



Fondation de Coopération Scientifique Sciences et Technologies pour l'Aéronautique et l'Espace

Office National d'Etudes et de Recherches Aérospatiales
"Aerodynamic and Energetic Modeling Department"

Post-Doctoral Position

« Closed-loop control of the wake trailed by a thick flat plate through Plasma Synthetic Jets actuation »

Context and scientific objectives

In order to increase the aerodynamic performances of an aircraft and to lower its environmental impact, various strategies are nowadays being explored in the aerodynamic research community. Of particular interest, altering the topology and the dynamics of a flow using simple, robust and efficient actuators, is regarded as a promising research area. The CARPE project (Active and Robust Control of Flow past a Flat Plate), in which the present work is to be conducted, aims at developing further this complex, cross-disciplinary area through the gathering of various academic experts in domains such as control and experimental, theoretical and computational fluid mechanics. This national project is divided in two parts: a first one focuses on theoretical models and numerical simulations, and a second one focuses on the realization of an experimental demonstrator. Tightly linked, these two tasks aim at defining new closed-loop control strategies – with an emphasis on robustness – of experimental flows trailed by a thick flat plate ended with a cap.

Workplan

As part of the research group “Control by Plasma” in the TACT unit (Thermics, AeroThermoDynamics, Control by Plasma and Turbulence) of ONERA, and in the framework of the CARPE Project gathering researchers from IMFT, IMT, ONERA, ISAE and LAAS laboratories, the candidate will have to conduct an experimental campaign of wake control using plasma actuators. More precisely, the following tasks will be carried out:

- Design of the model following specifications provided by the partners: definition of the characteristics of the plasma actuators, their positioning, as well as the locations of the unsteady pressure transducers for closed-loop control.
- Experimental characterization of the actuators, participation through these measurements to the definition of the numerical/theoretical model used by partners, and thus participation to the design of the closed-loop control strategy.
- Wind tunnel experiments for the characterization of the dynamics of the flow and its interactions with the actuators; analysis of the flow and adjustment of the control laws; implementation of the closed-loop control and realization of the technological demonstrator.

Profile

PhD obtained in experimental Fluid Mechanics. Experiences in aerodynamics, flow control, and measurement techniques in wind tunnel environments are desired.

Employer: RTRA - STAE Toulouse - Fondation de Coopération Scientifique Sciences et Technologies pour l'Aéronautique et l'Espace

Hosting laboratory:

ONERA - “Aerodynamic and Energetic Modeling” department (DMAE) - Toulouse

Duration: 18months (beginning between October 2014 and January 2015)

Salary: depending of the experience in research, the net salary will be from 2200 to 2500 € per month.

Other specification: the candidate must have spent at least one year outside Toulouse after its PhD defense if done in Toulouse.

How to postulate ? Please send to daniel.caruana@onera.fr a complete CV with a list of publications, a motivation letter and at least one recommendation letter.

Daniel Caruana - daniel.caruana@onera.fr - <http://www.onera.fr/en>

ONERA-DMAE – BP 74025 - 2 av. Edouard Belin – 31055 Toulouse Cedex 4, France