Internship : Flexible Aircraft Dynamics and Control

PARTENAIRES

Key words: UAV, Stall, Drone, CFD, Experimental, Flexible, Aircraft, Dynamics, Control, Closed-Loop

Department: DRRP-DAEP

JOB DESCRIPTION:

The flexibility of aircraft structures plays a crucial role in the design of high-altitude, highly efficient, and long-endurance vehicles. For such configurations, the traditional assumption of a fully rigid airframe is no longer valid. This structural flexibility directly impacts flight dynamics, stability, and control design.

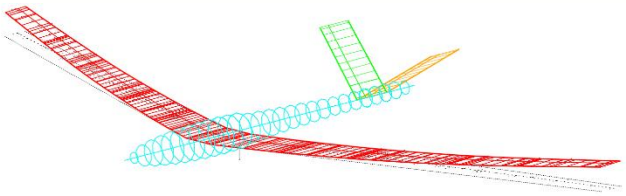
The internship offers the opportunity to contribute to an active research area at the intersection of aerodynamics, structures, and control, with potential applications in next-generation UAVs and high-altitude, long-endurance platforms.

MISSIONS:

This internship will focus on addressing the challenges of flexible aircraft dynamics and control. One of the two possible directions will be pursued:

- **Theoretical/Simulation-based approach:** Investigate the gust resilience of flexible, closed-loop controlled aircraft through a variety of design and control scenarios. This will involve developing or using simulation tools (ASWING) to assess how different controller architectures or structural properties affect flight performance and robustness.
- • **Experimental/Practical approach:** Develop and test a flexible UAV demonstrator. The work will focus on designing and flying a fixed-wing UAV, followed by iterations on the

control system to improve performance and resilience. The goal is to bridge theoretical insights with practical validation.



SuperFLEXOP aircraft, modeled in ASWING

Fixed-Wing UAV in flight, from https://universe.roboflow.com/project-pcgth/fixed-wing

REQUIRED PROFILE:

- 3A / Master Student / Advanced Master
- Strong spoken and written English (French is optional)
- Mechanical or Aerospace background
- Programming in Matlab and/or Python (Fortran is a plus);
- UAV hands-on experience and CAD design skills appreciated.
- LaTeX, GitHub, Linux are highly appreciated

STARTING PERIOD: Spring Semester 2026
COMPENSATION: 600 €/ mois
DURATION: 4-6 Months
LOCATION: ISAE-SUPAERO (DAEP, Building 38) and ENAC (Ziegler Building), Toulouse

RESPONSIBLE OF THE SUBJECT:

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APPLICATION PROCESS: Applicants should submit their CV via JobTeaser (link or QRcode) with a brief cover note highlighting your relevant skills, experience, and motivation for this internship.

https://isae.jobteaser.com/fr/job-offers/5f2cc376-5543-46c5-b3c8-49f3b6c76b6e-isae-supaero-enac-internship-proposal-flexible-aircraft-dynamics-and-control