

ISAE-SUPAERO Research Associate in Space Mission Analysis and Design

Context

UNIVERSEH (European Space University for Earth and Humanity) is an alliance of five European Universities committed to secure new approaches for teaching & learning, as well as developing new expertise in the space field, particularly, within the themes of *space for societal challenges*, *space sustainability*, *space exploration* and *space resources and settlement*. The alliance includes five universities from five European countries (Federal University Toulouse Midi-Pyrénées, University of Luxembourg, University of Dusseldorf, Lulea University of Technology and AGH University of Science and Technology) and is underpinned by European Commission's SwafS programme.

The Institut Supérieur de l'Aéronautique et de l'Espace (ISAE-SUPAERO), member of the Federal University Toulouse and the UNIVERSEH alliance, is a world leading institution in higher education and research in the field of aerospace engineering. ISAE-SUPAERO offers a complete and unique range of high-level scientific trainings including ISAE engineering training, apprenticeship training and international Master of Science in Aerospace Engineering. The scientific activity at ISAE-SUPAERO is organized within six training and research departments, including the Aerospace Vehicle Design and Operation Department (DCAS). DCAS conducts training and research activities related to the development of engineering models, methods and tools for the design and operations of aeronautical and space vehicles. DCAS researchers are divided into 4 research groups (Design of Aeronautical Vehicles, Decision and Control, Neuroergonomics & Human Factors and the Space Advanced Concepts). In particular, the Space Advanced Concepts group constitutes an interdisciplinary research team (4 profs, Postdocs/Ras, PhDs, etc) with expertise in the fields of Astrodynamics Control, GNC, AOCS, Robotics, Optimization, Propulsion and System Engineering.

Missions

The Research Associate (RA) will become part of the Space Advanced Concepts group during the three years duration of the appointment. The researcher is expected to contribute to the research activities of Dr Joan Pau Sanchez, which include research projects and studies that underpin the preliminary design of future space systems. Current research activities include the development of tools for mission design and flight dynamics (mixed-integer optimization, invariant manifold enabled transfers, autonomous deep space navigation), as well as the preliminary mission analysis of a range of space systems concepts including short- to mid-term missions (e.g., Comet-I, CASTAway, iCubeSats, etc) to long-term (asteroid mining, sunshades, etc).

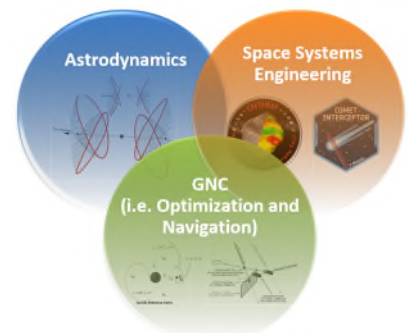


Figure 1. A RA is sought with expertise in some of the partially overlapping fields of Astrodynamic, GNC and Space System Engineering to strengthen the research activities at the Space Advanced Concepts at ISAE-SUPAERO.

Moreover, the RA is also expected to lead the development of new digital teaching material within the curricula of the Space System Major of the International Master of Aerospace Engineering.

To sum up, the allocated tasks for the post are:

- To develop a set of research activities in collaboration with Dr Joan Pau Sánchez and other researcher at the Space Advanced Concepts group. The remit of these activities is expected to be within the partially overlapping fields of Astrodynamics, Guidance Navigation and Control and Space Systems Engineering. Related disciplines will also be considered.
- To lead the development of a series of novel space digital microcontents, or digital nuggets, for learning within the curricula of the Space System major (see example material [here](#))
- To contribute to the deliverables of Beyond UNIVERSEH project by contributing to the discussion of the space research and innovation roadmap for the UNIVERSEH alliance.

Profile

The candidate holds a doctoral degree in aerospace engineering or related discipline. He/she has a solid track record of research on a space engineering, mathematics and or physics. He/she shows an ability to conduct research and promote the results within the science community. The candidate demonstrates vocation for

higher education and an awareness for different approaches for teaching and learning. He/she must demonstrate ease and efficiency in teamwork, relational, listening and communications skills. Fluency in written and oral expression in English

Contacts

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Application deadline: 26 June 2022 (with interviews first half of July)

Starting date 1 September 2022