



Extract from the annual report 2020  
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## SMART SURFACES FOR FUTURE-ORIENTED AUTOMOTIVE DESIGN – FRAUNHOFER IST@OHLF

Current megatrends such as the electrification of mobility and autonomous driving have an enormous influence on the design of the car of future generations. New business models such as “shared mobility” and (autonomous) taxi systems are playing an increasingly important role and changing the way we look at the vehicle, its functions and requirements. The focus is on longer running times and shorter stationary times, an individualized interior and different usage scenarios based on autonomous driving: the mobile office during the daily commute to work or to a meeting, a big shopping trip or group excursion, goods transport instead of unproductive waiting times, which today account for about 95 percent of the vehicle life. In addition, the automotive industry’s requirements for sustainability and CO<sub>2</sub> efficiency are increasing, thus exerting a massive influence on future vehicle design. Several Fraunhofer Institutes are working together to develop solutions for the technological challenges of resource-saving and cost-effective lightweight construction as well as for increasing efficiency, reducing traffic-related emissions and recycling vehicle components. The Fraunhofer IST focuses on the further development of smart surfaces such as surface-integrated thin-film sensors.

### Four Institutes pool their expertise in the Fraunhofer Project Center in Wolfsburg

The Fraunhofer Society is a partner in the Open Hybrid LabFactory (OHLF) research campus, which was established at the Wolfsburg site as a public-private partnership for the research field of mobility. In 2014, as part of OHLF’s activities and with the support of the state of Lower Saxony, Fraunhofer founded a project center in which the Fraunhofer Institutes for Manufacturing Technology and Advanced Materials IFAM, for Surface Engineering and Thin Films IST, for Machine Tools and Forming Technology IWU and for Wood Research WKI

are represented. Within their joint infrastructure, the Institutes are pooling their expertise in materials science, component and process development, and production technology to develop integrated system solutions for future mobility. One focus lies on the combination of light metals and fiber-plastic composites in hybrid lightweight construction with a focus on vehicle structure. Other research fields address the interior, flexible production and, in cooperation with the Fraunhofer Project Center for Energy Storage and Systems ZESS, the integration of energy storage systems for alternative propulsion systems into the overall vehicle.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

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17 PARTNERSHIPS FOR THE GOALS




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## Future production of surface-integrated thin-film sensors with a matrix-based production system

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The Fraunhofer IST extends the expertise of the Project Center Wolfsburg through its extensive experience in the field of coating technologies, especially micro- and sensor technologies with the development of smart surfaces. In close partnership with the Institute of Machine Tools and Production Technology IWF at the TU Braunschweig, a matrix-based production system is currently being developed which will allow the flexible and efficient production of functional layers and surface-integrated thin-film sensors in the starting constellation. The planned integration into the Open Hybrid LabFactory system technology will allow an extension of the processes for functionalization and individualization of components from conventional production methods. Possible approaches can be found in the interior, for example in the area of smart surfaces, the condition monitoring of passengers and the autonomous vehicle, or in production engineering via tool-integrated sensors for intelligent process control.

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## Background information

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The public-private partnership Open Hybrid LabFactory eV (OHLF) was initiated in 2012 under the leadership of the Automotive Research Centre Niedersachsen at TU Braunschweig and is funded within the framework of the BMBF initiative "Research Campus – Public-Private Partnership for Innovations". The aim is to develop material, manufacturing and production technologies suitable for large-scale production for the economically and ecologically sustainable manufacture of hybrid lightweight components made of metals, plastics and textile structures.

- 1 A view of the technical center at the Wolfsburg OHLF project center.
- 2 Sensory inserts for the efficient production of natural fiber reinforced plastics.
- 3 The Fraunhofer Project Center Wolfsburg at the OHLF.

To this end, OHLF is mapping the entire value-added chain for hybrid components: from conceptual design, semi-finished textile products and organic sheet production as well as production processes for hybrid components to the life cycle design and engineering including recycling. Partners in the Open Hybrid LabFactory are, in addition to the research institutes TU Braunschweig and the Fraunhofer Gesellschaft, industrial partners such as Volkswagen AG, Magna Cosma, Magna Exteriors & Interiors, thyssenkrupp, IAV, Engel, Zwick/Roell and the city of Wolfsburg. In addition, over 20 project-related research and industrial partners are members of OHLF.

The establishment of the Fraunhofer Project Center Wolfsburg is supported by state funds of the "Niedersächsisches Vorab" (funding number: VWZN2990).

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