Press release

Holzkirchen, Germany
March 30, 2011

Picture 1: At its location in Holzkirchen, the Fraunhofer IBP has a unique Flight Test Facility (FTF). It will soon be joined by another unique testing facility, the Ground Thermal Test.
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Pro-environmental and economically airborne

The Fraunhofer Institute for Building Physics IBP and the Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM are presenting their innovations as part of the "Clean Sky" Joint Technology Initiative (JTI) at Aerodays 2011 in Madrid, Spain.

How can we make air traffic ecological and economical at the same time? Fraunhofer scientists are working on this multifaceted and decidedly difficult question under the European "Clean Sky" project. Along with reductions in emissions and noise, the project places particular emphasis on resolving questions of energy efficiency and a sustainable lifecycle. Since the beginning of the year, the Fraunhofer IBP is coordinating the contributions of Fraunhofer-Gesellschaft in the "Clean Sky" JTI, which at 1.6 billion euros is the largest European project for sustainability and competitiveness in the aviation industry. At Aerodays in Madrid, from March 30 through April 1 the IBP and the IFAM will be presenting their findings jointly with other Clean Sky partners at Stand 2.

The "Clean Sky" JTI is aptly named. After all, the project has an ambitious goal: by 2020, CO_2 emissions are to be reduced by 50 percent, nitric oxide emissions by 80 percent and noise pollution by 50 percent – along with the introduction of a sustainable lifecycle for all of the components of air travel. "In our globalized society, flying and hence the aviation industry itself continue to gain impact. Therefore it is all the more important to take account of both ecology and economy. With this in mind, the Fraunhofer Institutes participating in the Clean Sky Project are researching new architectures for aircrafts to make them more environmentally friendly while at the same time offering their passengers maximum comfort and performance," observes Dr. Klaus Breuer, Fraunhofer member of the Governing Board of the "Clean Sky" JTI.

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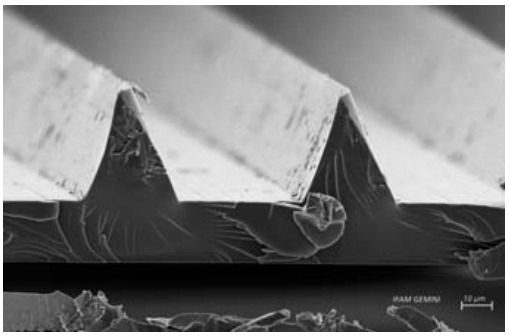

Picture 2: Scanning electron micrograph of a riblet-structured coating surface.
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At its location in Holzkirchen, the Fraunhofer IBP has a unique Flight Test Facility (FTF). There, a low-pressure chamber houses a segment of an original aircraft, 15 meters in length and with room for up to 80 test persons. In addition to experiments on cabin climate, the aircraft is also being investigated as an overall system. For instance, the cockpit, passenger cabin, avionics and cargo holds are being studied in terms of energy aspects and use requirements.
The flight laboratory will soon be joined by another unique testing facility. The Ground Thermal Test Bench will open up additional fields of research to the scientists and their partners in industry. With regard to the all-electric philosophy – the increasing use of electronics replacing hydraulics in the contol of aircraft functions – and the use of lightweight materials in the development of new aircraft, the Ground Thermal Test Bench will play a key role in the simulation and testing of new systems in light of thermal considerations. An original aircraft fuselage will be used – segmented into three typical aircraft areas (cockpit, cabin and rear) – to facilitate a very broad range of thermal measurements. The goal is to develop, validate and ultimately demonstrate innovative energy management concepts.

Those interested in learning more about innovative systems for personalized aircraft cabin environment are encouraged to attend the lecture on April 1st by Prof. Dr. Andreas Holm, division director for indoor climate at the Fraunhofer IBP. He will be speaking between 10:00 and 11:30 a.m. in the "Paris" Room at Aerodays in Madrid, addressing the forum "Ensuring Customer Satisfaction and Safety" as part of the thematic block "Towards More Electrical Aircraft and Personalized Cabin Environment".

The main R&D activities of the Fraunhofer IFAM in Bremen concern materials, suitable joining methods for materials, and their surfaces. For example, the institute has developed an innovative, riblet-structured "sharkskin" coating system which allows large, high-area structures such as aircraft to be provided with low-drag surfaces. This can reduce the wall friction resistance by up to 8 %. This consequently has enormous potential for reducing fuel consumption, reducing CO_2 emissions, and reducing costs, whilst at the same time

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protecting resources and the environment. The coating system has a microstructured surface which mimics the low drag of sharkskin. It is a UV curing system and contains nanoparticles. It is applied with a roller application unit which applies, structures, and cures the coating. This method can be readily used for 3-dimensional curved surfaces. The coating can withstand severe conditions, for example temperature fluctuations from –55 to +70 degrees Celsius, aggressive ultraviolet radiation, and very high speeds.

At Aerodays 2011 the Fraunhofer IFAM will also present novel, environmentally friendly, chromate-free, corrosion protection systems for aluminum alloys that are very effective and easy to apply. They are based on primers containing active pigments that provide cathodic protection. The pigments essentially comprise intermetallic zinc-magnesium phases. Such pigments have a corrosion potential that not only allows cathodic protection for steel, but also for common aluminum alloys. These systems are thus able to replace chromate-containing pigments, which are harmful to health and the environment. Furthermore, the corrosion products of these pigments "compact" the primer, so providing an enhanced long-term protective effect.

In addition, the "Eco Design Airframe",to which the Fraunhofer-Gesellschaft and Dassault Aviation (DAV) as coleaders extensively contribute to, is going to be presented at Stand 2. Complimentary to this Bruno Stoufflet, CTO of DAV, will be speaking at the Clean Sky Forum. His lecture is about "Life Cycle Assessment of Materials and Processes" and will take place the 31st of March between 11:40 und 13:10 in the "Londres" room.

Background information:
The "Clean Sky" Joint Technology Initiative is a private public partnership with representation by companies in the aviation sector (AgustaWestland, Airbus, Alenia, Dassault Aviation, EADS-CASA, Eurocopter, Fraunhofer-Gesellschaft, Liebherr, Rolls-Royce, SAAB, Safran and Thales) and the European Union. The Fraunhofer-Gesellschaft is closely involved in the project's overall setup and implementation. Along with Fraunhofer IBP there are nine other Fraunhofer Institutes in-

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volved in the "Clean Sky" JTI: the Institute for Chemical Technology ICT, the Institute for Manufacturing Technology and Advanced Materials IFAM, the Insitute for Structural Durability and System Reliability LBF, the Research Institution for Electronic Nano Systems ENAS, the Institute for Computer Graphics Research IGD, the Institute for Material and Beam Technology IWS, the Institute for Non-Destructive Testing IZFP, the Institute for Systems and Innovation Research ISI and Material Flow and Logistics IML. The project pursues the overriding goal of reducing the negative environmental impact of aviation while at the same time securing the leadership of European aviation in global competition. The project has been provided with a budget of 1.6 billion euros for 2008 through 2015. Some 800 million euros come from the Seventh Framework Programme on research of the EU, while the other half is being contributed by the participating partners themselves.

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