Job Title: Internal Research Fellow (PostDoc) for Data Systems of Human and Robotic Exploration Missions

Req ID **8701** - Posted **15/05/2019**

EUROPEAN SPACE AGENCY

Research Fellowship Opportunity in the Directorate of Operations.

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) for Data Systems of Human and Robotic Exploration Missions
This post is classified F2.

Location
ESOC, Darmstadt, Germany

Our team and mission
The Internal Research Fellow will be based in the Applications and Robotics Data Systems Section, Mission Operations Data Systems Division, Ground Systems Engineering & Innovation Department.
The Mission Operations Data Systems Division is responsible for specifying, developing, operating and maintaining mission-dedicated software systems and providing support for their use during the preparation and the operational phases of space missions. Our Data Systems comprise Mission Control Systems (to monitor and operate the satellite), Mission Planning Systems, Operational Simulators and Service Provision Data Centres. The division is also very active in Software Innovation by means of Research and Development studies on software technologies applied to space missions including standardisation of interfaces with other space agencies (e.g. NASA), CubeSats, robotics, virtual and augmented reality. For all these activities we use state-of-the-art software technologies such as Service Oriented Architecture, Web technology, advanced man machine interface, cloud computing and Agile development methodologies.

Interested candidates are encouraged to visit the ESA website:
http://www.esa.int/Our_Activities/Operations/Ground_Systems_Engineering/European_software_excellence

Field(s) of activities/research
The proposed Post-Doc research will focus on Specification of an open, generic and reusable architecture for the next generation operational data systems of human and robotic exploration missions. It will also encompass a reference implementation based on existing and new ESA infrastructure.
There are a number of missions in the definition phase at present, targeting the Moon and Mars, in orbit servicing and CisLunar outpost LOP-G. These missions require a set of new capabilities related to distributed, multi-asset, human-in-the-loop mission operation concepts and related operation data systems.
In the satellite operations domain, a European multi-mission capability has been developed over the last two decades in form of a reference ground segment architecture, based on international standards and a customisable suite of software systems (infrastructure) for mission planning, simulation, monitoring and control, data dissemination and other capabilities related to mission operations. The ESA investment in this infrastructure has led to an open and competitive market of 60+ European companies with expertise in development, maintenance and operation of the related systems for a wide range of institutional and commercial space missions.
In the area of robotic operations, the situation is today different and there exist no open, generic and reusable reference architecture. The current solutions are proprietary and mission specific. In short, there is no backbone for exploration data systems.
In the past years, ESA has gained through a series of METERON experiments valuable experience in the area of communication, technology and operational concepts for a variety of future human/robotic mission scenarios.
In particular, METERON experiments have extended the ESA mission operation infrastructure with features related to Delay Tolerant Network, DTN, CCSDS Mission Operation Services, adoption of Augmented and Virtual Reality (AR/VR) and man-machine interfaces customised to needs of distributed, multi-asset human-robotic surface operations.

The research shall leverage in close collaboration with other units within ESA, both in the Operations directorate as well as in the TEC and HRE directorates, the experience gained from METERON experiments and from the development of the ExoMars Rover Operation Centre, ROC, operational data systems and prepare the specification of an open, generic and reusable architecture for the next generation Operations Data Systems of future human and robotic mission scenarios.
The Research Fellow shall assess the suitability of the European Ground Segment Common Core (EGS-CC) as the backbone of the envisaged architecture. The candidate shall validate the devised architecture through a reference implementation and prototyping in a field test scenario.
Today a number of European private initiatives are aiming at very interesting and challenging robotic missions (e.g. PT Scientist, i3Space and others). The envisaged architecture/infrastructure can serve as a common baseline for human and robotic mission operations (capabilities of mission planning, simulation, monitoring and control, data archiving, data analytics, data dissemination, etc.) not only for ESA missions, but also for future European commercial and new space missions with a robotic operations element.
A particular focus shall be put on adoption of interoperability standards in the envisaged architecture, in support of distributed operation scenarios, cross-support and cooperation between the various players carrying out space segment operations.

Technical competencies

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

Behavioural competencies

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

Education

Applicants should have recently completed, or be close to completion of a PhD in a related technical or scientific discipline. Preference will be given to applications submitted by candidates within five years of receiving their PhD. In particular for this position, the following is required: PhD or equivalent qualification in computer sciences, aerospace engineering or robotics.

Additional requirements

Familiarity with existing robotic data systems, software architectures used in robotics, simulation, monitoring and control, automation, AI based planning and advanced visualisation would be an asset.
The working languages of the Agency are English and French. Due to the research nature of this position and the required intensive collaboration within the entities of the Agency but also with academia and international partner, very good knowledge of the English language is mandatory. 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 12 June 2019.

In addition to your CV and your motivation letter, please add your proposal of no more than 5 pages outlining your proposed research in the "additional documents" field of the "application information" section. Candidates are asked to arrange for 3 reference letters, to be sent by the referees themselves, before the closing date to temp.htr@esa.int. Please ensure your name is mentioned in the subject of the e-mail.

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, and the United Kingdom. Nationals from Slovenia, as an Associate Member, or Canada as a Cooperating State, can apply as well as those from Bulgaria, Cyprus, Latvia, Lithuania and 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.