

EUROPEAN SPACE AGENCY

Young Graduate Trainee in Radiofrequency Technologies and Techniques

Job Req ID: 14763

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Vacancy Type: Young Graduate Trainee

Date Posted: 23 March 2022

Young Graduate Opportunity in the Directorate of Technology, Engineering and Quality

ESA is an equal opportunity employer, committed to achieving diversity within the workforce and creating an inclusive working environment. We therefore welcome applications from all qualified candidates irrespective of gender, sexual orientation, ethnicity, beliefs, age, disability or other characteristics. Applications from women are encouraged.

This post is classified F1.

Location

ESTEC, Noordwijk, Netherlands

Our team and mission

The Radio Frequency Payloads and Technology Division is responsible for RF payloads, instruments and technologies for space and ground applications, including all equipment having a Radio Frequency space/ground interface and the associated laboratories. The Division supports the definition, specification and development/procurement of laboratories for either ESA projects and technology programmes or external customers.

The Division consists of four Sections covering the following areas:

- Payloads with RF interface for telecommunication and navigation exploiting different technologies (e.g. analogue, digital, optical) including design, performance analysis tools and testing;
- Earth observation and scientific RF active and passive instruments design, performance analysis, engineering and testing up to sub-millimetre waves;
- Wave-propagation and interaction relevant to space communications, navigation and remote sensing, including interference and regulatory aspects;
- Antenna systems, architecture, technologies and techniques for all space applications, including space vehicle TT&C and user segment terminals, as well as antenna engineering and RF testing of antennas and material;
- RF equipment and technologies, including RF passive technologies, RF active technologies, vacuum electronics and high-power RF phenomena (multipactor,

corona and passive intermodulation);

- Time and frequency references, modelling, design tools, measurements, performance characterisation and calibration techniques.

The Division manages laboratories to test/proof concept soundness and validation as well as to enable hands-on. They cover:

- Microwave and millimetre wave (microwavelaboratory.com)
- Payload engineering
- Antenna testing
- High-power RF phenomena and high-power space material characterisation (www.val-space.com).

You are encouraged to visit the ESA website: <http://www.esa.int>

Field(s) of activity/research for the traineeship

You will have the opportunity to work in one of the following disciplines, depending on your background and interests:

- RF active technologies: the world's first W-band CubeSat satellite has been in orbit since summer 2021 (W-band CUBE) and another, operating in the same mm-wave frequency band, will be launched in the following year (EIVE). This success has been possible thanks to the maturity of mm-wave semiconductor technologies that allow monolithic integration of the key RF active functions, such as high-power amplifiers, low-noise amplifiers, frequency converters and other elements. You will be involved in development, testing and deployment of a W-band ground station that will be used to receive signals from the very first W-band satellites. You will also provide support to other ESA projects dealing with development of RF active functions in W-band.
- Time and Frequency (T&F) technologies: oscillators, atomic clocks, clock monitoring units or UTC laboratory tools for time realisation and time transfer require extensive characterisation and performance analysis under a wide range of operational and environmental conditions. You will support the development of clock performance tools, time transfer techniques and tests beds for the verification of novel T&F equipment and subsystems.
- RF passive technologies: numerous satellite mega-constellations are under development. Accommodation and cost are a big concern for small platform satellites when considering high performance RF passive hardware (filters, isolators, switches, beamforming networks, etc.). This can only be achieved by developing innovative solutions comprising novel synthesis methods for filters, use of advanced technologies/materials and a higher level of function integration adapted for mass production. Advanced manufacturing (AM) of RF parts such as 3D printing also plays an increasingly important role in this area. You will touch upon the above topics and be involved in the design, analysis with circuit and/or full-wave electromagnetic simulations, breadboarding and experimental validation in ESA's microwave laboratory of novel RF passive technologies.
- High-power RF breakdown under modulated signals and passive intermodulation (PIM) prediction and mitigation techniques: currently the prediction of high-power RF breakdown is performed assuming unmodulated signals and, in most cases, single carrier scenarios. The proposed training will focus on multipaction prediction in 3D structures considering arbitrary signals (modulated, multicarrier, pulsed, chirp) and its

validation by means of multipaction tests. You will also investigate standard PIM source parameters affecting PIM (temperature, pressure, power, frequency, PIM order, etc.) and mitigation techniques, supported by measurements.

Technical competencies

Knowledge of relevant technical domains

Relevant experience gained during internships/project work

Breadth of exposure coming from past and/or current research/activities

Knowledge of ESA and its programmes/projects

Behavioural competencies

Result Orientation

Operational Efficiency

Fostering Cooperation

Relationship Management

Continuous Improvement

Forward Thinking

Education

You should have just completed, or be in the final year of your Master's degree preferably in telecommunications, electrical/electronic, microwave engineering or physics..

Additional requirements

Specific competence in one of the following disciplines will be considered an asset:

- Knowledge of design and simulation tools, such as ADS, MWO, HFSS, CST and MICIAN;
- Experience in RF testing as well as in programming e.g. MATLAB, LabView.

You should have good interpersonal and communication skills and should be able to work in a multi-cultural environment, both independently and as part of a team.

The working languages of the Agency are English and French. A good knowledge of one of these is required. Knowledge of another Member State language would be an asset.

During the interview motivation and overall professional perspective/career goals will also be explored.

Other information

For behavioural competencies expected from ESA staff in general, please refer to the [ESA Competency Framework](#).

For further information on the Young Graduate Programme please visit: [Young Graduate Programme](#) and [FAQ Young Graduate Programme](#)

At the Agency we value diversity and we welcome people with disabilities. Whenever possible, we seek to accommodate individuals with disabilities by providing the necessary support at the workplace. The Human Resources Department can also provide assistance during the recruitment process. If you would like to discuss this further please contact us email contact.human.resources@esa.int.

Please note that applications are only considered from nationals of one of the following States: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, and the United Kingdom. Nationals from Latvia, Lithuania, and Slovenia, as Associate Member States, or Canada as a Cooperating State, can apply as well as those from Bulgaria, Cyprus and Slovakia as European Cooperating States (ECS).

According to the ESA Convention, the recruitment of staff must take into account an adequate distribution of posts among nationals of the ESA Member States*. When short-listing for an interview, priority will first be given to candidates from under-represented or balanced Member

States*. (<https://esamultimedia.esa.int/docs/careers/NationalityTargets.pdf>)

In accordance with the European Space Agency's security procedures and as part of the selection process, successful candidates will be required to undergo basic screening before appointment.

*Member States, Associate Members or Cooperating States.