Fraunhofer

JUNE 19-25, HALL 1, BOOTH H295

PARIS AIR SHOW LE BOURGET 2017

CLEAN SKY

Clean Sky is the largest European research programme developing innovative, cutting-edge technology aimed at reducing CO2, gas emissions and noise levels produced by aircraft. Funded by the EU's Horizon 2020 programme, Clean Sky contributes to strengthening European aero-industry collaboration, global leadership and competitiveness.

Clean Sky 2 is the second part of this European research initiative in which Fraunhofer will play a continued key role. The European Commission and the private sector will together be providing a further budget of some 4 billion euros. The project is designed to complement the objectives of Flightpath 2050, which sets out a vision for air travel and aviation in the year 2050. Clean Sky 2 also takes into account the new agenda for strategic research and innovation drawn up by the Advisory Council for Aeronautics Research in Europe (ACARE). Clean Sky 2 is a private public partnership established under the Council Regulation until the end of 2024.

FRAUNHOFER TOPICS

Flying has become an essential part of modern society, a means of bringing people together as well as an instrument of global trade and economic growth. At the same time, the industry has shown itself to be sensitive to environmental concerns such as air pollution, noise and climate change. One of the central questions in this context is the question of "ecolonomy": How can air traffic become more and more ecological but at the same time remain economic?

Six Fraunhofer Units present their innovations at a theme pavilion (hall 1, booth H295).

The Fraunhofer-Gesellschaft is the leading organization for applied research in Europe. Its research activities are conducted by 66 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of nearly 24,000, who work with an annual research budget totaling more than 2 billion euros. Of this sum, around 1.7 billion euros is generated through contract research. More than 70 percent of the Fraunhofer-Gesellschaft's contract research revenue is derived from contracts with industry and from publicly financed research projects. International collaborations with excellent research partners and innovative companies around the world ensure direct access to regions of the greatest importance to present and future scientific progress and economic development.

Fraunhofer Institute for Electronic Nano Systems ENAS

Active flow control for aviation, automotive and wind energy systems can only be realized if efficient and robust actuators are available. Fraunhofer ENAS develops actuators with and without mass flow. Especially the latter, so called synthetic jet actuators, were developed to a higher degree of maturity in the projects AFLoNext and Clean Sky 2. By using novel transducer systems and integration concepts, actuators with outlet velocities larger than 100 m/s were feasible. Moreover, robustness tests were carried out which represent an important step toward application of the actuators.

Fraunhofer Institute for Building Physics IBP

The most impressive aviation installation of Fraunhofer is the unique flight test facility located in Valley near Munich.
The FTF comprises a low-pressure chamber housing a full cross section of an Airbus A310-200 front, with space for up to 80 test persons. In the frame of the Clean Sky Joint Undertaking three sections of a business jet were integrated and the Aircraft Calorimeter providing thermal shock and rapid decompression capability for a versatile test area was established, featuring:

- Temperature Range: -60°C – +120°C
- Humidity Range: 1g/kg – 200g/kg
- Pressure Range: 5hPa – 945hPa

Fraunhofer Institute for Chemical Technology ICT

Polyurethane (PUR) is a key material in aircraft interior. In a large passenger aircraft the amount of seats and cushion material is significant to the overall weight and has a high impact on the recycling strategies needed for these airplanes. New developments allow the substitution of harmful substances in the production process of the foams and the use of renewable raw materials. Renewable raw materials are a key element in becoming independent from fossil carbon sources which will offer a better availability and lower fluctuations in prices.

Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM

Automated printing of large structures using novel ink systems
Direct Printing is a novel technology that allows large and complex designs to be directly printed on large structures. The way this done is similar to the functioning of an inkjet printer. Up until now aircraft have only been coated or adhesive films or airbrushes had to be applied for more complex motifs and logos. These options were costly and time-consuming. The new printing technology utilizes a high-precision linear axis system with the printhead automatically moving line by line across the component. Direct Printing enables realistic images, color gradients, and logos with sharp edges to be applied in a single step, so considerably reducing the processing time and weight. The project work involves the development of solvent-based and UV curing printing inks and interactions between the printhead and ink system.

Fraunhofer Institute for Production Technology IPT

The "Turbomachinery" business unit of the Fraunhofer IPT researches and develops technologies for the production and repair of turbo engine components. The integration of machines into a Smart Manufacturing Network and protocolling all changes of a component's geometry throughout its life cycle by using "digital twins" opens up the possibility to combine models and simulations in a CAx environment with machine-integrated measurement technology. By recirculating these measuring data into process planning and ultimately into the ongoing production process, we are taking the optimization of turbo engine manufacturing processes to new levels.

FRAUNHOFER SPACE ALLIANCE

Bringing together 15 institutes, the Fraunhofer Space Alliance conducts applied research in the field of industrial space technology.

Weather forecasts, navigation, real-time transmission for satellite TV or global Internet access – space industry applications and services have become an indispensable part of daily life, underpinning the importance of space technology for a modern industrialized society. In the Fraunhofer Space Alliance, the institutes pool their technological expertise in order to provide the industry and funding agencies such as the European Space Agency (ESA) and the European Commission with a central contact. Fraunhofer acts as systems provider, developing a wide range of top-quality components, integrating them into an overall system and delivering that system to the customer. The sheer technological variety of the participating institutes enables the Fraunhofer Space Alliance to offer its customers a unique range of services. Its business units are Communication and Navigation, Materials and Processes, Energy and Electronics, Surfaces and Optical Systems, Protection Technology and Reliability and Sensor Systems and Analysis.

