Title: ENERGY HYBRIDIZATION FOR PROPULSION IN GENERAL AVIATION DEP (distributed electric 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.

The final purpose of the internship is to be able to evaluate, in conceptual and preliminary design, the hybridization (fuel/electric) of propulsion at aircraft systems level for a given TLAR (X-57 / Ecopulse project).

The objectives of the internship are:

- To establish a state-of-the-art review of models for the evaluation of energy hybridization for aircraft propulsion;
- To develop parametric low- and medium-fidelity models (mass, volume, energy, power) for abovementioned aircraft architecture;
- To develop the new aircraft mission computation logic (electricity/fuel propulsion management);
- To code the models (energy generation and distribution + new mission propulsion management) in appropriate packages (possibly OpenMDAO modules) and integrate them in the sizing loops of the Overall Aircraft Design platform FAST (programming language: Python);
- To run study cases in FAST, evaluate the results, and perform overall aircraft design energy hybridization optimization.
• The intern will be interacting with the DEP aerodynamics team member in order to define boundaries of aero propulsive interaction with the electric source of power (order of magnitude of propeller RPM, power demand, etc).

REQUIRED SKILLS

Skills: Aircraft performance, Aircraft design, Python.
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) and Juan Pablo RUSCIO (juan.ruscio@isae-sup.aero.fr)

For further information: please contact the above mentioned contacts.