

IGOSat Project

Internship Proposal - Spring 2020

Satellite to Ground Telecommunication engineering: Command Control for IGOSat

Skills, Keywords : ground software, satellite operation, programming and debugging, software engineering, radio communication, UHF/VHF

Desired Level : 4th year, master degree, programming experience **Duration** : 4 to 6 months **Stipend** : > 500 € / month

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Project Description :

The Laboratory of Excellence (LabEx) UnivEarthS, set up by laboratories AIM (Astrophysique et Interactions Multi-Echelles), APC (AstroParticule et Cosmologie) and IPGP (Institut de Physique du Globe de Paris) from Paris Diderot University, is carrying carrying transverse projects between those 3 laboratories.

Using the strong involvement of those laboratories in numerous space experiments and instrumentation, an educational nanosatellite project has begun in 2013, with the financial and technical support from CNES (Centre National d'Etudes Spatiales) and the Space Campus of Paris Diderot University.

More specifically, the project is to develop a scientific 3U CubeSat, and launch it in 2021. The satellite will carry 2 payloads, one to study the Ionosphere and one to study the radiation belt.

Internship Description :

The purpose of the internship is to work on the software that will be used on the ground to receive and send data to the satellite, as well as visualizing scientific and engineering data received during operations. Several software have already been developed for similar missions and documentation is existing, but a specific software is needed for each mission. The communication is in UHF/VHF, and is using the AX25 protocol with a correction code. The main task of the internship will be to take ownership of the tracking system (Gpredict) and develop the Software Defined Radio (GNURadio) for uplink and downlink.

The Satellite / ground link is using the Packet Utilization Standard (PUS) from the European Cooperation for Space Standardization. The development of the command control link has to be in accordance with this standard. The future intern will then start by getting familiar with the standard, to develop the desired software following the recommendation of the software engineer and the system engineer.

The future intern will also need to be comfortable in Python, and interested in satellite operation.

Within a team of students, engineers and scientists, the student need to be able to work autonomously as well as part of a team, have a sense of rigor especially in writing presentation, and already a global vision of information transmission.

This internship is a good opportunity to address numerous points of space engineering.

Website: <http://www.igosat.fr>