

Training Opportunity for Lithuanian Trainees

Reference	Title	Duty Station
LT-2016-TEC-MMA	Orbital and low-gravity robotics	ESTEC
<p>Overview of the unit's mission:</p> <p>You will be supporting the Automation and Robotics section at ESTEC, and in particular the Automation and Robotics Laboratories (ARL). The lab has recently upgraded its infrastructure in the field of orbital robotics and we are currently actively pursuing activities and R&D in the very relevant fields of <u>On-Orbit Servicing (OOS)</u> and <u>Active Debris Removal (ADR)</u>. ESA currently is working on two missions aimed at Active Debris Removal and On-orbit Servicing (e.deorbit and d.deorbit), that the lab is supporting. In addition the lab continues its traditional important role in <u>planetary robotics</u>, primarily in support of Exomars and future Mars exploration missions such as Mars Sample Return.</p> <p>The section is located within the Mechatronics and Optics Division, which provides technical expertise and engineering support in the areas of automation and robotics, space mechanisms, life & physical sciences and environment control & life support (ECLS), optics and opto-electronics. It is responsible for the creation and maintenance of an industrial technology base for the automation aspects of space based operations and their remote control.</p> <p>As such, the domain of competence of the group includes the specification and control of space robotics systems (from manipulators to autonomous vehicles) and laboratory supporting automation and robotics in manned and unmanned missions.</p> <p>For a more detailed description of the terms of reference, activities and assets of the section see: http://www.esa.int/Our_Activities/Space_Engineering_Technology/Automation_and_Robotics/Automation_Robotics</p>		
<p>Overview of the field of activity proposed:</p> <p>This position is primarily in the area of 0-to-micro gravity robotics.</p> <p>Our trainees are given a high degree of autonomy and responsibilities, and will be expected to take ownership of the laboratories, be responsible for tasks and help with the day-to-day maintenance.</p> <p>The exact tasks will depend on the candidate's final qualifications, interests and the needs of the section and will be from among the following:</p> <p>Orbital robotics</p> <ul style="list-style-type: none"> • <u>Research & Development on novel robotic systems using air bearings/cushions.</u> The ARL has recently acquired a flat floor and a number of air-bearing platforms. The lab is evaluating novel air-bearing concepts in order to de-couple the inertia of the air-bearing from the item under investigation. This will allow for further improvement in the quality of the simulated orbital environment. In particular the system should be upgraded to represent low gravity scenarios on moons and asteroids. Typical tasks are: Finding requirements, concept development, evaluation of solutions and bread boarding of prototypes. • <u>Support and supervise industrial activities on the ARL flat floor in the area of low-gravity landing, space debris removal and in-orbit servicing.</u> The trainee is expected to support a number of industrial activities that will use the lab. • <u>Research & Development on autonomy for space debris capture</u> The lab is currently supporting the e.Deorbit and d.Deorbit missions in which the question of autonomy has been identified as being of particular significance. The candidate will be presented with the opportunity to develop hardware and execute tests aimed at performing a detailed investigation of the difficulty vs necessity of autonomy required for capturing un-cooperative targets with a robotic arm in a free-floating environment. The work will leverage previous developments within the section in the field of visual surveying and autonomy to investigate the capture operation. 		

Other

- Collaboration with third parties companies in the frame of hardware development and procurement
The ARL has a constant need to upgrade and adjust its inventory in order to support new activities. The candidate will be intimately involved in this process by directly interacting with third parties to discuss concepts, negotiate prices, in order to procure equipment or software.
- 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, d.deorbit or Exomars missions may also be expected.

Required education:

- Recent graduate in the field of Robotics, Mechatronics, Mechanical, Space engineering, or Computer Science with significant software experience.
- Electronics experience is an asset
- Demonstrated experience in initiating and running practical projects.