SPACE PROJECTS

CFRP for Optical Applications

- New coating and finishing processes for CFRP-based optical components
- More than 80 percent weight reduction compared to full-metal components
- Prototype: optical mirror made from electroless nickel plated CFRP

Project Overview:

- CFRP substrate developed and produced by IAP-PYCO
- Coating process developed by Fraunhofer IST
- Ultraprecision turning processes developed by Fraunhofer IPT

Experimental Spacecraft based on Nanosatellite Technology ERNST

Fraunhofer EMI currently designs, integrates and tests the 12U nanosatellite platform ERNST. Its main objective is to evaluate the utility of a 12U nanosatellite mission built on CubeSat components for scientific and military purposes.

The main payload is an advanced MWIR camera for monitoring the Earths infrared background (developed by FraunhoferEMI and Fraunhofer IOSB). In addition, there is a radiation sensor for in orbit measurements (developed by Fraunhofer INT).

FRAUNHOFER EXHIBITOR OVERVIEW

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SHORT LECTURES

To learn more about Fraunhofer Aerospace Technologies we would like to invite you to join our short lectures covering topics such as smart manufacturing, sustainable materials, environment simulation, novel concepts for space systems and many more.

The short presentations (10 minutes each) will take place at the front of our booth next to the reception desk (H295, Hall 1).

SHORT LECTURES

TUESDAY, JUNE 20, 2017

09:00	*The Fraunhofer Co-Validation Methodology with the Clean Sky Indoor Environment Simulation Suite* **Andreas Lindner, Fraunhofer IBP**
10:00	*Comfort for Body and Conscience: Sustainable Raw Materials for Aircraft Seating Cushions* **Bert Käbisch, Fraunhofer ICT**
11:00	*New coating and finishing processes for CFRP-based optical components* **Andreas Dietz, Fraunhofer IST**
12:00	*Networked, Adaptive Production in the Smart Manufacturing Network* **Sven Jung**

SHORT LECTURES

WEDNESDAY, JUNE 21, 2017

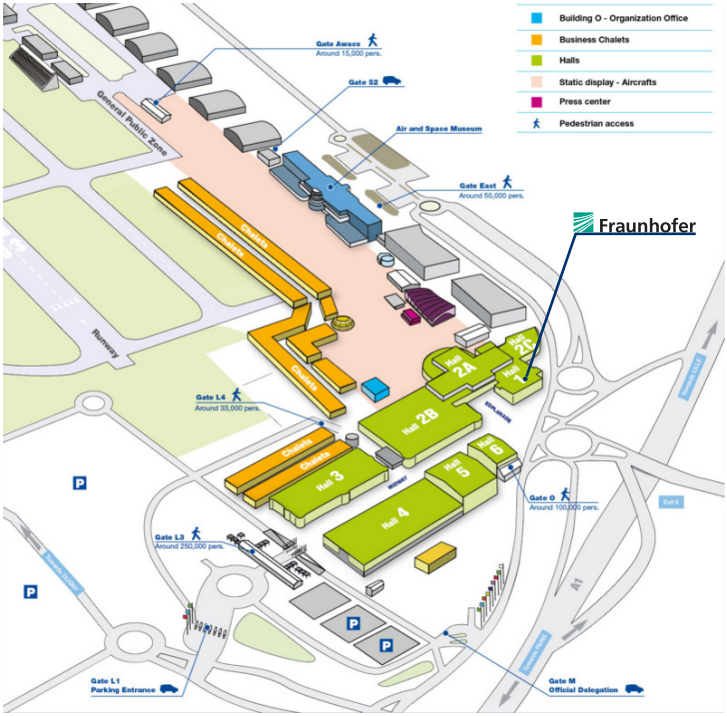
09:00	*Comfort for Body and Conscience: Sustainable Raw Materials for Aircraft Seating Cushions* **Bert Käbisch, Fraunhofer ICT**
10:00	*The Fraunhofer Co-Validation Methodology with the Clean Sky Indoor Environment Simulation Suite* **Andreas Lindner, Fraunhofer IBP**
11:00	*New coating and finishing processes for CFRP-based optical components* **Andreas Dietz, Fraunhofer IST**
12:00	*Active Flow Control: Pulsed and Synthetic Jet Actuators* **Mathias Lipowski, Fraunhofer ENAS**

SHORT LECTURES

THURSDAY, JUNE 22, 2017

09:00	*Advanced Machining for Turbomachinery Manufacturing* **Philipp Ganser, Fraunhofer IPT**
10:00	*Comfort for Body and Conscience: Sustainable Raw Materials for Aircraft Seating Cushions* **Bert Käbisch, Fraunhofer ICT**
11:00	*New coating and finishing processes for CFRP-based optical components* **Andreas Dietz, Fraunhofer IST**
12:00	*Active Flow Control: Pulsed and Synthetic Jet Actuators* **Mathias Lipowski, Fraunhofer ENAS**

LOCATION


Building O - Organization Office
Business Chalets
Halls
Static display - Aircrafts
Press center
Pedestrian access
Gate Awacs
Around 15,000 pers.
Gate S2
Air and Space Museum
General Public Zone
Gate East
Around 50,000 pers.
Chalets
Runway
Fraunhofer
Hall 2C
Hall 2A
Hall 2B
Gate L4
Around 33,000 pers.
Chalets
Chalets
Hall 3
Hall 5
Hall 6
Hall 4
Gate O
Around 100,000 pers.
Gate L3
Around 250,000 pers.
Gate L1
Parking Entrance
Gate M
Official Delegation

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