Master Thesis Proposal – 4 to 6 months

Title :

Development of the Flight Software of the IonSat project

Context of the intership

The Centre Spatial de l'École polytechnique (Space center of École polytechnique, CSEP), created in 2010, proposes and supervises space projects for École polytechnique students. It is at the origin of one of the first French student nanosatellites, X-CubeSat, launched into orbit on May 17, 2017. The CSEP brings together and coordinates, 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 (*Space, Science and Challenges), 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 orbit (250km). It is at the frontier of space applications, and is positioned in the NewSpace philosophy. The project started in 2017 and validated its preliminary design review in May 2020. With a strong educational vocation, the project is currently led by twenty students, supported by numerous space actors: startup (ThrustMe), industries (Thalès Alenia Space), agencies (CNES, Onera).

Intership description

In the context of IonSat and the CSEP, the student will participate in the development of the Flight Sofware (FS), as well as the flatsat that will be used to test the software. Notions of software development and space systems engineering will prevail. The mission will focus on :

- The development, implementation, and validation of main modes of the FS
- The development, implementation, and validation of the communications between the on board computer (OBC) and the different sub-systems

The intern will work with two full time engineers of the CSEP, and can use the help of the space team of the Laboratory of Plasmas Physics, specialized in conception of space-ready magnetometers and on-board electronics. There are also frequent contacts with experts from the French aerospace agencies (CNES, ONERA) and companies (Thalès) partners of the IonSat Project.

Technical Requirements

- M1 or M2 level in informatics and programming, electrical engineering, or related domains.
- Experience in C/C++ or FPGA (VHL) programming.
- Knowledge in UNIX like systems,
- Good English level
- Knowledge in aerospace systems is a plus

Behavioural Requirements

- Self Motivation and autonomy
- Communication and teamwork

Internship duration : between 4 and 6 months, from March 2021
If you are interested, send your CV and a cover letter, clearly indicating your motivation and availability dates.

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