

## Training Opportunity for Belgian National Trainees

Reference	Title	Duty Station
BE-2023-OPS-SW	Space Weather	ESOC, Darmstadt

### **Overview of the mission:**

The ESA Space Safety Programme Office takes care of all potential hazards from or in space which can impact human activities on Earth or in space. The spectrum of tasks involves developing at basic understanding of space hazards originating from our Sun, man-made space debris, or asteroids potentially colliding with Earth. It also examines basic approaches mitigating these hazards and implementing space systems end-to-end in a sustainable and eco-compatible way. Moreover, several corner stone missions are underway to demonstrate basic methods of space weather forecasting, asteroid deflection and active space debris removal from orbit.

The Space Weather Office is responsible for developing tools, models and applications for nowcasting and forecasting space weather, i.e. the enormous eruptions in the Sun that impact the environment everywhere in our Solar System.

When these eruptions hit Earth, they can cause major damage in surface infrastructure, damage satellites and endanger the health of astronauts in space. Geomagnetic storms triggered by solar events can cause blackouts in power grids, disrupt satellite navigation and communication, as well as aviation, transport and many other functions that have become part of our daily lives. Energetic particles from solar events can also damage space probes that we have sent to other planets in the Solar System. The Space Weather Office is therefore developing space weather forecasting capability for other planets such as Mercury, Venus, Mars and Jupiter. The Office is also responsible for developing and implementing the satellite missions for space weather monitoring to make space weather services possible for users.

You are encouraged to visit the ESA website: <http://www.esa.int>

### **Overview of the field of activity proposed:**

For many years, ESA's Space Weather Office has been building a large network of observatories dedicated to collecting, processing, analysing and distributing data describing the current conditions of the environment between the Sun and Earth. To predict how this environment will look in the future, we are using advanced computer models. An accurate space weather forecast must then, using a computer, solve and take into account, the detailed physics of the heliosphere at multiple scales of time and space - a task that no single piece of software can perform. ESA, in collaboration with European industry and academia, is coordinating the development of models of the Sun, interplanetary space, the geomagnetic environment, and the environment of the Moon and those of other planets. These codes are at the forefront of scientific discovery in space weather.

As a Belgian National Trainee, you will validate the results obtained by the coupled models in the ESA Virtual Space Weather Modelling Centre. The project will start with understanding the inputs and outputs of the models, and evaluating their performances. In collaboration with the project coordinator, and the Space Weather Office, you will select interesting solar events during the last solar cycle that will be reproduced by the computer models. You will compare these results with existing satellite and ground observations to evaluate the current performances of the system.

**Required education and skills:**

- You should have just completed, or be in the final year of your Master' s degree in aerospace engineering, computer sciences, physics or applied mathematics.
- Good interpersonal and communication skills
- Ability to work in a multi-cultural environment, both independently and as part of a team
- Fluency in English and/or French, the working languages of the Agency