Job Title: Internal Research Fellow (PostDoc) in model-based Verification & Validation of autonomous systems

Req ID **2206** - Posted **20/09/2017**

EUROPEAN SPACE AGENCY

Research Fellow opportunity in the Directorate of Technology, Engineering and Quality.

ESA is an equal opportunity employer, committed to achieving diversity within the workforce and creating an inclusive working environment. Applications from women are encouraged.

Post
Internal Research Fellow (PostDoc) in model-based Verification & Validation of autonomous systems
This post is classified F2 on the Coordinated Organisations' salary scale.

Location
ESTEC, Noordwijk, The Netherlands

Description
The Software Systems Division covers engineering, verification and validation techniques for space systems, in particular in the functional domain. This includes mission-critical software, software technology for flight as well as ground systems, real-time software embedded in spacecraft systems and payloads, but also ground facilities software, including electrical ground support equipment, test benches, databases and simulation and modelling tools.

Future missions will rely on an increased level of autonomy to enable more complex missions and an increased performance. For the design of such missions, increased use is made of model-based methods and tools, impacting the engineering information management along the life-cycle of the development. The impact of this evolution on the verification and validation process needs to be fully understood to ensure the required quality of these missions.

Interested candidates are highly encouraged to visit the ESA website: www.esa.int.

Field(s) of activities/research
Future planetary exploration missions will require complex autonomous robotic systems. These systems will operate in a partially unknown environment and will feature adaptation and self-aware behaviour that could lead to emergent behaviour. To address the shortcomings of traditional Verification and Validation (V&V) approach for space autonomous systems, the incremental development of the Harwell Robotics and Autonomy Facility (HRAF) has been initiated. The present development focuses on two out of three main activities of the V&V process: simulation and experimentation, with planetary rover as main application.

In support of this development, the research will address formal methods and verification as part of the model based engineering process for specifying, developing, testing and evaluating space autonomous systems. As to achieve the proposed ambitious goal, these specific objectives are defined:
- Identify gaps where traditional V&V framework are misaligned or deficient for space autonomous systems;
- Develop methods to automate requirements evaluation for testability and traceability;
- Develop techniques to support appropriate decisions with traceable evidence during design phase;
- Demonstrate the benefits and advantages of the research outcomes in HRAF.

The research will entail SysML (or equivalent) modelling at system level, and mixed reality testing of autonomous robotic systems using HRAF HLA based distributed simulation environment. The post will involve collaboration across ESA directorates, academic and industrial partners.

Technical competencies
Ability to conduct research autonomously
Breadth of exposure coming from past and/or current research/activities
Research/publication record
Knowledge relevant to the field of research
Interest in space and space research
Ability to gather and share relevant information

Behavioural competencies
Innovation & Creativity
Continuous Learning
Relationship Management
Self Motivation
Communication
Problem Solving
Cross-Cultural Sensitivity

Education
Applicants should have recently completed, or be close to completion of a PhD in computer science, modelling methods, V&V or systems engineering. Preference will be given to applications submitted by candidates within five years of receiving their PhD.

Additional requirements
The working languages of the Agency are English and French. A good knowledge of one of these is required. Knowledge of another Member State language would be an asset.

Other information
For behavioural competencies expected from ESA staff in general, please refer to the ESA Competency Framework.

The Agency may require applicants to undergo selection tests.

 The closing date for applications is 18 October 2017.

In addition to your CV and your motivation letter, please add your proposal of no more than 5 pages outlining your proposed research. Candidates must also arrange for three letters of reference to be sent by e-mail, before the deadline, to temp.htr@esa.int. The letters must be sent by the referees themselves. The candidate's name must be mentioned in the subject of the email.

If you require support with your application due to a disability, please email contact.human.resources@esa.int.

Please note that applications are only considered from nationals of one of the following States: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, the United Kingdom and Canada and Slovenia as well as Bulgaria, Cyprus, Latvia, Lithuania, Slovakia as European Cooperating States (ECS).
 Priority will first be given to candidates from under-represented Member States.
In accordance with the European Space Agency's security procedures and as part of the selection process, successful candidates will be required to undergo basic screening before appointment