Presse Press

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SmartVIZ project explores innovative visualization technologies with micro LEDs

Osram is working with ASM AMICRA and Fraunhofer IISB on brighter, more robust and more efficient lighting solutions than LCDs or OLEDs

Osram Opto Semiconductors, a leader in photonics, announced it is part of a new project that is exploring the principles of high-resolution visualization solutions using µLEDs (micro LEDs). The project, which began in November 2018, is funded by the Bavarian State Ministry for Economic Affairs, Regional Development and Energy. There is still no standard definition for the term µLED, only a loose guideline for the opto chip's dimension to include edge lengths smaller than 100 µm. Since µLED technology can produce extremely high luminance in a wide dynamic range, it can play a key role for future megatrends such as augmented reality applications. The focus of this project is on automotive interior applications. The project is expected to complete in October 2021 when an initial demonstrator will be presented.

Imaging devices based on direct emitting µLED pixels are considered a disruptive development in the visualization market and have the potential to sideline technologies such as LCD or OLED. These rather conventional technologies are constrained by their fundamental limits in energy efficiency, contrast, luminance, functionality and other associated restrictions. Over the next two and a half years, the SmartVIZ research project aims to provide the basis for future transparent, high-resolution, direct-emitting visualization solutions using µLED technologies.

The envisioned work packages will focus on three key technologies. First, the design of efficient µLED light sources, second, their handling on sub-component level and third, the final assembly. Red, green and blue µLED structures will perform as efficient high-

luminance image pixels. Implementation of such concepts and applications requires in-depth studies of the underlying physical principles that are in-part entirely different than today's macro LED chips.

The project will also conduct research addressing the component integration of µLEDs using a novel approach for transparent and flexible image encoders. Transparent substrates based on indium gallium zinc oxide thin-film transistors (IGZO TFTs) will be the researchers' focus for controlling the individual pixels. This approach allows for quasi-transparent surfaces, which can be filled with content only if the µLEDs are switched to active. Employing such an active matrix backplane for the driver electronics allows image rendering with µLEDs to produce visualization scenarios with ultra-high resolution.

Another work package will target processing concepts to enable rapid transfer of large quantities of µLED chips from a source wafer to the backplane driver electronics via automated parallel assembly. Key requirement here is a positioning accuracy of around 1.5 µm. Researching accurate transfer methods for such small chips (edge length smaller than 40 µm) will require entirely new technological approaches, which will be addressed within the project.

The consortium partners have the necessary expertise to realize the envisioned technological breakthrough. For instance, ASM AMICRA is an expert player in the field of production automation, especially in the high-tech area of photonic applications. The company brings its in-depth knowledge of micro assembly of photonic components to the project. The Fraunhofer Institute for Integrated Systems and Device Technology IISB specializes in power electronics and technologies for producing semiconductor devices. IISB will design and manufacture transparent electronic circuits for their final installation in micro-pixel visualization components.

Hubert Halbritter, SmartVIZ project leader at Osram Opto Semiconductors, described his company's role, "as a project partner with in-depth experience in micro-pixel imaging

components that will research efficient, high-luminance pixels. Along with our partners, we aim to gain technology leadership in one of the key future technology markets.”

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The SmartVIZ project will research new visualization concepts for automotive interior applications thereby realizing imaging scenarios on transparent backplanes in high-resolution. Picture: Osram

ABOUT OSRAM

OSRAM, based in Munich, is a leading global high-tech company with a history dating back more than 110 years. Primarily focused on semiconductor-based technologies, our products are used in highly diverse applications ranging from virtual reality to autonomous driving and from smartphones to networked, intelligent lighting solutions in buildings and cities. OSRAM utilizes the infinite possibilities of light to improve the quality of life for individuals and communities. OSRAM's innovations will enable people all over the world not only to see better, but also to communicate, travel, work, and live better. As of the end of fiscal year 2018 (September 30), OSRAM had approximately 26,200 employees worldwide. It generated revenue of more than €3.8 billion from continued operations in fiscal year 2018. The company is listed on the stock exchanges in Frankfurt and Munich (ISIN: DE000LED4000; WKN: LED400; trading symbol: OSR). Additional information can be found at www.osram.com.

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