Fraunhofer FEP

PRESS RELEASE

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High-performance OLED Microdisplay for Industrial AR Data Glasses

The Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP develops microdisplays in OLED-on-silicon technology. At the SID Display Week 2019, from May 12 – 16, 2019, in San Jose/USA, booth 1417, Fraunhofer FEP will present a new OLED microdisplay that is especially dedicated to industrial Augmented Reality (AR) data glasses.

The beginnings of Head-Mounted Displays (HMDs) date back to the 1960s. In the 1990s further developed data glasses, which are initially associated with the entertainment/gaming sector, were mainly used in professional scenarios, such as pilot training or robot programming. Today, data glasses and HMDs have become indispensable in the age of industry 4.0 for production, maintenance and medical applications.

For more than 10 years, Fraunhofer FEP has been developing applications and display solutions based on the OLED-on-silicon technology that are predestined for the use in data glasses and HMDs. In the meantime, a whole series of OLED microdisplays has been developed and their parameters are being continuously improved. Each display is designed application-specific, because parameters such as brightness, resolution, power consumption, screen size and complexity of the electronics play a major role in the increasingly professional and demanding requirements.

Many initiatives such as the publicly funded "Glass@Service" project focused particularly on the development of see-through AR data glasses. To this end, the scientists have now evaluated the requirements for OLED microdisplays for the use in industrial applications. Figure 1 shows the comparison of the requirement parameter matrix of different microdisplays for various use cases.

Some of these use cases are already covered by existing OLED microdisplay solutions of Fraunhofer FEP: Wearables use look around displays with limited resolution and frame rate but benefit from very high brightness and extremely low power consumption. On the other hand, there are quite different requirements for VR applications - these are fulfilled by a specially designed high-resolution WUXGA microdisplay with 2.3M pixels and 1 inch screen diagonal.

GLASS@SERVICE

Funded by the German Federal Ministry for Economic Affairs and Energy.

Federal Ministry for Economic Affairs and Energy

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This portfolio is now being completed by a new generation of OLED microdisplays especially dedicated to the requirements of industrial AR data glasses (figure 2). Philipp Wartenberg, Head of Department for IC and System Design, presents: "Our new "720p Microdisplay" features high frame rates and high contrast ratios based on the OLED-on-silicon technology. At the same time, it offers low power consumption and thus meets one important criteria for AR applications. With a resolution of 1280 × 720 pixels at a screen diagonal of 0.64 inches and a subpixel size of 5.5 micrometers, it offers high-quality images at a low power consumption of 160 milliwatt at 120 frames per second.".

In addition to the display parameters, the new OLED microdisplay features simple driving electronics for an easy integration into portable systems and furthermore is available as evaluation kit.

A first prototype of a HMD with see-through optics for AR applications in industry (figure 3) is equipped with these 720p displays. The new generation of OLED microdisplays will be presented at the SID Display Week in San José, USA, from May 12 to 16, 2019. The Fraunhofer FEP scientists are available for projects on further developments of this display technology.

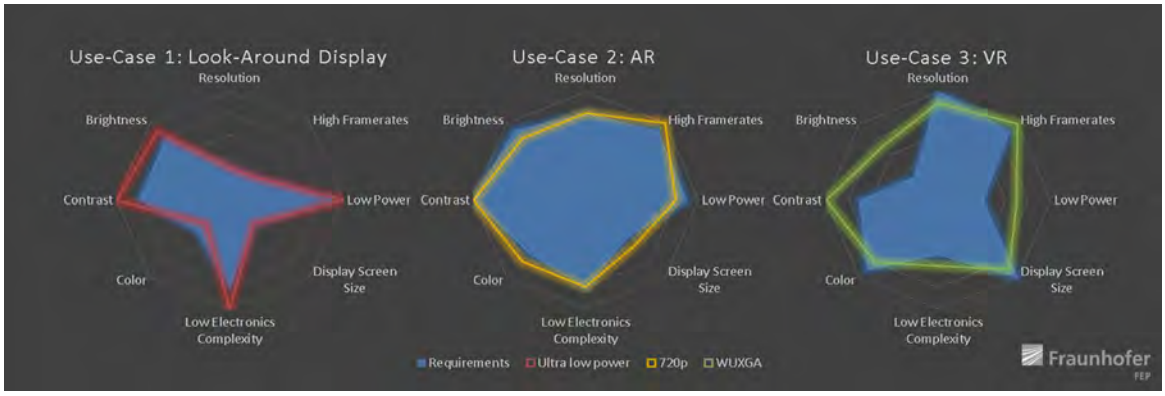

Figure 1: Different display types, which are discussed with regard to their parameters according to three different application scenarios
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Figure 2: New OLED microdisplay with a resolution of 1280 × 720 pixels
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Figure 3: Prototype of the AR data glasses for industrial use, developed in the "Glass@Service" project
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Fraunhofer FEP at SID Display Week 2019:
Exhibition
14. – 16. May 2019
San Jose Convention Center, San Jose, USA
Booth No. 1417

Talks:
Wednesday, 15 May 2019 / 2:45 pm:
Exhibitors´ Forum Presentation, Executive Ballroom
Session 5: AR/VR
F5.2: OLED Microdisplays: Choose the right device for your application
Judith Baumgarten, Fraunhofer FEP

Thursday, 16 May 2019 / 10:40 - 12:00 am, Room 220 B:
Session 52: OLED AR/VR Applications (Augmented, Virtual and Mixed Reality / OLED)
52.2: Invited Paper: "A New 0.64" 720p OLED Microdisplay for Application in Industrial See-Through AR HMD", Philipp Wartenberg, Fraunhofer FEP

About the project Glass@Service:

The joint project "Glass@Service" was launched in March 2016 and is funded by the Federal Ministry of Economics and Energy (BMWi) as part of the "Smart Service World – Internet-based Services for Business" technology competition. The aim of the project is to establish an interactive personalized visualization in industrial processes by means of data glasses and other wearables using the example of the "digital factory" in electronics production.

The consortium would like to thank the Federal Ministry of Economics and Energy (BMWi) for supporting the project as part of the "Smart Service World Initiative".

More information: http://s.fhg.de/ND9

Consortium:

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