

# EO-CONNECT

## Promoting global networking in Earth observation training

Announcement "CONNECT Education-Research-Innovation

**This is an auto-translated excerpt of the original German version of the research proposal.**

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## 1 Subject and objective of the project

### 1.1 Presentation of the project idea

Earth Observation (EO) is becoming increasingly important for many aspects of society, politics and ecology. Satellite imagery is used in many disciplines to better understand what is happening on our planet. Through initiatives such as the Copernicus programme of the European Union and the European Space Agency, EO is being made available as an analysis and decision-making tool to broad user groups in science, society and industry. While a few institutions (e.g. universities) used to specialise in the analysis of EO data, the circle of users is now expanding. This leads to an increasing demand for specialists. The EO sector faces many challenges. Large amounts of complex data need to be converted into information and made accessible quickly, easily and with high quality. In addition, knowledge about climatic changes, for example, must also be communicated to those parts of the world that are most affected by anthropogenic climate change. These are often emerging and developing countries, without technical-educational infrastructure for effective knowledge transfer.

Over the past eight years, the Chair of Remote Sensing at Friedrich Schiller University (FSU) Jena has developed learning materials and training on radar remote sensing as well as the "EO College" (<http://eo-college.org>) - a learning platform for questions and needs of learners in the field of EO for the simplest possible global access to knowledge. The networking of initiatives and institutions in the field of EO education is a very recent development. Until now, there were mainly isolated solutions that advanced specific aspects of EO education or developed very specific products. The trend towards networking has only started in recent years, but can already point to extensive synergy effects.

In the proposed project, national and international cooperation networks in EO education are to be strengthened and formalised through harmonisation, standardisation and opportunities for collaboration. This should create and establish a qualitatively and quantitatively improved EO education. Through a nucleus project on the contribution of Earth Observation to the reduction of world hunger, the global knowledge community shall be promoted and solutions for one of the most elementary problems of the 21st century shall be found. The approach outlined here is intended to contribute to long-term establishment and standardisation in the field of EO education. By establishing common standards and procedures, future cooperation can be made much more efficient and sustainable.

## 1.2 Characterisation of networking and cooperation activities

The project aims to improve the global networking of EO education initiatives as follows: A central contact point for EO education (EO Education Office) will help relevant stakeholders to quickly and easily implement necessary content for their own teaching offers. Part of the budget should be reserved for training, workshops and pilot studies.

The nucleus project, which is to be carried out together with relevant stakeholders, is intended to create a common emotional, formal and future-oriented basis from the outset, which is created by working together on a global problem.

The Figure 1 shows the applicant's existing cooperation with relevant actors. In addition, there are potential new cooperation partners with whom cooperation in the project can arise (e.g. FAO, Worldbank, EnMap). The FSU Jena is a member of the following committees, among others: An attractive cooperation context has been created with the Copernicus Academy<sup>1</sup>. The EO4GEO project<sup>2</sup> represents a formal approach to networking European training initiatives. A combined top-down and bottom-up approach is being pursued to integrate further international partners, especially from emerging and developing countries: At the institutional level, the CEOS<sup>3</sup> "Working Group on Capacity Building and Data Democracy" is a potential global umbrella organisation for EO training. The national space agencies (e.g. DLR, ESA, JAXA, NASA) are organised there with the aim of a resource-efficient global exchange of knowledge, whereby developing and emerging countries are actively involved in processes. Another relevant point of reference is the cooperation with the United Nations, represented by the United Nations Platform for Space-based Information for Disaster Management and Emergency Response, UN-SPIDER for short.

