Training Opportunity for Belgian Trainees

Reference	Title	Duty Station
BE-2019-TEC-EPS(1)	**Assessment of predictive tool performances for optical and thermal surfaces degradation in the context of Human and Robotic Exploration of the Moon and asteroids.**	ESTEC

Overview of the unit's mission:

The Space Environments and Effects Section supports the development of ESA missions and programmes by investigating the space environments within which they will operate, assessing likely effects and defining mitigation methods. Environments addressed include: High-energy radiation from radiation belts, solar-particle events and cosmic rays; plasmas encountered in planetary magnetospheres, the solar wind and artificially-generated charges and fields on spacecraft; micro-meteoroids and non-trackable debris as well as planetary atmospheres. The Section also initiates and manages related technology R&D activities. See its web page (http://space-env.esa.int) for more details.

Overview of the field of activity proposed:

Human and Robotic Exploration of the Moon, Mars and asteroids is a growing field of interest at ESA and other space agencies alike with e.g. common efforts towards the establishment of a Deep Space Gateway, robotic access to the surface and the exploitation of In Situ Resources in fairly short timescales.

TEC-EPS has developed a good expertise in the field of plasma and airless bodies interactions with the goal of enabling diagnostics of plasma and charged dust related environmental effects (such as sensitive surfaces and mechanisms contamination) for landed assets such as rovers, habitats and astronauts. A Particle In Cell code (the Spacecraft Plasma Interaction Software SPIS) used for spacecraft charging assessments has been further developed to include the charging, transport and interactions of surface dust with systems. The code has not been yet tested using in situ data.

In this context the work will include primarily the development and tuning of simulation models allowing to compare model predictions with the measured degradation of optical and thermal surfaces during the Apollo era. This will allow to test the operational capability of the code as well as determine potential gaps in the usability and implemented physics that would require further developments. In addition, time allowing and pending a successful implementation of previous cases simulations of Astronaut charging at the Lunar surface and/or asteroids regolith surface charging and transport based on realistic operational scenarios (EVA or asteroids surface sampling/exploration mission) will also be developed.

Required education:

Applicants should have just completed, or be in their final year of a University course at Masters Level (or equivalent) in a relevant technical or scientific discipline. In addition, applicants should demonstrate good interpersonal skills and the capacity to work both independently and as part of a team.