

Postdoctoral Researcher – Asteroid Seismology

Key words: geophysics, seismology, regolith, numerical simulation, data archiving

Department: Electronics, Optronics, and Signal Department (DEOS)

CONTEXT:

ISAE-SUPAERO is one of the leading European schools for training high-level multidisciplinary engineers in all areas of aeronautics and space. As part of its policy to develop research activities related to the space sector, and to support the Seismic Instrument for Asteroids (SIA) / RAMSES project, ISAE is recruiting a postdoctoral researcher on a fixed-term contract.

On April 13th 2029, the 340 m asteroid (99942) Apophis will have a very close encounter with Earth coming within 1/10 of the Earth-Moon distance. The RAMSES mission is a joint ESA-JAXA mission planned for launch in March 2028. RAMSES will reach asteroid Apophis in February 2029 before the asteroid's fly-by of the Earth. The Seismic Instrument for Asteroids (SIA), currently under development at ISAE-SUPAERO with support from the French Space Agency (CNES), will be deployed to the surface of asteroid Apophis (inside a CubeSat platform) by the RAMSES mission prior to the asteroid's closest approach to Earth.

The SIA measurements will be used to constrain the seismicity of Apophis, to understand how the asteroid responds to external (tidal) forces in the low-gravity environment, and to probe the asteroid's subsurface and internal structure.

JOB DESCRIPTION:

The postdoctoral researcher will be part of the Space Systems for Planetary Applications (SSPA) team within the Electronics, Optronics, and Signal Department (DEOS) of ISAE. The candidate will perform research related to asteroid seismology to prepare the interpretation of the RAMSES/SIA data, and will also contribute to the SIA instrument data archiving activities. The specific responsibilities will include:

Research (70%):

- Develop and run numerical models simulating seismic wave propagation in low-gravity, granular, or rubble-pile asteroid environments.

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- Investigate seismic source mechanisms relevant to small bodies, including tidal-generated seismicity.
- Model the effects of asteroid internal structure (porosity, layering, rubble-pile structure) on seismic wave attenuation, scattering, and propagation velocities.
- Participate in the supervision of student research projects.
- Collaborate with the research team to analyse findings, prepare scientific publications, and present results at relevant conferences.

Data Archiving Support (30%):

- Prepare, format, and validate data products for submission to the Planetary Science Archive (PSA), in compliance with current PDS4 standards.
- Build and maintain pipelines for converting instrument data into archive-ready formats.
- Coordinate with ESA and the PSA throughout the review and certification process.
- Train and assist other group members in proper data handling and archiving practices.

REQUIRED PROFILE:

Candidates should hold a PhD in geophysics, seismology, physics or planetary science, or a closely related field and have demonstrated experience in seismic, geophysical or wave propagation numerical modelling. Strong written and verbal communication skills in English are necessary, including a record of peer-reviewed publication and/or manuscripts in preparation. Familiarity with PDS4 standards, XML-based metadata labeling, or prior data archiving experience would be an asset, as would a capability to communicate in French. The candidates should be proactive, and autonomous, while also enjoying working as part of a small multidisciplinary team.

SALARY AND BENEFITS:

The proposed salary ranges from 3495 to 3643 €/month (gross salary), depending on experience. The standard working week is 40 hours. Employees are entitled to 25 days of annual leave, 9 flexible RTT (reduction of working time) days, and 20 additional days corresponding to mandatory institutional closure periods. Remote work is possible for up to 1 flexible day per week.

Travel support is available to attend conferences and meetings.

DURATION: 12 Months, renewable for up to 3 additional years to cover the RAMSES/SIA mission operations, data analysis and scientific interpretation.

START DATE: January 2027

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LOCATION: TOULOUSE

RESPONSIBLE OF THE SUBJECT:

NAME: MURDOCH, Naomi

E-MAIL: naomi.murdoch@isae.fr

APPLICATION PROCESS:

Send a cover letter including ideas of potential research directions for this particular position, an academic CV with a list of publications, and the contact details of at least two referees to Naomi Murdoch (naomi.murdoch@isae.fr) and Raphael F. Garcia (raphael.garcia@isae.fr). The application deadline is 31 October 2026; however, the position may be filled before this date if a suitable candidate is selected.

REFERENCES:

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