Internship Proposal – 6 months

Title: CubeSat Structure CAD Design and Optimization for the IonSat project

Context of the internship

The Space Center of École Polytechnique (CSEP), created in 2010, proposes and supervises space projects for École Polytechnique students. CSEP coordinates and brings together, through its projects, students, teacher-researchers, industrialists and French and European space agencies. It is financially and operationally supported by the education patronage program *Espace, Science et Défis du Spatial* led by Professor Pascal Chabert.

IonSat is a 6U nanosatellite project equipped with an electric propulsion engine, dedicated to demonstrating the feasibility of nanosatellite missions in Very Low Earth Orbit (300km). With a strong educational vocation, the project is currently led by twenty students, supported by numerous space actors: start-up (ThrustMe), industries (Thalès Alenia Space), agencies (CNES, Onera).

Internship description

IonSat structure is very dependent on the subsystems that compose the satellite. Despite the very limited volume associated with a 6U platform, IonSat structure needs to be compatible with the specific needs of the different components it supports. Each subsystem has a certain number of mounting holes as well as a specific shape, size, electrical connections and accessibility needs for testing purposes. On top of that, every subsystem also has its own limitations in terms of resilience to stresses and heat dissipation requirements. In all, the mission sets a list of requirements that need to be met with the design of the structure.

In this context, the main objective of this internship is to design, analyze and test the structure of IonSat by using Computer Aided Design (CAD) modelling and Computer Aided Engineering (CAE) tools for analysis. The purpose is to identify a cost-effective and highly reliable structure design that will ensure that the satellite will survive the different phases of its mission. This internship will focus on:

- Mission-specific design and detailed integration process description.
- Use of state-of-the-art CAD design techniques to ensure good versatility of the CAD model.
- Optimal design while ensuring the respect of IonSat requirements.
- Part design through adaptation for machining.

- Prototyping.

Technical Requirements

- Experience designing mechanical systems using 3D CAD software and 2D drawings.
- Good English level.
- Knowledge of sizing mechanical components and structures is a plus.
- Knowledge of Fusion 360 is a plus.

Behavioural Requirements

- Self Motivation and autonomy
- Communication and teamwork

Internship duration: 6 months, from October 2023

If you are interested, send your CV and a cover letter, clearly indicating your motivation and availability dates.

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