

Internship in Copernicus Mission Development Division

Internship title: System Data Circulation modelling using File Based Operations (FBO)

Traditionally Earth Observation missions have been operated using data packetisation standards as the transport means for telemetry and telecommand data between user applications on-ground and applications on-board the satellite, in accordance with the ECSS Packet Utilization Standard (ECSS E-70-41). More recently, however, there has been a move towards off-line operations concepts, as file transfer has become an ever more common function. In addition, a reliable Space to Ground interface is becoming an increasingly critical issue for Earth observation missions, which are facing the need to cope with an increasing demand in terms of data rate acquisition. The need to adopt downlink frequencies, which allows higher data rates, comes at the price of a reduced reliability of the Downlink with the potential risk of data loss, associated (for example) to bad weather conditions.

The use of the FBO (File Based Operations) is made possible by the availability of standardized file transfer protocols, such as the CCSDS File Delivery Protocol (CFDP).

The file based approach shall also be integrated in a wider context at mission level, making sure the space segment and the ground segment implement the new approach consistently, tailoring the standard CFDP to the specific mission objectives.

The internship activities will be focused on the development of a simulator, to model the end-to-end system data circulation using file based operations. The case study will be the Copernicus CO2M Mission. The objective is to model the main building blocks of the data circulation, from the Space Segment to the Ground Segment, allowing the analysis of the data volume profile over time, to evaluate the behaviour of the system with various operational scenarios and assumptions. The simulator shall be able to tune a set of key parameters, to perform selected trade-off studies, sensitivity analysis, contingency scenario analysis and data availability assessment.

The intern will join the Copernicus Mission Development (CMD) Division.



LOCATION

Darmstadt, Germany



QUALIFICATIONS

The internships are open to bachelor and master students with mandatory internship requirements in relevant disciplines such as Telecommunication Engineering, Electronic Engineering, Aerospace Engineering, Physics, Mathematics.



LANGUAGES

The official languages of EUMETSAT are English and French. It is necessary to be able to work effectively in English.



DEADLINE

20 November 2023

Duties

As an intern you will:

- Study of an end-to-end file-based data delivery approach, implemented via the CFDP protocol for the Future Copernicus missions;
- Trade-off of different operational scenarios taking in account the CO2M Mission as study case, focusing on the end-to-end data flow using a file based approach;
- Build an end-to-end file-based data circulation simulator as support for the analysis and trade-off assessment;
- Expand and develop the capability of an already existing CFDP software environment for the automatic testing of some sub-systems identified during the activities listed above.
- In addition, the intern will support relevant day-to-day activities within the team.

Skills and Experience

- Have the ability to work effectively in English;
- Be computer literate;
- Be intrinsically motivated and curious about the internship subject;
- Be able to work independently and collaboratively;
- Have the ability to take the initiative in researching ideas;
- Have the ability to collect, collate, conceptualize and present information clearly.

Additional specific requirements:

- Some knowledge of the most common Telecommunication Protocols and some knowledge of the LEO earth observation systems would be an advantage.
- Some knowledge of the Linux, Matlab or/and Python would be an advantage.

Employment Conditions

Length of internship: **6 months**

Anticipated start date: **First half 2024**

The internship will require a non-disclosure agreement and potentially a basic background check for the intern, due to the sensitivity of the provided information.

No salary is paid to interns who are still in studies, however a daily allowance and contribution to

travel / accommodation costs may be provided. The conditions will be established taking into account the requirements and policy of the intern's educational institution.

Interns are responsible for providing their own health and accident insurance and for finding their own accommodation in Darmstadt.

EUMETSAT is committed to providing an equal opportunities work environment for men and women.

Please note that only nationals of EUMETSAT Member States may apply. The EUMETSAT Convention requires that Staff shall be recruited on the basis of their qualifications, account being taken of the international character of EUMETSAT.

About EUMETSAT

EUMETSAT is Europe's meteorological satellite agency. Its role is to establish and operate meteorological satellites to monitor the weather and climate from space - 24 hours a day, 365 days a year. This information is supplied to the National Meteorological Services of the organisation's Member States in Europe, as well as other users worldwide.

EUMETSAT also operates several Copernicus missions on behalf of the European Union and provide data services to the Copernicus marine and atmospheric services and their users.

As an intergovernmental European Organisation, EUMETSAT has 30 Member States (Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.)

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