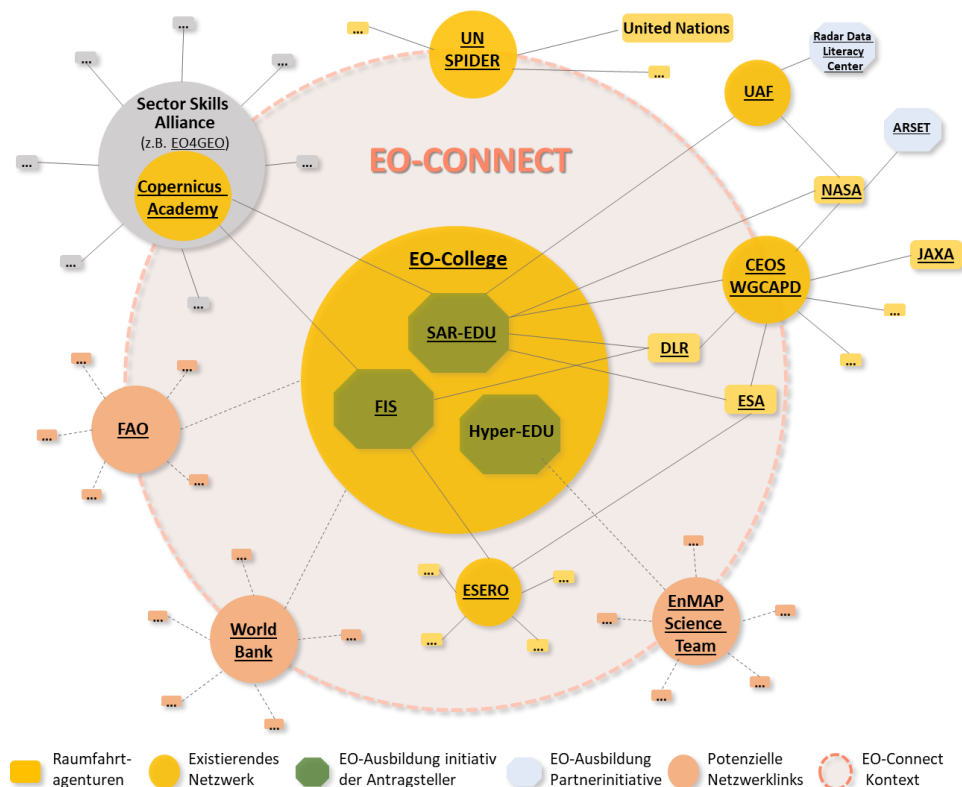


Figure 1: EO-Connect Network Sketch

<sup>1</sup> <https://www.copernicus.eu/en/network/networks-map>

<sup>2</sup> <http://www.eo4geo.eu/partnership/>

<sup>3</sup> <http://ceos.org/ourwork/workinggroups/wgcapd/>

EO is a classic cross-cutting topic that encompasses natural and social science areas. The project should cover the broadest possible fields of application. A basic objective of the project is to ensure that the results are as fundamentally usable as possible and that the targeted partnerships within the EO training network are structured flexibly. An indicator of the broad thematic positioning is the choice of the joint nucleus project (see section 3), which has numerous professional, institutional and political dimensions as well as a general global focus of interest.

### 1.3 Work objectives and methodological approach in the project

The project is intended to give EO training actors greater scope for cooperation within the framework of training initiatives. The following measures are planned for this purpose:

**(1) Assess the emerging networks and create a one-stop shop** (EO Education Office) to support potential partners in planning and implementing offline and/or online courses or creating other EO teaching materials. The support can be of a personnel, financial or didactical nature.

**(2) Design, production and publication of an online course (MOOC) "Earth Observation as a Contribution to Achieving the Sustainable Development Goal Zero Hunger"** <sup>4</sup>. This specific project objective aims to achieve a strong networking of involved actors based on a concrete topic. For this purpose, a topic with the greatest possible public interest is to be worked on in order to create media attention for Earth observation, the network of course creators and for the problem as such. Based on this concrete working goal, future collaborations between a) the applicants and b) the involved partners of the EO training network are to be established.

**(3) Emerging networks of actors should be used to research new learning methods** in digital EO education. For this purpose, existing know-how of the EO community should be compiled, abstracted and further developed and lead to concrete technical developments of the learning platform EO College. The knowledge gained is to be made available to the general public.

