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

Req ID **2206** - Posted **18/05/2018**

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, verifictaion 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 compplex missions and an increased perfromance. For the design of such missions, increased use is made of model-based methods and tools, impacting the engineering information manageent along the life cycle of the development. The impact of this evolution on the verifictaion and validation process needs to be fully understood to ensure the required quality of these missions.

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

Field(s) of activities/research
Future space exploration missions will require autonomous robotic systems with self-awareness/-adaptation capabilities. Achieving acceptable performance and assurance levels for an autonomous robotic system will require substantial verification and validation activities. Coverage of these activities will take place at several levels and at several points in the V-cycle, and will be provided through both experimentation and test benches. Finally and importantly, the verification and validation approach must match the processes increasingly being adopted by space system integrators: model-based system engineering and increasingly virtual engineering, requiring the ability to switch effortlessly between the physical and virtual worlds and to apply consistent test conditions and test results analysis in either case.
In this respect the Harwell Robotics and Autonomy Facility (HRAF) provides a framework for the testing and evaluation of autonomous robotic systems. Initiated a few years ago, its incremental development has focused on the High-Level Architecture (HLA) based distributed simulation environment and planetary rover field tests.
In support of this development, the research will address the verification and validation coverage for system-level testing on the bench as part of model-based engineering for specifying, developing, testing and evaluating autonomous robotic systems. In particular, a simulation-based validation methodology, including worst case scenarios and reference use cases, will be defined, and the selected black-box testing method(s) will be developed and evaluated on the HRAF.
The research will involve SysML (or equivalent) modelling at system level and will consider a planetary rover as the main application. The post will involve collaboration at ESA Directorate level as well as with 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 June 2018.

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