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Smart Eye and STMicroelectronics demonstrate high-sensitivity, lower-cost, 1-LED Driver Monitoring System

- *Demonstration, at AutoSens (Sept 12-14) and InCabin (Sept 15) events in Brussels, highlights power and cost improvements*

Geneva, Switzerland, and Gothenburg, Sweden – September 13, 2022 – Smart Eye, a world leader in using artificial intelligence (AI) to build technology that understands, supports, and predicts human behavior in complex environments, and **STMicroelectronics (NYSE: STM)**, a global semiconductor leader serving customers across the spectrum of electronics applications, today announced their cooperative development of a high-sensitivity, 1-LED Driver Monitoring System (DMS). Combining Smart Eye's expertise in driver monitoring algorithms and optical system design with ST's high-sensitivity automotive-grade global-shutter VB56G4A imager, the new DMS reduces power consumption and system cost by using only one illumination LED. Current systems typically require two or more LEDs to adequately illuminate the driver. The high-sensitivity DMS is demonstrated at this week's AutoSens and InCabin exhibitions in Brussels.

"The excellent performance and high sensitivity of ST's automotive-grade global-shutter imaging sensor is an excellent match for Smart Eye's industry-proven driver-monitoring algorithms," said Eric Aussedat, Executive Vice President, Imaging Sub-Group General Manager, STMicroelectronics. *"In developing a sensor with 2.6µm pixel size and double the quantum efficiency of previous-generation sensors, we've simplified DMS development, reduced its power consumption, and lowered costs without compromising performance."*

"Building on our two decades of automotive experience proven by nearly 100 design wins from leading car manufacturers, we've worked with ST to combine our technology with ST's advanced image sensor to eliminate at least half of the expensive LEDs/lenses," said Martin Krantz, CEO and Founder of Smart Eye. "*Even with this smaller and more economical design, we've created an exceptional no-compromise DMS demonstrator that shows how automakers can significantly improve road safety with reduced cost of ownership. We are happy to support our partners and customers with our HW and SW reference design and expertise for flawless product integration."*

The high-sensitivity DMS developed by Smart Eye and ST is being unveiled and demonstrated at the ST stand (#21) at AutoSens on September 12-14 at the Autoworld Museum in Brussels and in the same location at InCabin on September

15. For demonstrations after AutoSens and InCabin, please contact Smart Eye or ST sales.

Notes to Editors
The VG56G4A, announced earlier this year, is ST's second generation automotive-grade global-shutter sensor for driver monitoring systems. This sensor leverages ST's in-house investment in manufacturing advanced 3D-stacked back-side illuminated (BSI-3D) image sensors. These sensors are more sensitive, smaller, and more reliable than the conventional front-side illuminated (FSI) sensors typically being used in first-generation DMSs.

The sensor achieves high Quantum Efficiency (QE), reaching 24% at 940nm near-infrared (NIR) wavelength, with linear dynamic range up to 60dB. This enables a simple low-power, non-visible LED emitter to provide adequate illumination for the sensor. Operating outside the visible spectrum also ensures consistent response in day or night driving and in bright or overcast conditions, while minimizing potential driver-fatigue issues.

In addition to the sensor's high QE, it implements a global-shutter approach that offers big advantages over rolling-shutter imagers. The global shutter simultaneously exposes all pixels to the scene, allowing simple synchronization with NIR illumination. This lowers the illumination-subsystem power budget. Combining a pixel size of just 2.6µm with the high QE and global shutter helps optimize total power consumption and camera size. In addition, integrated automatic exposure control eases use and simplifies the application-software design by minimizing system interaction with the sensor.

The sensor also provides flexible operating modes that help optimize system features and performance. These include programmable sequences of 4-frame contexts, illumination control outputs synchronized with sensor integration periods, and an input for an external frame-start signal. Additional features include automatic dark calibration, dynamic defective-pixel correction, image cropping, and a mirror/flip-image readout.

External connections include eight programmable general-purpose I/O (GPIO) pins and a dual-lane MIPI CSI-2 transmitter interface operating up to 1.5 Gbps per lane. The sensor can operate at up to 88 frames per second (fps) at full resolution and typical power consumption is 145mW at 60 fps.

About Smart Eye
Smart Eye is the global leader in Human Insight AI, technology that understands, supports, and predicts human behavior in complex environments. We are bridging the gap between humans and machines for a safe and sustainable future. Our multimodal software and hardware solutions provide unprecedented human insight in automotive and behavioral research—supported also by Affectiva and iMotions, companies we acquired in 2021.

Smart Eye offers road-ready Driver Monitoring Systems and next-level Interior Sensing solutions built on two decades of automotive experience. Smart Eye's technology is embedded in next-generation vehicles as OEM or Tier 1 solutions and has been selected by 14 of the world's leading car manufacturers for 94 car models. Smart Eye also provides complete hardware and software solutions for fleet and aftermarket, powering vehicles on the road today.

As the preferred partner to the automotive industry, Smart Eye is leading the way towards safer, more sustainable transportation and mobility experiences enhancing wellness, comfort, and entertainment.

Smart Eye was founded in 1999, is publicly traded and headquartered in Sweden with offices in the US, UK, Germany, Denmark, Egypt, Japan, Singapore, and China. Learn more at: http://smarteye.ai/

About STMicroelectronics
At ST, we are 48,000 creators and makers of semiconductor technologies mastering the semiconductor supply chain with state-of-the-art manufacturing facilities. An integrated device manufacturer, we work with more than 200,000 customers and thousands of partners to design and build products, solutions, and ecosystems that address their challenges and opportunities, and the need to support a more sustainable world. Our technologies enable smarter mobility, more efficient power and energy management, and the wide-scale deployment of the Internet of Things and connectivity. ST is committed to becoming carbon neutral by 2027. Further information can be found at www.st.com.

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