



**Fraunhofer**

IAA 2019 – HALL 4.1, BOOTH C12

**FRAUNHOFER AT THE IAA – NEW  
IDEAS FOR THE AUTOMOTIVE  
WORLD OF TOMORROW**



With the spirit of scientific inquiry to guide us, we invent the shape of things to come – the world of tomorrow and beyond. For the future is the force that drives the Fraunhofer-Gesellschaft. We ask the questions that need to be asked. We find the answers that need to be found, the solutions that deliver immediate benefits to industry and society. How do we build smart, universally trusted machines? How do we manufacture drugs that provide faster, more affordable relief to patients? How do we make the world a safer place for everyone? And how do we know which idea is the right idea? Researchers, entrepreneurs, visionaries – this is who we are. What we do not only sets the pace for science; it puts science in service of society. Our innovative powers, our partners and workforce, our 70-year history – these are the outward signs of our success. Yesterday's victories and today's possibilities spur our curiosity about the future. They inspire us to explore tomorrow's key issues, forever seeking new answers to the question: **What's next?**



**9 institutes of Europe's leading institution for application-oriented research present their innovative developments.**

Providing new impulses for the increasing challenges of the automotive and supplier industry – this is the tradition that Fraunhofer is pursuing at this year's IAA, as the following examples demonstrate: Costeffective and resourceefficient body construction, the optimal installation of new radar applications or innovative coating processes for brake discs result in economic benefits. New production processes, that reduce particulate emissions and solutions such as invisible solar cells on the car roof, are sustainable and environmentally friendly. The digitization of processes also driving this forward: Errors can be detected more quickly and environmental impacts can be simulated. And improving algorithms extend the possibilities of modern driver assistance systems.



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## Efficiency

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### **Highly developed radar applications increase economic efficiency**

Smaller, cheaper, more efficient: The Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR researches and develops effective radar applications that achieve a continuous increase in cost-effectiveness in numerous areas of application with ever more powerful systems. Projects on the topics "Reliable Qualification of Automotive Radars with ATRIUM", "Cognitive Automotive Radar", "Antenna Development for Future Automotive Radars" and "Material Characterization for Automotive Radar" will be presented.

*Fraunhofer FHR*



### **Efficient production up to batch size 1**

With the “Silberhummel” concept, the Fraunhofer Automobile Production Alliance demonstrates a solution for an economical low-volume production of automobiles – up to “batch size 1”, i.e. unique vehicles. Based on drawings of a 1930s racing car by former German automaker Horch that was never actually built, Fraunhofer IWU employed a mix of novel, fast and flexible forming and joining technologies to make the body parts, cost- and resource-efficiently creating a unique *car.Allianz AutoMOBILproduktion*

**1** *Material characterization for automotive radar*

**2** *“Silberhummel” concept*



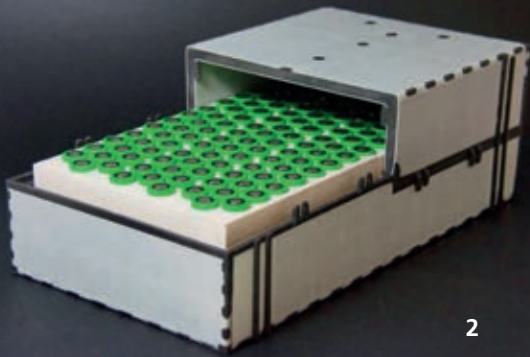
## **Laser-printed Coatings against Wear and Corrosion, Sensors and Conductive Tracks for automotive**

In recent years, the demands placed on the chemical, mechanical and electronic performance of components have increased extensively in many industries. Thus, they can often no longer be met by the components' specifications alone. Printed and laser-treated coatings are used to support the parts in meeting the demands such as wear and corrosion resistant coatings on disc brakes, conductive tracks integrated on car doors as well as on and in FRP components, directly printed strain gauge sensors, locally gold-plated electrical contacts, 3D printed functional parts and many other applications for automotive.

*Fraunhofer ILT*

**1** *Coating process of a cast iron brake disc by Extreme High-speed Laser Material Deposition EHLA*

**2** *sandwich battery housing*



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### **Sandwich battery housing with integrated thermal storage**

Within the EU project "OPTEMUS", a traction battery with thermal storage capacity has been developed by the Fraunhofer LBF. The focus was on a novel sandwich battery housing made of continuous fibre reinforced thermoplastics (CFRTP), which helps to insulate stored heat in the traction battery for preconditioning. Besides, novel phase change material was integrated to store heat generated by the cells.

*Fraunhofer LBF / Fraunhofer Allianz Verkehr*

### **VMC EcoEstimator**

Consumption and energy efficiency have become the most important buying criteria for many car buyers. Only: How do you transfer the standard information to your own driving profile? When is the purchase of a more economical engine worthwhile? We develop technologies and apps addressing these questions. Instead of general statements such as "This reduces the air resistance by up to 10%, especially if you drive a lot on freeways" you get individual answers "On their personal routes you save 3€ per 100km."

*Fraunhofer ITWM / Fraunhofer Allianz Verkehr*



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## Sustainability

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### Thermal environment

In the automotive sector, the Fraunhofer IBP researches and develops concepts, technologies and components for improving the climate, comfort and air quality of vehicles for drivers and passengers. The interdisciplinary cooperation in the fields of acoustics, indoor climate and chemical-biological investigations, existing test facilities as well as special simulation and analysis methods, enable the development of new and customized solutions. Moreover we analyze these and existing systems from an ecological, economic, social and technological point of view and subject them to life cycle analyses.

*Fraunhofer IBP / Allianz Verkehr*

### Car roof with invisible solar cells

To further extend the driving range of electric vehicles, the Fraunhofer Institute for Solar Energy Systems ISE has developed a solar car roof with highly efficient solar cells. The roof can be coated in any color, with the solar cells integrated invisibly into the preformed solar roof. The photovoltaic car roof can reach approx.  $210 \text{ W/m}^2$  and deliver sustainable electricity for up to 10 km daily. The estimate is based on solar radiation on a sunny summer day and the consumption of a compact-class e-car.

*Fraunhofer ISE*





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## Digitalization

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### Smart VR/AR for maintenance service

The latest versions of instant3Dhub and VisionLib can be used to run cloud-based augmented reality applications (“software as a service”). This eliminates the need for time-consuming and often manual CAD data reduction. We made it possible to routinely use augmented reality for industry 4.0 or digital twins. At the IAA we demonstrate this based on a scenario for customer services representatives on site, where they can quickly recognize a defective components on a car.

*Fraunhofer IGD*

**1** *car roof with invisible solar cells*

**2** *software as a service*

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## **EXHIBITING FRAUNHOFER UNITS**

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### **EDITORIAL NOTES**

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Picture 2, page 5 Porsche and Fraunhofer IGD,

picture 1, page 4 Fraunhofer ILT | Volker Lannert

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