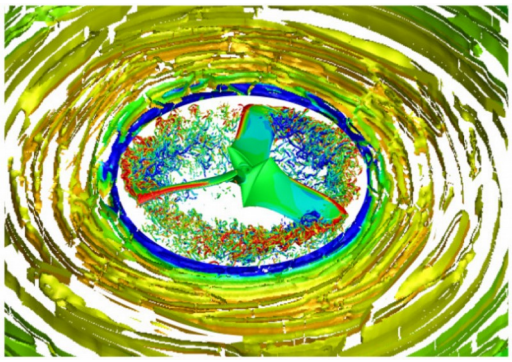
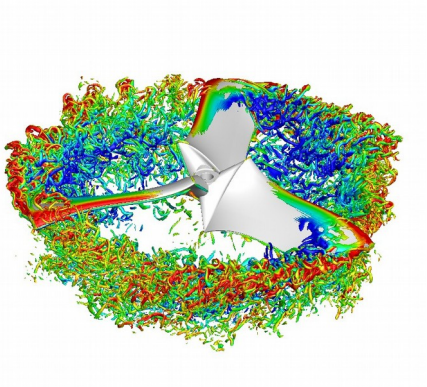
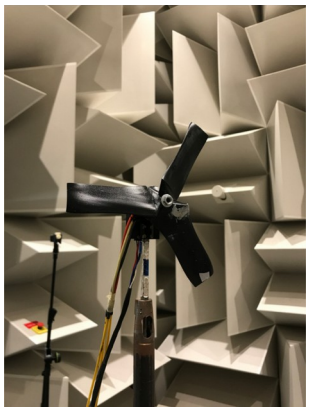
Post-doctoral position at ISAE-Supaero
Towards Silent Micro Air Vehicles

Supervisors: Jean-Marc Moschetta, Marc C. Jacob.
Duration: 12 to 36 months.
Location: ISAE Supaero, DAEP, Toulouse, France.
Starting: January 2018
Contact informations: jean-marc.moschetta@isae.fr, +33 (0) 561338104

Context:
The demand in Micro-Air Vehicles (MAV) is increasing as well as their potential missions. Whether for discretion in military operations or noise pollution in civilian use, noise reduction in MAV is a goal to achieve. Aeroacoustic research has mainly been focusing on full scale rotorcrafts, now yielding significant improvements and original shape designs. An active field of research at ISAE Supaero is dedicated to conduct aeroacoustic research in the relatively low Reynolds number range where MAV evolve to reduce the noise produced by the rotors. Thanks to an in-house optimization tool that combines BEMT, FW-H analogy and broadband noise models, written in Matlab, a significant first step has been achieved in 2017. The acoustic power was reduced by 10 dB(A) and the power consumption was reduced by 15%. This allows ISAE Supaero to lead innovation in this area. In addition, the department for aerodynamics at ISAE Supaero (DAEP) provides exceptional facilities to support aeroacoustic investigations with an anechoic chamber and an aeroacoustic wind tunnel coupled with high fidelity numerical simulations (LBM-LES) and aeroacoustic analogies (FW-H) or propagation codes (LEE). Strong interactions with these other departments at ISAE and industrial partners are encouraged.

Position objectives:
Multiple tasks can be addressed in this post-doctoral position. On the numerical side, an objective is to consolidate the broadband noise models and in particular, take into account the noise from vortex shedding and/or from the tip vortex. Another objective is to enhance the optimization tool by considering unsteady aerodynamic effects. In addition, investigations from high fidelity numerical simulations can be considered. On the experimental side, the measurement procedure could be enhanced and installation effects should be characterized.

Applications:
The applicant should have a PhD in a relevant field (aeroacoustics and/or fluid mechanics) and feel at ease in UNIX environment and Matlab programming. Skills in experimental work would be suitable.