

Open Positions Recruitment CubeSat Team

System Engineering

Position Title: System Engineering – SE System Engineers

Position Description: You will:

- Define the mission context;
- Perform the stakeholders' needs and value analysis;
- Elaborate the mission statement;
- Define the mission objectives, both scientific and technological;
- Define the High Level mission Requirements, using also the STM/TTM tools, if necessary (*in collaboration with Trajectory Analyst, Requirement Engineer and Payload System Engineer*);
- Perform the (preliminary) risk assessment (*in collaboration with SD System Engineers*);
- Establish a (preliminary) function tree (*in collaboration with SD System Engineers*). You will update and redefine the preexisting work.

Key Skills (nice to have, required to develop): Good knowledge of System Engineering, Good knowledge of ECSS, Valispace.

Position Title: System Engineering – Mission Analysts

Position Description: You will:

- Identify possible Concepts of Operations;
- Identify possible Mission and Communication Architectures;
- Establish spacecraft operational modes (*in collaboration with SD Engineers*);
- Conduct “trade-off” studies and select the preferred system concept, together with the preferred technical solution(s) for this concept.

You will update and redefine the preexisting work. Your job will be coordinated with the Trajectory Analyst and the Requirement Engineer.

Key Skills (nice to have, required to develop): Good knowledge of System Engineering, Good knowledge of ECSS.

Position Title: System Engineering – Trajectory Analyst

Position Description: You will:

- Run simulations in order to obtain possible mission scenarios;
- Carry out several analyses, such as coverage, revisit time, eclipse time, link budget (*in collaboration with CommSys Engineer*);
- Implement Flight Dynamics functionalities, such as orbital propagation, manoeuvres planning and optimization;
- Cooperate to define the High Level mission Requirements (*in collaboration with SE System Engineers, Requirement Engineer and Payload System Engineer*).

You will update and redefine the preexisting work.

Key Skills (nice to have, required to develop): Good knowledge of System Engineering, Good knowledge of Orbital and Attitude Dynamics, Matlab/Simulink, STK o GMAT.

Position Title: System Engineering – Requirements Engineer

Position Description: You will:

- Be in charge of writing the Requirements (HLR and others), collaborating in their elicitation and gathering them to develop the (Preliminary) Technical Requirements Specification

(TRS).

- Create and manage the Valispace Model.

You will update and redefine the preexisting work. Your job will be coordinated with the whole System Engineering subsection members and the other subsections' System Engineers.

Key Skills (nice to have, required to develop): Good knowledge of System Engineering, Good knowledge of ECSS, Valispace.

Spacecraft Development

Position Title: Spacecraft Development - Laboratory Technician

Position Description: You will support the testing activities in the laboratory, by programming electrical boards, creating cables, managing user interface systems, and using laboratory instruments. The most used tools are Raspberry Pi boards.

Key Skills (Nice to have, required to develop): Embedded Systems – Linux – C – Raspberry Pi - Welding.

Position Title: Spacecraft Development - CommSys Engineer

Position Description: You will refine the pre-existing preliminary design and perform functional and performance simulations using a virtual mock-up. After this phase, you will proceed with pre-qualification activities to test the compatibility with other subsystems and the communication with the ground station, possibly using a suitcase model.

Key Skills (Nice to have, required to develop): Good knowledge of Telecommunication Engineering - Matlab

Position Title: Spacecraft Development - System Engineer

Position Description: You will complete and update the requirements regarding the spacecraft's bus, manage its Valispace model and the interfaces within the subsystems, or between the subsystems and other mission elements.

Key Skills (Nice to have, required to develop): Good knowledge of System Engineering – Good knowledge of Electronics Engineering - Valispace

Position Title: Spacecraft Development - ADCS Engineer

Position Description: You will develop electrical and functional models of the sensors and the actuators, perform functional and performance tests on them and proceed with their integration.

Key Skills (Nice to have, required to develop): Good knowledge of Dynamics and Control of the Spacecrafts – Matlab/Simulink

Position Title: Spacecraft Development - Thermal Engineer

Position Description: You will determine the thermal properties of the bus components, and perform a detailed thermal analysis to define the thermal conductivity of the interfaces and the optical properties of the structural panels. Finally, you will evaluate which test must be performed and you will simulate them.

Key Skills (Nice to have, required to develop): Good Knowledge of Thermal Engineering - Matlab - C

Position Title: Spacecraft Development - Structure and Mechanism Engineer

Position Description: You will update and refine the pre-existing CAD, perform the structural analysis on the final design and assemble the components of the structure. As to the mechanism activities, you will develop a hardware model of the UHF-band antenna deployers to validate the study carried out with the virtual mock-up, verify that the design's physical properties are met, and perform a functional test to verify that the secures remain closed until the design current intensity

is met.

