JOB OFFER – POST-DOCTORAL

Next Generation Installed Propeller Simulations

OFFER INFORMATION

Reference: AAM-2026-MAR-01
Team: AAM

Lieu : 42 Avenue Gaspard Coriolis – 31057 Toulouse

Contact person:

- Thomas Marchal, tmarchal@cerfacs.fr

Period: 1 year – from January 2026
Salary: 42 K€/year (gross)
Level of education required: PhD

Keywords: Aerodynamics, Acoustics, Turbomachinery, High performance computing

CERFACS

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HOSTING TEAM - AAM

The Advanced Aerodynamic & Multiphysics (AAM) team is dedicated to developing cutting-edge numerical methods, physical modeling, and High-Performance Computing (HPC) techniques for new Computational Fluid Dynamics (CFD) solvers. The work focuses on fluid dynamics simulations for aircraft, rockets, and turbomachinery, in close collaboration with Cerfacs partners.

CONTEXT

Propeller engines (such as turboprops and Open FAN) represent one of the promising solutions being considered to reduce the environmental impact of aviation in the near future. Their potential to improve fuel efficiency and decrease CO_2 emissions makes them an attractive option for sustainable aircraft propulsion. However, these configurations raise significant challenges related to aerodynamic interactions with the airframe and nacelle, as well as the generation and propagation of noise.
To anticipate potential performance and certification issues, it is essential to identify the most suitable computational practices for simulating both the aerodynamic performance and the acoustic footprint of such engines. High-fidelity CFD simulations offer a pathway to deepen the physical understanding of these complex interactions and to guide design choices in the context of greener aviation.

MISSION

The postdoctoral researcher will:

1. Perform advanced CFD simulations to capture the unsteady aerodynamics of propeller–airframe and propeller–nacelle interactions.
2. Analyse the resulting aeroacoustics field, focusing on noise generation mechanisms and their propagation.
3. Evaluate the numerical methods and modelling approaches available in CODA, identifying strengths and limitations in predicting coupled aerodynamic–acoustic phenomena.
4. Propose methodological improvements and solutions to overcome computational bottlenecks, such as meshing strategies, turbulence modelling, or acoustic prediction techniques.
5. Collaborate closely with Airbus flight physics and acoustics teams through regular technical meetings, ensuring that the research outcomes align with industrial needs.

Beyond the physical analysis of the simulated configurations, this study aims to consolidate CODA as a robust and efficient tool for industrial-scale aerodynamic and aeroacoustics applications, while also contributing to the broader objective of reducing aviation's environmental footprint.

DESIRED PROFILE

- PhD defended less than 3 years ago.
- Abilities:
  - Capacities for analysis and synthesis
  - Innovation capacity
  - Relational qualities
  - Rigorous
  - Ability to work independently
- Background required:
  - Numerical simulation
  - Fluid dynamics
  - C++ and Python
  - Language: French or English

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HOW TO APPLY?

To apply, please send your CV and cover letter to **tmarchal@cerfacs.fr**, applications are open until **31/12/2025**.

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