



INTERNSHIP 6 MONTHS YEAR 2020

Internship tutors:
Joel JEZEGOU – Juan RUSCIO
joel.jezegou@isae.fr
Juan.ruscio@isae-supaeero.fr

Internship with ISAE SUPAERO - Toulouse

Location: **ISAE SUPAERO - Toulouse**

Starting Date: between 01/03/2020 to 30/06/2020

Duration : 6 months

Title : MODELIZATION OF PROPELLER-WING INTERACTIONS FOR PRELIMINARY DESIGN OF DISTRIBUTED PROPULSION AIRCRAFT

ISAE-SUPAERO is an institute dedicated to aerospace engineering higher education and research. ISAE-SUPAERO develops a research focused on the future needs of aerospace or high-tech industries.

The ISAE-SUPAERO Department of Aerospace vehicles design and control (DCAS) supports activities related to the design and development of aerospace systems. The DCAS researchers belong to three research groups:

- Aerospace vehicle design
- Decision and Control
- Neuro-ergonomics and human factors

The research groups collaborate on the following topics:

- Design and operation of safer aircraft
- Integrated multidisciplinary design of aircraft
- Advanced space concept.

The internship is related to the multidisciplinary design of innovative CS-23 aircraft architectures, as part of research chair ISAAR (Innovative Solutions for Aircraft Architectures & Regulation). The intern will be integrated in the Aircraft Design research team of DCAS Department.



NASA X-57 Maxwell © NASA

The final purpose of the internship is to be able to evaluate and properly calculate, at aircraft level, in conceptual and preliminary design, the influence of propeller-wing interaction for traditional, wing-distributed-propulsion and wingtip-propulsion CS-23 aircraft architectures.



EcoPulse demonstrator © Daher

The objectives of the internship are :

- To establish a state-of-the-art review of models for the evaluation of wing-propeller interaction and its influences on aircraft aerodynamics properties;
- To theoretically develop parametric low- and medium-fidelity models to estimate the influence of wing-propeller interaction on aircraft aerodynamic properties for abovementioned aircraft architecture;
- To code the models in appropriate package(s) and integrate them in the sizing loops of the Overall Aircraft Design platform FAST (programming language: Python); the selection of the relevant design variables and interfaces to consider for integration in FAST will be done in collaboration with the team in charge of FAST development;

- To refine, as much as necessary, the models that have been proposed (e.g. VLM for interaction evaluation, electrical engine characteristics, propeller);
- To run some case-studies in FAST and evaluate the results to improve the models.

REQUIRED SKILLS

Skills : Aerodynamics, Propulsion, Aircraft architecture, Systemic interdisciplinary background, Python coding
Soft skills : autonomy, curiosity, innovation

APPLICATION FOR INTERNSHIP

To apply : CV and motivation letter to be send by email to Joël JEZEGOU (joel.jezegou@isae.fr)

For further information: please contact Joël JEZEGOU (joel.jezegou@isae.fr)