

BUSINESS UNIT MOBILITY

Autonomous Mobility

Around 90 percent of all accidents on our streets are due to human error. New technologies and advancing autonomy should enable safe interaction between all road users. For different modes of transport Fraunhofer IMS develops solutions for reliable environment detection and integrates safety and security features into electronic systems.

Our offers are:

- LiDAR (detector arrays, system design and simulation)
- Uncooled infrared sensors
- Early sensor(data)fusion and advanced signal processing
- RISC-V based microprocessors and ASIC development

Fraunhofer IMS

The Fraunhofer Institute for Microelectronic Circuits and Systems IMS in Duisburg is a globally recognized application-oriented research institution for the development of marketable technologies and processes in the fields of microelectronics and sensor technology. Especially in the key areas of »Health, Industry, Mobility, Space and Security«, scientists have been working intensively and interdisciplinarily on the development of future-relevant solutions for industry and society - for over 30 years.

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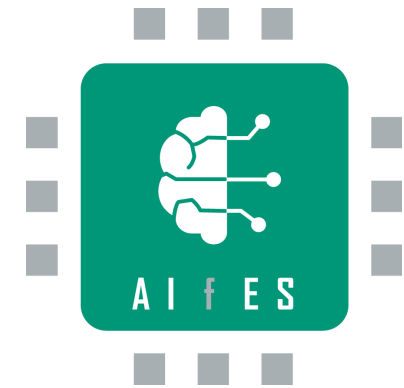
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Introduction to the business unit

Self-motion from A to B and convenient access to all goods drives our existing network of transportation and mobility systems. In addition, reduced emissions in our cities, multimodal mobility, good reachability from country to city, and greater autonomy for aircraft and trains are becoming increasingly important.

Vision & Mission

The development of new sensors, the more efficient use of data, the safe use of technology for higher levels of autonomy and the all-round service for our industrial customers are the focus of our activities. The goal is to realize emission-free, safe and affordable mobility concepts.

Emission-free Mobility

Fraunhofer IMS contributes to the research field of emission-free mobility. With our technologies, we support the reduction of CO₂ emissions and the development of emission-free mobility solutions.

Our offers are:

- Resource-saving Embedded-AI solutions
- Condition monitoring of components for long-life or second-use

Reference projects

- Velektronik (www.velektronik.de/en)
Trusted electronics for industry, funded by BMBF
- Smart Headlight
Integration and sensor fusion of 3D-Sensors in headlamps, funded by Fraunhofer
- ALBACOPTER® (www.albacofter.fraunhofer.de/en.html)
Fraunhofer lighthouse Urban Air mobility project, funded by Fraunhofer
- DRONES4SAFETY (www.drones4safety.eu)
Building a cooperative, autonomous, operating drone system to enhance transport safety, funded by EU's Horizon 2020 program
- Flash LiDAR camera Owl
Demonstration of high-performing CSPAD detector arrays
- Uncooled infrared sensor
Scalable technology to detect smallest temperature

AIFES

AIFES is our platform-independent and constantly growing machine learning library, which implies a fully configurable Feedforward Neural Network (FNN). The program source code is reduced to a minimum, thus even the integration on a microcontroller including learning algorithms is possible.

www.ims.fraunhofer.de/en/Business-Unit/Industry/Industrial-AI/Artificial-Intelligence-for-Embedded-Systems-AIFES.html

AIRISC

AIRISC is our implementation of the RISC-V Instruction Set Architecture for use of AI in safe and secure embedded systems, i.e. a resource-saving and efficient core with functional safety certification. We offer AIRISC free of charge for FPGA based evaluation and provide a seamless FPGA-to-ASIC paths for larger volume products and customization.

www.ims.fraunhofer.de/en/Core-Competence/Smart-Sensor-Systems/Integrated-Sensor-Systems/System-on-Chip-Design.html

CSPAD

CSPAD is our smart and scalable CMOS Single-Photon Avalanche Diode technology for LiDAR applications. Fully CMOS based photon timing devices, with high single-photon sensitivity and integrated pixel individual control and read-out.

www.ims.fraunhofer.de/content/dam/ims/en/newsroom/business-units/mobility/CMOS-CSPADalpha-Video.mp4