



Institut Supérieur de l'Aéronautique et de l'Espace

RESEARCH MASTER INTERNSHIP

Department of Aerodynamics, Energetics and Propulsion

Supervisors :

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INTERNSHIP DESCRIPTION

Domain : Aerodynamics, Propulsion

Title : **FLOW SEPARATION AT THE AIR INTAKE OF A NACELLE
IN LATERAL WIND**

Research program: The flow control at the intake of a nacelle with lateral wind is of first interest for aircraft manufacturers. They wish to broaden the engine flight domain without total pressure distortion. To define control strategies we need to characterize the separation pattern as a function of the physical parameters. This work benefits from collaborations with Airbus France.

Objective of the project: in this context, the project will consist in carrying out numerical simulations in order to characterize the separation at the air intake of a nacelle as a function of the flight conditions (angle of attack, yaw angle, mass flow rate, and swirl). In the first part, we will try to define a numerical methodology (mesh, flow domain, RANS/URANS modelling) to perform three-dimensional simulations. In the second part, we will focus the analysis of the topology of the separation region for a reference test-case. Next, we will proceed to a sensitivity analysis of the separation region to numerical settings and physical modelling.

This work will benefit from an experimental study done in parallel, in the large wind-tunnel of ISAE, in the frame of another student project. This project may be followed by a PhD Thesis which combine numerical and experimental approaches to design a demonstration platform of the three-dimensional separation control.

10 % Theoretical Research

80 % Applied Research

10 % Experimental Research

Possibility to go on a Ph.D.:

Yes

No

APPLICANT PROFILE

Knowledge and required level:

Fluid Mechanics, Unsteady flows, Numerical Flow Simulation

Langages/Systèmes Unix, MATLAB, C++

Applications should be sent by e-mail to the supervisor.