



Optimization of Interfaces for Real-Time Co-Simulation and Control Integration

Offer

Contract Type: Internship

Location: Paris suburbs – Massy (91)

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About SpaceDreamS

Founded in 2021 and based in Paris and Toulouse, SpaceDreamS are spaceport architects. The company's mission is to enhance the competitiveness of launch systems by developing interoperable and modular launch pads. SpaceDreamS provides turnkey ground solutions for launch vehicles and spaceports, aiming to reduce the cost and time to access space.

A multiple laureate of the France 2030 program, SpaceDreamS is supported by the DGA, CNES, and ESA to foster the growth of its clients in France and Europe.

We are developing NuPad (Next-generation Universal Pad), the first interoperable launch pad adaptable to any type of launch vehicle, at various lifecycle stages, and capable of being transported between certified launch sites.

The TwinPad is the digital twin of the ground launch system. It facilitates the development of launcher and launch pad operational software, as well as virtual and real-time simulation of cryogenic, electrical, and mechanical fluid processes.

SpaceDreamS is also conducting preliminary studies on the development of ground support systems for several mini and micro launchers.

Role

As a Co-Simulation Interface Optimization Intern, you will play a key role in advancing our multiphysics simulation capabilities by developing robust methods for coupling different subsystem models in real-time.

Working closely with the simulation and engineering teams, you will be responsible for:

- Reviewing and improving the current interface configuration between coupled models, where variables such as mass flow, pressure, and temperature are exchanged.

- Investigating and implementing numerical methods to improve convergence, including iterative solvers, relaxation techniques, or predictor–corrector schemes.
- Developing or integrating intermediate codes/solvers to dynamically reconcile exchanged values between models.
- Exploring and testing adaptive communication steps (CINT) to balance stability with real-time performance.
- Applying optimized approaches to a representative case study (e.g., tank–valve system) to validate improvements in stability and convergence.
- Documenting all tested configurations, benchmarks, and recommended workflows for future co-simulation projects.

This role will give you exposure to the complete simulation cycle: from problem analysis and method development to solver integration, validation, and technical documentation. You will contribute directly to enabling real-time co-simulation for complex aerospace systems.

Profile

Qualifications

- Currently enrolled in a Master's program / Engineering School in Aerospace Engineering, Energy Systems, Applied Mathematics, or Computer Science.
- Solid understanding of numerical methods, system modeling, and fluid/thermal dynamics.
- Good analytical and problem-solving skills with the ability to investigate convergence issues.
- Good organizational skills, as well as a great adaptability,
- Technical writing skills in English (presentation, reports, or project documentation),
- Motivation for learning and experimenting with new simulation approaches.
- Ability to work effectively in a multidisciplinary team.

Preferred Qualifications

- Familiarity with OPC UA, FMU/FMI standards, and co-simulation practices.
- Experience with EcosimPro/ESPSS is an advantage.
- Knowledge of CATHARE software (CEA) and its ICOCO co-simulation interface is a plus.

- Programming skills in Python, C++ or Fortran for solver integration and interface coding.
- Basic knowledge of control strategies (PID, Model Predictive Control) for stability enhancement.
- Interest in space systems and multiphysics simulation challenges.
- Familiarity with cryogenic fluids and / or space fluid system design is a plus,
- Interest in space exploration and staying up to date on space-related news,

We offer

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- A chance to build the digital twin of real space ground infrastructure.
- Direct exposure to systems designed in the industry, especially for clients from the New Space sector.
- The opportunity to shape the design process of ground fluid systems by contributing to advanced co-simulation methodology.
- Daily collaboration with a passionate team of engineers working on fluid, control, and mechanical systems, as well as launch operations.
- A structured mentorship environment with room for technical growth, autonomy, and meaningful contribution.
- A culture that values clarity, curiosity, and engineering as a team sport.

Internship Conditions

- **Duration:** 6 months
- **Start Date:** Flexible start between Jan – March 2026
- **Location:** Massy, France – Our offices are 20mins away from Paris by public transport
- **Compensation:** 1200€ gross

Interested?

Send your CV and cover letter to contact@spacedreams.com