Key Skills (Nice to have, required to develop): Solidworks – Ansys

Position Title: Spacecraft Development – C&DH Engineer

Position Description: You will finalize the definition of On-board Software architecture, then you will develop the operating system and the function manager (a software that manages the allocation of the subsystems' software functions to the processing units, identifies any faults, and synchronizes critical data). You will also work together with the Payload subsection's software engineers, the other subsystems' engineers and the system engineers to manage the interfaces between the function manager and the specific software of each subsystem.

Key Skills (nice to have, required to develop): Embedded systems - Linux -Programming languages (C, C++, Python)

Payload Development

Position Title: Payload Software Architecture - Software Engineer

Position Description: You will create the system architecture of the payload software.

The overall structure of the software architecture is defined by decisions on trade-offs between processing time, data safety and energy consumption. You will have to consider the spacecraft environment and its hazards towards data losses and data corruption. You will have to confront the spacecraft power and energy budgets and the limited processing power of the onboard computer. With the overall structure planned and satisfying the payload software requirements, you will code the software architecture you planned.

Key Skills (nice to have, required to develop): programming languages (C, C++, Python), knowledge of RTEMS or RTOS in general, embedded systems, multimedia databases.

Position Title: Image Preprocessing - Software Engineer

Position Description: You will create the preprocessing algorithm for the camera sensor data.

The algorithm will have to discern clouds, obstacles and aberrations, removing the unusable regions from each image and saving the usable areas for processing. You will work on constructing a simplified model of clouds and aberrations to be implemented on the payload software. The model could be generated using artificial intelligence techniques or other methods.

Key Skills (nice to have, required to develop): programming languages (C, C++, Python), fundamentals of computer vision, fundamentals of optics.

Position Title: Payload - Hardware Engineer

Position Description: From the payload system requirement, you will create the payload camera sensor model and set the requirements for the payload onboard computer. From this new information, you will choose the camera optics and electronics and, depending on availability, you will elect the right camera to buy or plan and construct the mounting for the optics and electronics yourself. The payload design choices are trade-offs between performance and cost.

Key Skills (nice to have, required to develop): Good knowledge of the spacecraft subsystems, optics and electronics.

Position Title: Payload - System Engineer

Position Description: You will complete and keep updated on the payload requirements and manage its Valispace model. You'll manage the interface definition and development between the camera sensor and the onboard computer, and between the payload and the other mission elements. Your work will be coordinated with the system engineers of the other two team subsections.

Key Skills (nice to have, required to develop): Good knowledge of the spacecraft subsystems, their features and elements, and good knowledge of electronics and computer engineering.

Ground Station System – C3

Position Title: **Electronic Engineer (RF)**

Position Description: Transceiver analysis for ground-to-space communication, and integration planning with the CubeSat Platform

Key Skills - Required: Bachelor in Electronic Engineer. **Nice to have:** Enrolled on Radio Frequency Systems Design master course (https://didattica.polito.it/pls/portal30/sviluppo.offerta_formativa_2019.vis?p_coorte=2021&p_sdu=37&p_cds=13)

Position Title: **Computer Science Engineer (SI)**

Position Description: Ground Station Network (GSN) management. Configuration and maintenance of the systems enabling the remote control of the ground station.

Key Skills - Required: Bachelor's in computer science. **Nice to have:** Enrolled on Network/Software master course.

Position Title: **Telecommunication Engineer (DSP)**

Position Description: Development and maintenance of the level 2/3 (ISO/OSI) interfaces between the on-board Communication System, the CubeSat Platform and the ground station and control systems.

Key Skills - Required: Bachelor's in Telcommunication Engineering.

Position Title: **Ground Station Operator (HI)**

Position Description: Configure, operate and maintain the ground station systems (C3) for communication with orbiting satellites.

Key Skills - Required: Bachelor's in engineering. **Nice to have:** Enrolled on Aerospace/Mechatronic.

Position Title: **CAD analyst and AIV Engineer (TS)**

Position Description: Operate with the ground station hardware to ensure the proper functioning, review/update the existing drawing.

Key Skills - Required: Bachelor's in Mechanical/Aerospace engineering. **Nice to have:** Solidworks (3D/2D drawing).

Outreach and Communication

Position Title: Web Developer

Position Description: You will improve, update, and maintain our website.

Key skills (nice to have, required to develop): Wordpress

Position Title: Event and Communication Manager

Position Description: You will care about the team's social presence, by creating content for the team activities' divulgation on social media platforms and managing the team's participation in events.

Key skills (nice to have, required to develop): -