Training Opportunity for Belgian Trainees

Reference	Title	Duty Station
BE-2018-HRE-X	**HRAF for exploration missions**	**ECSAT**

Overview of the unit's mission:
The HRAF (Harwell Robotics and Autonomy Facility) concept has been initiated at ESA/ECSAT to answer the need of development, verification and validation of complex autonomous systems such as planetary rovers and other landed elements, which are critical to enable future planetary exploration missions. Exploration activities at ECSAT are also related to the Mars Sample Return campaign, in particular with the Sample Fetch rover phase A/B1.

Overview of the field of activity proposed:
The present position aims at taking part to the HRF third Pilot "EDLS distributed simulation federation and model-driven engineering framework development". A first step will consist on the familiarisation with HRAF Engineering Framework design and Model Base System Engineering followed in a second step to a support to the implementation and extension of HRAF for the Exploration program.
In particular the following points will be addressed:

(a) HRAF development support
- Integration of 3DROV/3DROC Mars Rover simulation tool
- Integration of an Autonomous Navigation System
- Potential software development in parallel to the activity (content TBD but could be related to use of SysML)
- Participation to some integration activities and/or field trials
- Review of documentation for ongoing Pilot activities.
- Support data archiving activities (in collaboration with ESOC)

(b) Mars Sample Return support activities
- Support the team in the modeling/simulation for the Earth Return Orbiter and Sample Fetching Rover.

(c) Other activities
- Support Spaceship ECSAT Activities (following a similar concept than the one developed at EAC, http://www.esa.int/About_Us/EAC/Networking_Partnering_Initiative), aimed to develop low TRL innovative technologies for Robotics and Autonomy (vision based target localization, voice-commanding, augmented reality, etc.)

Required education: Applicants shall have completed their engineering degree in the field of computer science with focus on robotics, autonomy, image processing (for stereo vision, digital elevation map…). Knowledge and experience with XML, Java and C++ are a pre-requisite. Participation to actual robotic (in particular rover) projects development is clearly an asset. A very good understanding of distributed simulation architectures and technology as well as Model Base System Engineering practices (with experience related to SysML) is important.