**(4) Adapt and implement technical standards for** the processing and provision of EO training materials, held in a central repository that is openly available to a) network partners and b) the general public. This should significantly increase<sup>5</sup> the efficiency of future training initiatives and the reusability of existing resources.

The project comprises four work packages (WP). Each work package contains the phases conception - implementation - evaluation and communication and thus offers a coherent overall concept that should enable interaction between APs but also between partners of the network. The fifth WP serves to coordinate and evaluate the remaining APs in order to ensure an effective, resource-efficient and timely approach.

By creating a one-stop-shop for EO education, the access of interested stakeholders to EO education should be significantly increased, phases of learning concepts or implementing technologies should be shortened and relevant results should be communicated efficiently. Working towards the development of standards should increase collaboration between stakeholders and the use of learning materials. The implementation of a common nucleus project leverages the different expertise of relevant stakeholders. Relevant stakeholders for the listed activities are composed of the following institutions:

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<sup>4</sup> <http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-2-zero-hunger.html>

<sup>5</sup> With the IEEE LOM, an open standard exists for metadata to describe learning objects, [https://standards.ieee.org/standard/1484\\_12\\_1-2002.html](https://standards.ieee.org/standard/1484_12_1-2002.html)

- National and international space agencies (mainly via CEOS WGCapD and UN Spider <sup>6</sup>)
- National research institutes and universities (especially via the FSU+RUB network)
- National and regional administrative institutions (mainly via FAO, UN SPIDER, CEOS WGCapD)
- Commercial providers of remote sensing data and products

The joint development of an online course also leads to stronger formal and informal networking among the stakeholders and with the applicants. By reserving approx. 20% of the planned budget for subcontracts, a financial incentive for collaboration is to be created and professional collaboration in various subsectors is to be made possible in the first place. A concrete work plan, including specific subcontracts, will be developed in WP 2100 and WP 3100. Depending on the task, subcontracts should also be awarded to service providers from emerging and developing countries, if possible. The following activities are to be financed through subcontracts:

- Organisation and implementation of local trainings
- Contributions to the Zero Hunger MOOC (e.g. educational videos, animations, interactive web tools etc.)
- Orders for the necessary technical further development of the EO College
- Development and implementation of gamification elements in EO training
- Commissioning studies or funding experiments to explore new learning methods.

The chosen approach (contact point, standards, nucleus project, open information culture) is intended to make clear the existing synergy potential of networking EO training initiatives beyond the actual implementation of these measures. Based on this awareness and the common experiences, emerging cooperations can be expanded and deepened in the future.

The results of the work packages represent a tangible added value that can be easily measured (e.g. graduate numbers of the online course, workshops of the "EO Education Office"). In combination with a comprehensive network analysis and an open communication culture (e.g. open access publications), these results will generate or strengthen trust in the network and, not least, enable effective collaboration in digital education through standards to be developed.

The development of online courses and the envisaged cooperation network has a global focus. A large part of the findings and products to be developed (online course, standards, know-how learning methods) can be used in the future independently of the project outlined here and increase the efficiency of EO training. This significantly increases the likelihood of future funding measures. The target countries for the nucleus project are essentially the developing and emerging countries that are most affected by the hunger problem, as well as the stakeholders in the industrialised nations whose interest is the achievement of this development goal.

The project is to be designed as a network between the FSU and the RUB (Ruhr-Universität Bochum) because: a) increasing the size and excellence of the existing network and b) complementing the expertise of the institutions for more efficient, higher-quality processing of the planned tasks.

Major interfaces arise in the development of the planned online course, research into new learning methods and the development of standards for eLearning. Planning and coordination of the "EO Education Office", on the other hand, are to be bundled in Jena to enable direct communication between the staff.

These work objectives take into account the Federal Government's strategy for the internationalisation of education, science and research by strengthening excellence in and outside Germany, developing our own innovative strength internationally, expanding education and qualification internationally and, above all, contributing to shaping the global knowledge society together with emerging and developing countries.

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<sup>6</sup> UN SPIDER Regional Support Offices (<http://www.un-spider.org/network/regional-support-offices>)