DYNAMIC SOARING

PARTENAIRES

AGENCE INNOVATION DÉFENSE

Key-words: Aircraft performance, Flight mechanics, Atmospheric energy harvesting

Department: Aerodynamics, Energetics and Propulsion

You are passionate about aerodynamics, flight dynamics, and new propulsion strategies? Join our team to explore *Dynamic Soaring*, a flight technique inspired by seabirds that enhances drone endurance by exploiting wind gradients. This postdoctoral position offers a unique opportunity to combine experimental measurements and advanced simulations to better understand and master this innovative flight strategy.

JOB DESCRIPTION:

Dynamic Soaring (DS) is a flight strategy that exploits wind gradients to increase the energy of an aircraft without active propulsion. Inspired by seabirds, this technique extracts kinetic energy from wind variations, thereby improving drone endurance in flight.
This postdoctoral position is part of advanced research aimed at better understanding and exploiting this strategy by combining experimental measurements and flight dynamics simulations.

MISSIONS:

The main objective is to characterize the atmospheric environment and analyze Dynamic Soaring flight performance using advanced simulations and experimental tests.
The postdoctoral researcher will contribute to the following activities:

1. **Acquisition and analysis of experimental data**

- Implementation and operation of a vertical Doppler lidar to profile winds at altitude.
- Analysis of wind speed and direction variations to identify areas favorable for Dynamic Soaring.
- Advanced data processing and validation of measurements by correlation with other meteorological sensors.

2. **3D dynamic simulation of Dynamic Soaring**

- Development and improvement of DS flight simulation models based on the data collected.
- Optimization of trajectories and validation of models through comparison with experimental data.
- Study of energy performance and aerodynamic constraints of DS flight.

3. **Preparation and execution of flight tests**

- Development and integration of onboard sensors for wind gradient estimation.
- Design of a robust methodology for in-flight data acquisition.
- Supervision and analysis of test campaigns in real conditions.

REQUIRED PROFILE:

- PhD or research engineer in aeronautics, fluid mechanics, or a related field.
- Expertise in aerodynamics, flight dynamics, and numerical simulation.
- Proven experience in experimental data processing and scientific programming (Python, MATLAB, etc.).
- Experience in flight testing and instrumentation would be a plus.
- Ability to conduct independent research and publish in scientific journals.

COMPENSATION: According to experience

DURATION: 12 months (renewable)

LOCATION: TOULOUSE

RESPONSIBLE OF THE SUBJECT:

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TÉL. : /

APPLICATION PROCESS:

Interested candidates are invited to submit:

- A detailed CV
- Scientific publications representative of their expertise

REFERENCES: /