

EMuS2020 – Tentative program

The EMuS2020 conference brings together research scientists and R&D managers of industries with the aim to share knowledge about development of large, lightweight integrated aero-structures with multifunctional capabilities. The benefits of weight reduction and the lowering of recurring costs in aircraft production can only be achieved by an interdisciplinary approach. Scientists and research engineers from the CleanSky2 project [Next Generation Multifunctional Fuselage Demonstration](#) and the Horizon2020 project [Advanced Concepts for Aero-Structures with Integrated Antennas and Sensors \(ACASIAS\)](#) will present the last advances in multifunctional structures from their respective projects. These projects aim to reduce fuel consumption of future aircraft by improving aerodynamic performance, by facilitating integration of new and efficient propulsion systems and by reducing weight. By doing so, they will reduce CO₂ and NO_x emissions from aircraft and will contribute to make aviation more sustainable.

In the following is included a tentative program in which are described some of the sessions already organized for the conference.

Tuesday, November 17th, 2020

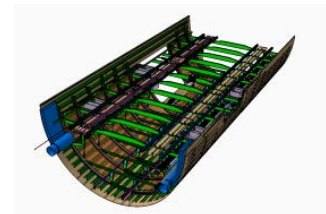
Starting at 10 am

All times are CET

SESSION 1: The next generation Multifunctional Fuselage Demonstrator — leveraging thermoplastics for cleaner skies

Keynote by Ralf Herrmann (Airframe Research & Technology Typical Fuselage, Airbus) followed by contributed papers

By greater integration of structure, systems and interior elements into the aircraft fuselage it becomes viable to reduce the amount of successive steps in the production of aircraft. New thermoplastic joining technologies enable moulded elements to be combined into larger components as part of the multifunctional fuselage demonstrator. Speakers will present the efficient manufacturing of thermoplastic structures and testing the joining technologies.



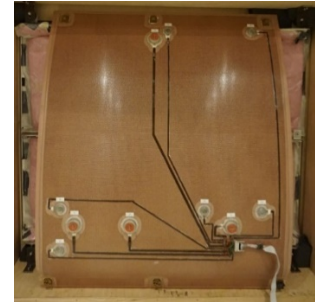
SESSION 2: Open session on Multi-Functional Structures

Keynote by Thanos Dafnis (RWTH Aachen) followed by contributed papers

SESSION 3: Presenting: a new lining panel with integrated active acoustic control

Keynote by Manfred Nader (Linz Center of Mechatronics) followed by contributed papers

Novel propulsion systems such as Counter Rotating Open Rotor (CROR) engines are a promising concept to reach a resource efficient transport, able to realize up to 25% fuel and CO₂ savings. But the CROR engines have a main disadvantage: the radiation of annoying multi-tonal noise leading to high sound pressure levels in the cabin. The noise levels in the cabin can be reduced by the integration of an active noise reduction into a lining panel. Papers will address the efficient manufacturing of the lining panel with integrated wiring, sensors and actuators, the development of the control system as well as the acoustic testing at DLR. The availability of such lining panels will facilitate the installation of CROR engines in the future but also retro-fitting of existing propeller aircraft.



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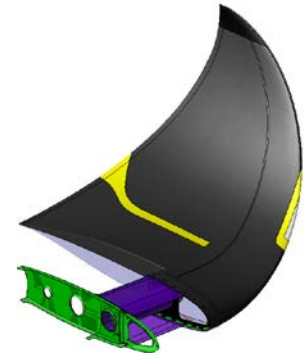
Wednesday, November 18th, 2020

Starting at 10 am

SESSION 4: New Challenges: Integration of antennas in load-bearing aerostructures

Keynote by Marta Martinez-Vazquez (Senior Antenna Engineer, IMST) followed by contributed papers

The successful design of winglets and fuselage panels with integrated antennas involves many challenges and requires knowledge of multiple disciplines: aerodynamics, structural stress analysis and electromagnetics. In this context integration means that the antennas are flush with the fuselage skin on the outside of the aero structure, while maintaining the structural properties of the load bearing structure. The antennas are developed to resonate at several frequency bands. The skins of these structures are made out of Carbon Fibre Reinforced Plastic (CFRP) with integrated Glass Fibre Reinforced Plastic (GFRP) “windows” to allow the antenna to radiate. Structural analyses and testing support the design of the transition between the CFRP and GFRP skin. Electromagnetic analyses and Radio Frequency (RF) testing of antenna breadboards are required for the successful design of integrated antennas. Papers will address the structural and RF characteristics of the aerostructures with fully integrated antennas.



SESSION 5: Open session on multifunctional structures

Session with contributed papers

14.30h Industrial Forum

Opening and welcome

Impact of multifunctional structures for industry with participation of Royal NLR, DLR, GKN Fokker, EVEKTOR, INVENT, IMST, TRACKWISE

Panel discussion with industry partner

The main achievements of the ACASIAS project are novel technologies for the efficient manufacturing of fuselage panels and winglets with structurally integrated antennas. Four smart aircraft structures with conformal antennas have been developed. At the Industrial Forum we will present the results and prototypes, the recent advances made on mechanical structures with multiple functions, including their manufacturing, and discuss with the industry how the innovations as presented at EMuS2020 can help to develop their aircraft for a more efficient and sustainable aviation.

Industrial forum networking sessions:

Opportunity for online networking sessions with project members of ACASIAS and STUNNING

Industry companies are invited to participate in one-on-one network sessions to get more information and ask individual questions to the scientific team members.

For more information please contact EMuS2020@cimne.upc.edu

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