Fraunhofer IMS

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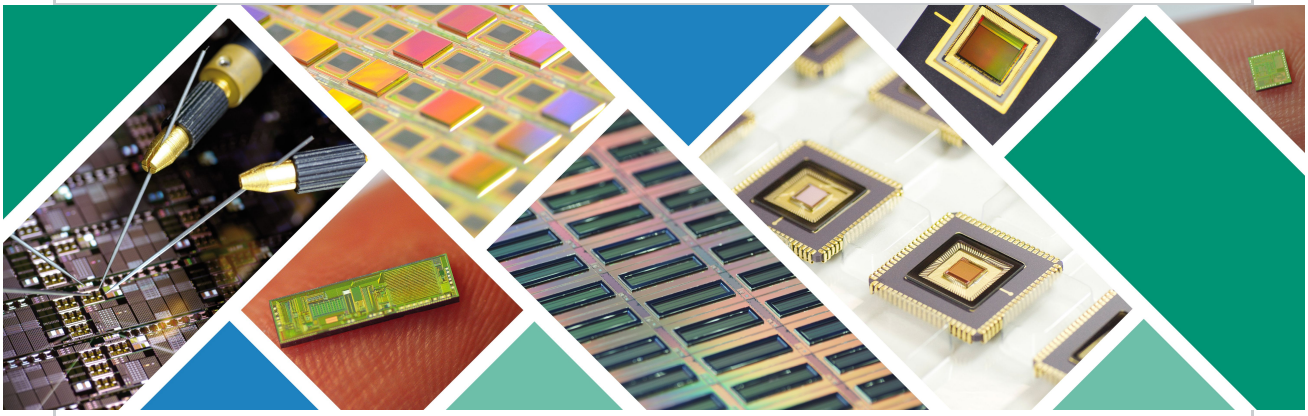
Fraunhofer IMS - Your partner for advanced research



in addition to the innovative developments in the areas of: Advanced microlenses for SPADs, LIDaR and embedded AI for LIDaR, Terahertz communication and a new project the contactless measurement of vital signs, we would also like to present our activity report 2019/2020. We are sure that there will be something interesting for you again.

Yours sincerely,

Your Fraunhofer IMS Team

Activity Report 2019 / 2020

Today we are sending you our Annual Report 2019 / 2020. A very challenging time globally, which we have used creatively for new innovations. Through excellent cooperation between our dedicated employees and partners, we have mastered the challenges we faced and realigned our institute to set the course for a promising future.

TO THE ANNUAL REPORT

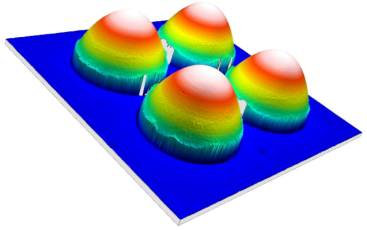
SPAD in focus

Highly sensitive image sensors with adapted microlens arrays

The performance of optical sensors depends strongly on the proportion of the light-sensitive area. Adapted microlens arrays can be used to target photons to the active areas of the sensor to significantly increase sensitivity. Adapted microlens arrays were selectively molded on SPAD-based

sensors on 8" wafers and lead to an increase in sensitivity by a factor of 7.

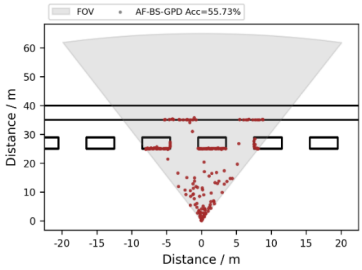
MORE INFO | CORE COMPETENCE TECHNOLOGY



LiDAR

Machine learning based data processing and distance determination for LiDAR data to increase reliability.

To improve the distance detection, speed and measurement quality of LIDAR systems, the IMS has developed a neural network for multi-peak analysis (NNMPA) optimized for embedded systems with the help of the AI framework "AIfES" and was able to achieve an improvement in the processing speed of 23% and the accuracy of the distance detection of 26% in relation to classic digital processing. Even the use of a fixed-point arithmetic still achieves an improvement in accuracy of almost 25%. In the future, the AI algorithms should ensure error-free detection of objects with the distance sensor and significantly improve measurements even in rain, snow and fog.



MORE INFO | CORE COMPETENCE ESA

iRel 4.0

Increase reliability of LiDAR detectors

The Fraunhofer IMS is working on optimizing the reliability and safety of electronic components and systems as part of the European joint project "iRel 4.0". For the optical sensors from the IMS CSPAD family for LiDAR detectors, automated test procedures are developed on wafer level. The Fraunhofer IMS is pursuing the goal of optimizing the new CSPAD Backside-Illuminated-Image (BSI) sensors and making them even safer and more reliable.

iRel 4.0
intelligent Reliability 4.0

MORE INFO | BUSINESS UNIT INDUSTRY

ESA

Project Neon

The NEON project will develop a compact, mobile measuring device that can record human vital parameters, such as pulse, respiratory rate, body temperature and oxygen

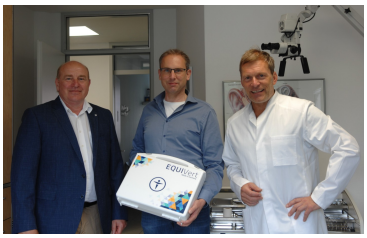
saturation, without contact. The individually measured vital parameters are to be combined and, together with other relevant health parameters such as age, gender and previous illnesses, automatically determine the person's state of health.

MORE INFO | CORE COMPETENCE ESA

PRESS RELEASE

FIRST EQUIMEDI DEVICES SUCCESSFULLY DELIVERED

On June 30, 2021, the EQUIVert team began delivering the first EQUIMedi devices. One device was personally handed over to Dr. Uso Walter for his practice. He is chairman of the board at HNOnet NRW eG, which helped develop the EQUIVert products. "I am delighted to finally hold the finished product in my hands and now be able to use it," explains Dr. Walter.



MORE INFO

PRESS RELEASE

Terahertz technologies for pioneering innovations in communications and sensor technology

In the recently launched joint project "T-KOS", terahertz technology is now to be developed synergistically for industry in the fields of communication and sensor technology for the first time. Innovative system solutions in both areas can make a decisive contribution to the successful implementation of future social issues such as digitization, Industry 4.0 or resource efficiency and thus strengthen Germany as a business location in the long term.

T-KOS
Terahertz-Technologien für Kommunikation und Sensorik

MORE INFO

Contact

Michael Bollerott
Marketing / Sales

Fraunhofer Institute for Microelectronic

Circuits and Systems IMS
Finkenstr. 61
47057 Duisburg

Telefon +49 203 3783-227

Send e-mail

The Fraunhofer-Gesellschaft is the leading organization for applied research in Europe. Its research activities are conducted by 72 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of more than 26,600, who work with an annual research budget totaling more than 2.5 billion euros. Of this sum, more than 2.1 billion euros is generated through contract research. Around 70 percent of the Fraunhofer-Gesellschaft's contract research revenue is derived from contracts with industry and from publicly financed research projects. International collaborations with excellent research partners and innovative companies around the world ensure direct access to regions of the greatest importance to present and future scientific progress and economic development.

Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme
Finkenstraße 61
47057 Duisburg
Germany
ist eine rechtlich nicht selbstständige Einrichtung der
Fraunhofer-Gesellschaft
zur Förderung der angewandten Forschung e.V.
Hansastraße 27 c 80686 München
Internet: www.fraunhofer.de
E-Mail: info@zv.fraunhofer.de

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