	INTERNSHIP 5-6 MONTHS **YEAR 2021**
Internship tutors: Emmanuel BENARD emmanuel.benard@isae-supaero.fr Martin DELAVENNE martin.delavenne@isae-supaero.fr	Internship with ISAE SUPAERO – Toulouse Location: **TBD** Grant: standard ISAE rates, approx. 600 euros/ months

Title : Geometry and mesh process for high-fidelity computations in aircraft design context

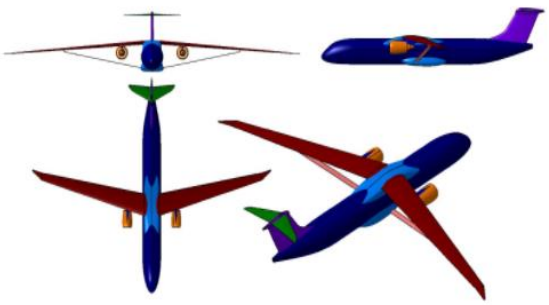
Context:
ISAE-SUPAERO is an institute dedicated to aerospace engineering higher education and research. ISAE-SUPAERO develops a research focused on the future needs of aerospace or high-tech industries. The ISAE-SUPAERO Department of Aerospace vehicles design and control (DCAS) supports activities related to the design and development of aerospace systems.

The internship subject is within the scope of the chair AIRBUS-ISAE CEDAR II for Eco-Design of Aircraft. This chair is intended to conduct different actions in order to contribute to the sustainable development of future air transportation, taking into account the many dimensions of that ambition (environment, society, economic & industrial issues …). This internship is also related to the European project U-HARWARD which aims to study high-aspect ratio wings concepts. The analysis of these configurations necessitates higher fidelity methods (such as CFD) than those currently used in aircraft design tools.

Objectives:
This internship proposes to develop a process to generate parametric geometries and meshes dedicated to high-fidelity analysis.

Missions:

- Benchmark the open source CAD solutions for parametric geometries;
- Wrap the selected tool in a module able to generate a geometry based on global aircraft design parameters (e.g. Fuselage length, wing plane form, wing profiles …). Generation of other geometries, such as nacelles and propellers, will also be explored;
- Identify mesh tools compatible with open source CFD solvers (OpenFoam, SU2, ADFlow, …);
- Develop methods for mesh refinement at interfaces (wing / fuselage, wing / strut, wing / pylon) a particular focus should be on strut-braced wings configuration;
- Develop the integrated tools gathering parametric geometry and mesh;
- Apply the solution on PADRI / CRM configuration(s).



PADRI Configuration from [1]

[1] Aeronautic and aerospace European platform website, https://aerospace-europe.eu/case-studies/a-common-platform-for-validation-of-aircraft-drag-reduction-technologies/definition-of-the-test-case/

REQUIRED SKILLS

Skills : Python Programming (essential), knowledge of parametric CAD, knowledge of CFD (Fluent, starCCM+, …)
Soft skills : Autonomy, Curiosity, Innovation, Aviation