

Open PhD Position, Ecole Centrale de Lyon, Centre Acoustique

Theoretical and experimental study of the aerodynamic noise from generic configurations of wing-propeller architectures for DEP (Distributed Electric Propulsion)

Offer Description

The LMFA (*Laboratoire de Mécanique des Fluides et Acoustique*) of ECL (*Ecole Centrale de Lyon*) offers a PhD-student position in the field of rotating-blade aeroacoustics. The research will be part of the contribution of ECL in the European Project ENODISE (ENabling Optimized DISruptivE airframe-propulsion integration concepts). It is aimed at optimizing generic wing-propeller configurations through a parametric study, using both analytical models and experiments performed in an open-jet anechoic facility. The addressed configurations (mimicking Distributed Electric Propulsion systems for future urban air vehicles) include two small-scale propellers and a rectangular wing, the relative positions of which can be adjusted. The study will assess aerodynamic and acoustic effects of the wing-propeller coupling. The coupling involves: 1 - scattering of propeller noise by the wing, 2 - modification of propeller noise due to the aerodynamics of the wing, and 3 - possible modification of the aerodynamic efficiency of the wing by the installation of propellers. Propeller synchronization will be also investigated. The final goal is the determination of a multi-criterion optimum, associating minimum noise and maximum aerodynamic efficiency. In a second step, the possibility of further noise reduction by means of leading-edge serrations will be assessed. Finally, the analytical models of propeller noise radiation will be adapted to a ducted tandem contra-rotating propeller tested by other partners of the project.

The candidate will be hosted by the Acoustic Center of LMFA. The research will imply collaboration with the TUD (Technical University of Delft (NL)) and the VKI (Von Kármán Institute, Brussels (BE)).

Applications are required before July the 31st, 2020.

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