Engineer position at LESIA – Observatoire de Paris

Research Engineer: the study and specification of the on-ground processing algorithms of the PLATO space mission (ESA)

Context

The PLAnetary Transits and Oscillations of stars (PLATO) space mission is ESA's M3 mission which is scheduled to be launched towards the end of 2026. Its main objective is to detect and characterize a large number of extra-solar planets, primarily earth-sized planets located in their habitable zone. The Earth analogues that PLATO aims to discover will become pristine targets for future atmospheric characterisation with upcoming facilities (JWST, ARIEL, LUVOIR/HabEx, ELTs…). Finding these twins of the Earth is a substantial step further towards the detection of life elsewhere in the Universe.

Exoplanets will be detected via the transit method and characterized via their host stars. Stellar seismology based on PLATO data will provide stellar masses and ages whereas Gaia parallaxes will provide distances and hence stellar radii.

The PLATO instrument is composed of 26 cameras with 4 CCD (Charge Couple Device) detectors mounted at the focal plane. The quality of the data will rely on very precise photometry and a very high stability of the cameras and detectors. The photometric fluxes of the majority of the targets (approximately 110,000 per camera and per pointing) will be produced on board using photometric masks while another part of the targets (approximately 15,000 stars) will be processed on ground from imagettes (6x6 pixels) which will be downloaded at a cadence of 25s.

The LESIA (http://www.lesia.obspm.fr/) is strongly committed to PLATO, both in terms of embedded software, the specification of on-board and on-ground processing algorithms, and the scientific preparation of the mission. As part of the mission development phase, one of the tasks to be carried out concerns the study and specification of all on-ground algorithms. These specifications are indeed essential to begin with the development of the on-ground data processing chains. This work is conducted under the responsibility of the LESIA (respectively R. Samadi) in the framework of WP 32 (a component of the Plato Data Center, PDC). It involves many collaborators in close c4ontact with the team responsible for the development of the on-ground software at the Max Planck Institute in Gottingen (Germany).

At this stage of the project, the main components of the on-ground data processing chains are identified. However, the corresponding algorithms have to be studied in detail and complete evaluations of the expected performances have to be made. Finally, it will be necessary to translate the algorithms, currently in the form of detailed specifications, into a set of documents on the basis of which the PLATO Data Center (PDC) team will then develop the codes and perform the validation and integration tests.

Job description

The successful candidate will join the DPA-WG working group.
He/she will be in charge of:

- contributing to the study and development (Python and C language) of correction and calibration algorithms;
- implementing the simulation sets needed for the studies conducted by the DPA-WG;
- contributing to the writing of documents describing in detail the algorithms and methods adopted for each sub-component of the on-ground data processing chain;

• defining and performing the unit tests associated with each component of the data processing chain.

To carry out his/her work, the candidate will have at his disposal the PLATOSim simulator (Marcos-Arenal et al, 2014, A & A) which models each telescope and their spatial environment. The applicant will integrate a team made up of several LESIA researchers and engineers involved in the PLATO space mission. The candidate will also benefit from the expertise of a team of researchers and engineers from different European countries (France, Portugal, Germany, United Kingdom) with solid experience in space missions CoRoT, *Kepler* and GAIA. The candidate will develop, in Python and C / C ++, the numerical codes corresponding to the algorithms that he will have to design or that will be proposed to him.

Profile

The candidate must hold a doctorate in astrophysics (or in a similar subject: physics, or signal processing for example) or an engineering degree (including experience in astrophysics research or signal processing). The person will have experience in software writing and/or data analysis. The candidate must appreciate teamwork and agree to travel within Europe to visit different partners. The mastery of written and oral English is essential. Previous work experience in a context related to space research would be a plus. Experience in image data analysis and / or optics will be much appreciated. Knowing the Python and C / C ++ languages would be a plus, as well as the mastery of collaborative development tools (eg Subversion). Experience in supervision would also be much appreciated.

Contract

The position is for one year and is renewable up to 3 years in total. The position is open from 1st October 2019. The salary level corresponds to the CNRS IR (Ingenieur de Recherche) fixed-term contract salary scale and depends on the level of the diploma and experience. The successful candidat would work at the LESIA-Observatoire de Paris, at the Meudon site (92, Haut de Seine, France).

Application and dates

Your application shall include:
• a CV;
• a letter of motivation indicating the adequacy of the qualifications and / or experiences including the position(s), as well as a description of past experiences;
• and a list of publications as appropriate.

The application shall be submitted in the form of a single PDF file (<5Mo) by email to wp32.office@obspm.fr with the subject "Application PLATO / ALGO". Applications are being solicited now and a first file review will be conducted starting from beginning of September 2019.

Plato websites

- http://sci.esa.int/plato/
- https://plato.cnes.fr/en/PLATO/index.htm
- http://www.oact.inaf.it/plato/PPLC/Home.html