

Training Opportunity for Luxembourgish Trainees

Reference	Title	Duty Station
LU-2021-TEC-EFD	RF Digital Equipment & Payload Data Processing Engineering	ESTEC

Overview of the mission:

The trainee position is located in the RF Digital Equipment & Payload Data Processing Section of the Radio Frequency (RF) Payloads & Technology Division. Several opportunities are available within the field of work of the section as outlined below.

The Division is responsible for RF payloads, instruments and technologies for space and ground applications, including all equipment having an RF space/ ground interface and its associated laboratories. It supports the definition, specification and development/ procurement of laboratories for ESA projects and technology programs or for external customers.

The Section provides functional support to ESA projects and carries out technological research (R&D) in the fields of RF digital equipment and building-blocks, on-board data processing, image and signal processing approaches, related designs and processing devices.

Candidates interested are encouraged to visit the ESA website: www.esa.int/ESA

Overview of the field of activity proposed:

Topic 1: Machine Learning for Radio-Frequency Signal Identification

The usage of Machine Learning techniques for the identification of Radio-Frequency signals on-board satellites is of high interest, enabling use-cases such as interference identification & mitigation, modulation detection, among others.

The scope of the trainee position is the study of Machine Learning techniques and devices for on-board identification of Radio-Frequency signals or characteristics of interest, in the time domain (I/Q samples) and/or frequency domain. Besides the study, a demonstrator implementing a use-case based on a relevant dataset.

Topic 2: Evaluation of RF System-on-Chip (RFSoc) and RF Transceivers

Key enablers for future Software Defined Radio/Radar (SDR) applications are FPGAs with integrated processors and RF analogue blocks, as well as RF transceiver integrated circuits, embedding in the same package the RF front-end functions and the conversion between analogue and digital domains, also known as "Agile Transceivers".

Your contribution will be in the evaluation of these devices taking into account different scenarios, such as Earth Observation instruments. You will integrate them in typical signal processing architectures & chains, and evaluate their performance in our laboratory and under radiation.

Topic 3: Synchronisation of Multiple RF Analog/ Digital converter

Earth Observation related instruments currently under development heavily rely on the precise synchronization of state-of-the-art RF Analog-to-Digital (A/D) and Digital-to-Analog (D/A) converter. The high bandwidth and resolution of the devices require high speed serial link (HSSL) to transfer the sampled data to the processing node.

You will have the opportunity to look into different, multi-device synchronization architectures and HSSL based device-to-device protocols (e.g. JESD204B, ESStream). You will implement different approaches and configuration in FPGA hardware and evaluate the performance.

Required education and skills:

- Master's degree in a technical or scientific discipline
- Good interpersonal and communication skills
- Ability to work in a multi-cultural environment, both independently and as part of a team
- Fluency in English and/or French, the working languages of the Agency