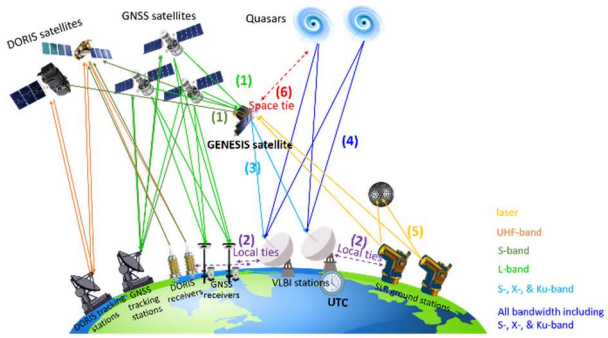
JOB OFFERS

The Royal Observatory of Belgium is looking for four scientists for its activities in the frame of the PRODEX project on GENESIS



Thanks to an important support from the PRODEX (Program for the Development of Scientific Experiments) program managed by ESA (the European Space Agency) in collaboration with the Belgian Federal Science Policy Office, **four positions for scientists** will be available in the frame of the GENESIS mission for the period 2023-2025. GENESIS will be launched in 2027. It is the first-ever satellite with all four space-based geodetic techniques on-board, namely Global Navigation Satellite System (GNSS), Satellite Laser Ranging (SLR), Very Long Baseline Interferometry (VLBI) and Doppler Orbitography and Radio-positioning Integrated by Satellite (DORIS). The main mission objective is to improve the international terrestrial coordinate frame (International Terrestrial Reference Frame, ITRF). Furthermore, the GENESIS mission will allow to improve the International Celestial Reference Frame (ICRF), and there with the link between the two frames, and thus the Earth Orientation Parameters (EOP). The Royal Observatory of Belgium (ROB) participates in the GENESIS mission by ensuring that it can achieve its scientific goals and follows the development of the novel VLBI transmitter (VT) as well as its scientific use.

The four positions will be fulfilled starting from November 2023, to work within four work packages:

In **WP1**, ROB performs efforts for ensuring the success of the overall GENESIS mission by providing contributions to definition, refinement and implementation of GENESIS Mission objectives, by contributing to the definition of system/instrument requirements and preparing the scientific tasks and data analysis. The assessment of needs, definition and realization of GENESIS specific services will be also part of the WP1. This WP, by its nature, will require exchange with the GENESIS industrial and scientific partners and ESA.

WP2 has the objective to follow the VLBI Transmitter (VT) development. The work will address mainly the VT scientific requirements and performances to assure its compatibility and operability with existing and future VLBI ground stations and its performances so that the data would be exploited at their full potential. WP2 includes thus assessment, implementation and verification of VT functionalities for compatibility and operability with existing and future VLBI ground stations (VGOS and legacy VLBI networks). It also includes the assessment of using the VT as calibration reference in sky for VLBI stations for the CRF realization as well as the assessment of proper clock/space-ties between the VT instrument and the other geodetic techniques onboard.

WP3 and WP4 deal with the operation, technique combination, and products. **WP3** will require one person who will use and develop scientific data analysis tools for the GENESIS mission. These tools will be used for verification/updates of science requirements and preparation of data exploitation in Phases A-D of the mission. The major task will be on single and multi-technique data combinations for TRF and CRF realization/improvements with GENESIS. In addition, Precise Orbit determination (POD) tools will be developed. The work will continue on TRF/CRF realization/improvements, assessment of geocenter variations and EOP parameter determination as well as the establishment of the additional contributions to Earth science that will be deduced. New data exploitation techniques necessary for GENESIS (with pseudo-range option that allows single-station delay measurements at VLBI ground stations) will be assessed also.

WP4 is about the atmospheric corrections, which includes corrections for neutral atmosphere and ionosphere as well as the atmospheric loading effects at ground station. The possible tropospheric/ionospheric data products (e.g. derivation of total electron contents, electron density profiles) from GENESIS data as well as from occultation data will be examined and strategies for optimizing the products will further be deduced. The work will be done in collaboration with ULiège who will contribute to ionospheric/plasmaspheric corrections and modeling starting in 2025 with state-of-art 3D ionospheric models and ray tracing method.

There will be four contracts, two for young scientists without a PhD (SW1) and two for young scientists with a PhD (SW2). Starting dates are flexible. The entry into employment is expected in November 2023 or after. We are looking for enthusiastic and motivated scientists, even if he/she is not available on November 1st, 2023. Students who are at the end of their master studies and who will get their master diploma in a reasonable timing (less than 3 months from the application deadline) may also apply.

We offer a competitive salary following the salary scales for federal government academic staff, flexible working conditions and additional benefits.

WE ARE LOOKING FOR

The candidate must have an academic master degree in Science or Engineering (and for some of the four positions of a PhD) or will have his/her master degree in less than 3 months from the application deadline and possess several of the following characteristics:

- strong interest in the field of space geodesy,
- scientific curiosity,
- creative and pragmatic problem-solving approach,
- capability to work in a team,
- capability to work in English.

For the different WPs we are looking specifically for

- WP1: Experience/knowledge in mission/system/instrument requirements, space industry interactions, science segment and geodesy data analysis;
- WP2: Experience/knowledge in instrument developments, in geodesy in particular;
- WP3: Experience/knowledge in geodesy data analysis, and VLBI data in particular, reference frame determination, precise orbit determination;
- WP4: Experience/knowledge in atmospheric corrections or characterization of the atmosphere from radio signal.

If the master and/or PhD degree were awarded outside of Belgium, the Netherlands and the Grand-Duchy of Luxembourg, a certificate to demonstrate the diploma equivalence will be needed during the procedure of the contract elaboration (see https://www.belgium.be/en/education/equivalence_of_diplomas).

HOW TO APPLY

Send a full CV (including grades), a motivation letter, and two or three reference names by August 31, 2023 to v.dehant@oma.be, Head of Operational Direction 'Reference Systems and Planetology' at ROB. The beginning of employment will be on November 1st, 2023 or later.