

FRAUNHOFER INSTITUTE FOR STRUCTURAL DURABILITY AND SYSTEM RELIABILITY LBF

PRESS RELEASE

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Fraunhofer LBF showcases system-oriented service portfolio for the automotive sector

"Reliably mobile" - this is the motto under which the Fraunhofer Institute for Structural Durability and System Reliability LBF will be attending the "Automotive Testing Expo Europe 2013", to be held from 4 - 6 June in Stuttgart/Germany (Booth 1030). The Darmstadt-based research facility will be using selected examples to showcase its system-oriented service portfolio. The concept vehicle "Frecco 2.0", for example, will be illustrating the tremendous advances achieved in the area of electromobility; a racing car model fitted with new, robust measuring equipment will also be on show. Numerous videos focusing on subjects such as verification of durability, comfort optimization, reliability assessment and functionally integrated lightweight design offer a deep insight into these areas.

The exhibits highlight one of the Institute's unique strengths - which lies in interdisciplinary cooperation. This relates for example to the design of durable light-weight structures, the development of customized monitoring systems or the implementation of actively controlled systems for vibration reduction.

Frecco 2.0 - Small and compact outside, big inside

This prototype serves as a manufacturer-independent technology carrier for model testing with a view to coordinating all components of an electric vehicle. Research scientists at Fraunhofer LBF integrated a complete electrical drive train and developed an in-wheel electric motor. The novel model fits completely into a 15-Inch-wheel and excels through superior power density. This enables compact vehicles with a large interior space.

Well and truly shaken

The innovative electromobile was rigorously tested on Fraunhofer LBF's full-vehicle test rig. This test facility enables all relevant loads to be introduced into the vehicle body through the axles. These measurements are supplemented by numerical analyses. Specifically for testing of electrical vehicles with their heavy batteries, the full-vehicle test rig is fitted with reinforced hydraulic actuators for the introduction of vertical, side and braking loads. The test facility provides the capability of simulating all six physical degrees of freedom. Loads encountered in service were recorded by means of LBF's dedicated wheel force transducers.

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FRAUNHOFER INSTITUTE FOR STRUCTURAL DURABILITY AND SYSTEM RELIABILITY LBF**New battery protection system**

The integration of the energy storage system into electrical vehicles presents a major challenge for designers. To this end, scientists at Fraunhofer LBF developed a light-weight battery protection system. Functional integration along with cell protection were focal points of the research - the coolant for example, is routed through the supporting structure to the individual battery modules. Fiber composite sandwich panels reinforce the aluminum frame and at the same time serve as protection against penetrating objects.

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Racing car model with intelligent sensor nodes provides higher safety

A racing car model also on show at the Fraunhofer LBF booth illustrates entirely new measuring methods and capabilities and recent advances in the area of vehicle safety through new mechatronic solutions and smart structures. Four wireless sensor nodes enable monitoring of the model vehicle's shock absorbers on the basis of measured vibrations while the vehicle is in service. Vibration signals are amplified, digitized and transmitted by means of a Bluetooth link. This enables early detection of damage and condition-based maintenance and permits a more efficient use of vehicles.

A system-oriented service offering for the automotive industry

Fraunhofer LBF's business unit Automotive has an established track record in the area of R&D partnerships with renowned research, development and production facilities, both with automotive OEMs and their suppliers.

The Institute supports its customers in the area of product development with comprehensive numerical simulations, experimental testing procedures and vibration analysis. This is true both for conventional and for electrically driven vehicles. All research units cooperate closely, for example in the avoidance of undesirable noises in the vehicle, the integration of actuators/sensors whilst ensuring full functional security, or in the assessment of combined electrical, mechanical, and thermal loads acting on electronic components. In the area of functional and design polymers Fraunhofer LBF offers the entire value creation chain, from chemical material synthesis, processing and analysis right through to the fully tested system as a single-source supplier.

Celebrating Fraunhofer LBF's 75th anniversary

In 2013, Fraunhofer LBF is looking back on a 75 year long history of success, characterized by innovative research, strong partnerships and forward-looking scientists. Since its establishment, the Institute has considerably widened the range of its key competencies: Next to structural durability, the Institute's current comprehensive research portfolio also comprises smart structures, and, since mid-2012, plastics.

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New challenges such as electromobility or noise control provided a source of constant growth and have made Fraunhofer LBF a reliable and internationally recognized partner. The fourfold increase in staff over the last decade as well as numerous national and international awards are clear indicators that the success story will continue and evolve into the future under the motto: Reliability and innovation!

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Fraunhofer Frecco 2.0 concept vehicle on the full-vehicle test facility in Darmstadt.
Photograph: Fraunhofer LBF.

Fraunhofer LBF, headed by Professor Holger Hanselka, develops, assesses and implements on behalf of its customers customized solutions for mechanical engineering components and systems, in particular for safety-relevant components and systems, with light-weight construction being central to all its considerations. Next to the assessment and design optimization of passive mechanical structures, the Institute develops and implements prototypes of active mechatronic adaptive functional units. In parallel, the appropriate numerical and experimental methods and testing technologies are being developed and enhanced. The Institute's principal markets are the automotive and commercial vehicle industry, rail vehicle and aeronautical technology, shipbuilding, mechanical and plant engineering, energy generation, electrical engineering, medical engineering and the chemical industry along with other markets. The Institute's customers benefit from the superior expertise of more than 500 staff members, and leading-edge technology on more than 11,560 square meters of laboratory and test space at the Institute's Bartningstraße and Schlossgartenstraße sites in Darmstadt/Germany.

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