Colloquium Thermo- and Fluid Dynamics

On the Application of Lattice Boltzmann Method to sUAS and eVTOL Aeroacoustics

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The lecture focuses on the emerging application of electric Vertical Take-Off and Landing (eVTOL) vehicles and small Unmanned Aerial Systems (sUAS) aeroacoustics, by covering fundamental aspects related to the simulation of transitional flow for broadband noise prediction, ground effects in multi-copter systems, and software technological aspects related to the complexity of the digital model and the required computational resources. After an introduction to the Lattice-Boltzmann method and the very large eddy simulation turbulence model, results for relevant benchmark problems are discussed. Finally, a multi-fidelity framework for eVTOL flight-mission and community noise assessment is presented.

Damiano Casalino (DC) - PhD in fluid dynamics (Turin Polytechnic) and acoustics (Ecole Centrale de Lyon) - has research interests in aeroacoustics that cover frequency-domain CAA for duct acoustics and installation effects, sound propagation in sheared flows, integral methods, stochastic noise generation, helicopter trajectory optimization, vortex-airfoil interaction, acoustic liners and porous treatments. DC is currently R&D director at Dassault Systèmes and chair of aeroacoustics in the aerospace faculty of Delft University of Technology. His main focus is on the industrial exploitation of the Lattice-Boltzmann method for airframe and engine noise prediction. More recently, DC has started developing methodologies for Urban Air Mobility and Wind-Energy applications.

Date: Wednesday, 20 November 2024
Time: 16:15 - 17:15 h
Place: ETH Zurich, ML F 36
Host: Prof. Nicholas Noiray

Further information: https://ifd.ethz.ch/events/ktf.html

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