartglasses can help improve driving safety and reduce the impulse of users to constantly check their mobile devices for notifications or messages."

Bosch Sensortec's innovative Smartglasses Light Drive solution paves the way for a day without digital fatigue. The system displays the perfect balance of just-in-time hands-free information in a minimalist format, making it ideal for applications including navigation, calls, and notifications such as alarms, calendar reminders, and messaging platforms such as WhatsApp and WeChat. Everyday note-based information like to-do and shopping checklists are exceptionally convenient.

To date, these applications have been primarily restricted to devices with physical displays like smartphones or smartwatches. Smartglasses minimize socially unacceptable behavior such as obsessive phone checking, and help improve driver safety by providing hands-free, transparent heads-up navigation directions. The new technology promises to broaden the scope and availability of apps and information, coupled with instant access to relevant data, social media, and intuitive control of audio playback.

Innovative technology in a tiny package

A microelectromechanical system (MEMS) based collimated light scanner inside the Bosch Smartglasses Light Drive module scans a holographic element (HOE) that is embedded in the lens of the smartglasses. This HOE redirects the light beam onto the human retina surface, directly painting a picture that is always in focus.

The technology enables hands-free, secure viewing of practically any data from a connected mobile device, such as a paired smartphone, overlaid in a comfortable viewing position. The projected high-resolution image is crisp, bright, private, and clearly visible even in direct sunlight thanks to its adaptive brightness.

The Bosch Light Drive technology is compatible with curved and corrective lenses, making this new tech appealing and available to users who already wear prescription glasses. Older competitor display technologies are hindered by a haze or rainbow glare called stray light that is visible when the system is switched off. The Bosch Light Drive technology provides pleasing all-day optical transparency with minimal stray light sensitivity, meaning the view is always crystal clear, and that distracting internal reflections are a thing of the past.

Smallest Smartglasses Light Drive solution on the market

The new complete turnkey Light Drive system is the smallest comparable solution available on the market, delivering a depth reduction of 30 percent compared to existing solutions. It measures approximately 45-75 mm x 5-10 mm x 8 mm (L x H x W, depending on customer integration) and weighs less than 10 grams. This makes it easy for glasses manufacturers to flexibly reduce the width of the glasses frame to create a stylish design, and eliminate the visibly chunky design of first-generation smartglasses. Social acceptance and broad adoption have the potential to make retinal Light Drive technologies the next boom for manufacturers of consumer electronics display devices.

End-to-end solution for smartglasses manufacturers

Bosch Sensortec provides a turnkey Light Drive solution – designed and built in-house to ensure consistent high quality, reliability, and performance, whilst being able to quickly respond to market and customer demands for product modifications. Bosch Sensortec is the only end-to-end system provider of such retinal Light Drive technology and can further leverage this position by offering an extensive range of complementary devices and solutions. The smartglasses module is enriched by several sensor solutions, such as Bosch's smart sensor BHI260, the barometric pressure sensor BMP388, and the BMM150 magnetometer. The sensors enable intuitive user interface features such as multi-tap functions on the frame to improve convenience while operating the glasses.

The Bosch Smartglasses Light Drive solution will be available in 2021 to high-volume manufacturers as part number BML500P.

[1]Source:
Reference: "How Many People in the World Wear Glasses?". URL: https://www.reference.com/world-view/many-people-world-wear-glasses-e1268cfa00bdbd41 [05.11.2019].

Jan-Willem Bruggink (2013): "More than 6 in 10 people wear glasses or contact lenses". URL: https://www.cbs.nl/en-gb/news/2013/38/more-than-6-in-10-people-wear-glasses-or-contact-lenses [05.11.2019].

Press photo: #2719200, #2719201, #2719202, #2719203, #2719204, #2719205

YouTube: Watch the smartglasses solution in action: link

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

Silvia Mayer
phone: +49 7121 35-18453

Christian Hoenicke
phone: +49 7121 35-35924
Twitter: @BoschMEMS

Bosch at CES 2020:

- **PRESS CONFERENCE:** From **9:00 to 10:30 a.m.** local time **on Monday, January 6, 2020** in Ballrooms B, C, and D, Mandalay Bay Hotel, Las Vegas **South Convention Center, Level 2**
- **BOOTH: Tuesday to Friday, January 7–10, 2020**, in the Central Hall, booth #12401
- **FOLLOW** the Bosch CES 2020 highlights on Twitter: **#BoschCES**

- **PANELS WITH BOSCH EXPERTS:**
  Wednesday, January 8, 2020, 10:15 to 11:15 a.m. (local time)
  Growth of Apprenticeships for "New Collar" Jobs session with Charlie Ackerman, Senior Vice President of Human Resources, Las Vegas South Convention Center

Contact persons for press inquiries:

Melita Delic, +49 711 811-48617, +49 160 7020086,
Trix Böhne, +49 30 32788-561, +49 173 5239774,
Irina Ananyeva, +49 711 811-47990, +49 152 59753284,
Annett Fischer, +49 711 811-6286, +49 152 08651292,
Christiane Wild-Raidt, +49 711 811-6283, +49 152 22978802

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, wearables and hearables, AR/VR devices, drones, robots, smart home and IoT (Internet of Things) applications. The product portfolio includes 3-axis accelerometers, gyroscopes and magnetometers, integrated 6- and 9-axis sensors, smart sensors, barometric pressure sensors, humidity sensors, gas sensors, optical microsystems and comprehensive software. 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.

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

The Bosch Group is a leading global supplier of technology and services. It employs roughly 410,000 associates worldwide (as of December 31, 2018). The company generated sales of 78.5 billion euros in 2018. 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 460 subsidiary and regional companies in over 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 nearly 130 locations across the globe, Bosch employs some 68,700 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.