Training Opportunity for Swiss Trainees

Reference	Title	Duty Station
CH-2018-TEC-MMA	Automation and Robotics	ESTEC

Overview of the unit's mission:

The Mechatronics and Optics Division provides engineering support for space projects and executes technology developments in the areas of Automation and Robotics, Mechanisms, Life and Physical Sciences Instrumentation, Optics and Opto-Electronics. One of the Sections of this Division, the Automation and Robotics Section, is the focal point in ESA for matters relating to the design, engineering and verification of space Automation and Robotics (A&R) systems (i.e. manipulation systems, mobility systems and payload automation systems).

You will be supporting the Automation and Robotics section at ESTEC, and in particular the Automation and Robotics Laboratories (ARL). ARL has recently upgraded its infrastructure in the field of orbital robotics and are currently actively pursuing activities and R&D in the very relevant fields of On-Orbit Servicing (OOS) and Active Debris Removal (ADR) with the aim of implementing them in future missions (e.deorbit). In addition the ARL continues its traditional important role in planetary robotics, primarily in support of ExoMars and future Mars Sample Return missions.

A more detailed description of the terms of reference, activities and assets of the section can be found here.

Overview of the field of activity proposed:

The Trainee will be assigned to one or more tasks pertaining the responsibilities and needs of the Section within the fields of robotics for planetary exploration and orbital applications. With the assistance of ESA engineers working in the Section, as well as with the support of other ESA specialists, the holder of the training position may work on:

• feasibility assessments of new space A&R concepts (e.g. scientific planetary exploration with rovers, low gravity landing/sampling and active debris removal);

• breadboarding and demonstration of A&R systems (e.g. rovers/robots, air-bearing platforms, manipulators and supporting technologies) and their subsystems (mobility platforms, mechatronics, avionics, sensory integration and software architecture design & implementation) and interfaces to users in the A&R laboratories;

• verification of existing A&R systems (including field testing campaigns and system remote operations);

• mathematical modeling and simulations;

• operational readiness, organisation and extension of the lab facilities;

Additionally the candidate may work on:

• Collaboration with third parties companies in the frame of hardware development and procurement

• Support relevant R&D activities or CDF studies when necessary: The section staff supervises a number of industrial R&D activities in all fields related to space robotics. The candidate will have the opportunity to participate in reviews and otherwise support the activities as required. Some support to the e.deorbit or Exomars missions may also be expected.

• Support to the operations of the Automation & Robotics Laboratories.

The ARL recently went through a complete reorganization and infrastructure upgrade, with the goal to optimise the operational resources and foster more parallel research activities. As certain final aspects of the upgrades are on-going, the candidate shall work closely with the head of the ARL in the deployment and calibration of new robotic facilities (metrology, hardware research platforms, etc.) and in the definition of lab operational guidelines and procedures. Within this task the candidate will obtain experience in the complex organisation and operation of a high-tech lab facility as well as gain an overview of all the research activities performed in ESA in the field of Automation and Robotics.

Required education:

Applicants should have, or be in their final year for a University or Graduate degree in Computer Science or Robotic, Mechatronics, Mechanical or Electrical Engineering. A good grasp of system aspects and a good understanding of the basis engineering domains of robotics (i.e. mechatronics, control theory, computer science, image processing) as well as a solid foundation in mathematics and physics is strongly desirable. Proficiency in the use of computer aided engineering tools is an asset. Strong general computer skills and proficiency in several programming languages is considered as an important asset.

Candidates should have good interpersonal and organisational skills, and show genuine enthusiasm, dynamism and self-motivation. Candidates must be fluent in English.