

Training Opportunity for Polish National Trainees

| Reference | Title | Duty Station |
|-----------------------|--|------------------------|
| PL-2023-OPS-GA | Space Mission Ground Segment AI and Cybersecurity Engineering | ESOC, Darmstadt |

Overview of the mission:

The Mission Operations Data Systems Division is responsible for specifying, developing, operating and maintaining infrastructure and mission-dedicated software systems and providing support for their use during the preparation and the operational phases of space missions. Our Data Systems comprise Mission Control Systems (to monitor and operate the satellite), Mission Planning Systems, Operational Simulators (for testing systems and training staff) and Service Provision Data Centres. We are ensuring that these systems are resilient and allow for fully cyber-secure mission operations. The division is also driving software innovation by means of research and development on software technologies applied to space missions and standardisation of interfaces with other space agencies (e.g. NASA). Examples of our applications focus are: CubeSats, space safety, distributed operations, and cyber-security. We are driving all these activities using state-of-the-art software and cybersecurity technologies.

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

Overview of the field of activity proposed:

This traineeship will focus on cyber-security activities related to mission operations and mission operations data systems. These include the following fields:

- Secure communication with the spacecraft: Ensuring cyber-secure operations through providing confidentiality, integrity and authenticity of the space link, i.e. to receive and process spacecraft telemetry and generate and send telecommands in a secure way and to manage cryptographic keys;
- Zero-trust distributed mission operations ground segment: Ensuring resilience and cybersecurity for distributed ground segment systems, ensuring security orchestration across hybrid-cloud environments;
- Secure systems and software engineering: Ensuring that operations ground segment systems and software are designed following a secure software engineering approach and verified in a robust and efficient manner. Activities here would be related to digital system security engineering tool development and rollout into secure system engineering activities, automated penetration testing and DevSecOps;
- Application of Artificial Intelligence to the Cybersecurity domain in both offensive testing and defensive detection/remediation capacities, and ensuring security assurance for AI applications;
- Security Hackathons: Planning and execution of cyber-security hackathons in the Advanced Ground and Space Applications (AGSA) lab in collaboration with academia;

The exact details of the work will depend on the missions or projects available and the specific interests of the candidate. It may include any task related to cybersecurity. This provides an excellent opportunity to learn about the specification, design, testing, transition to operations, and management of complex software systems and their underlying software infrastructure and as well the practical application of cybersecurity skills in an operational environment. The training may also provide the opportunity of exposure to real spacecraft operations. The work will be performed under the supervision of an experienced Data Systems Manager.

Required education and skills:

- You should have just completed or be in the final year of your Master's degree (or equivalent) in a technical or scientific discipline. A degree in Software Engineering, Natural Sciences or Engineering with major in subjects such as Information Technology or Computer Science would be preferred. Specialisation in Cybersecurity would be an asset.
- Applicants should have a good background in modern information technology and software engineering practices and cybersecurity.
- 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