







Capacity Building in Earth Observation Hyperspectral Remote Sensing: the Horizon Europe EXPERT project between ASI, DLR and ROSA space agencies.

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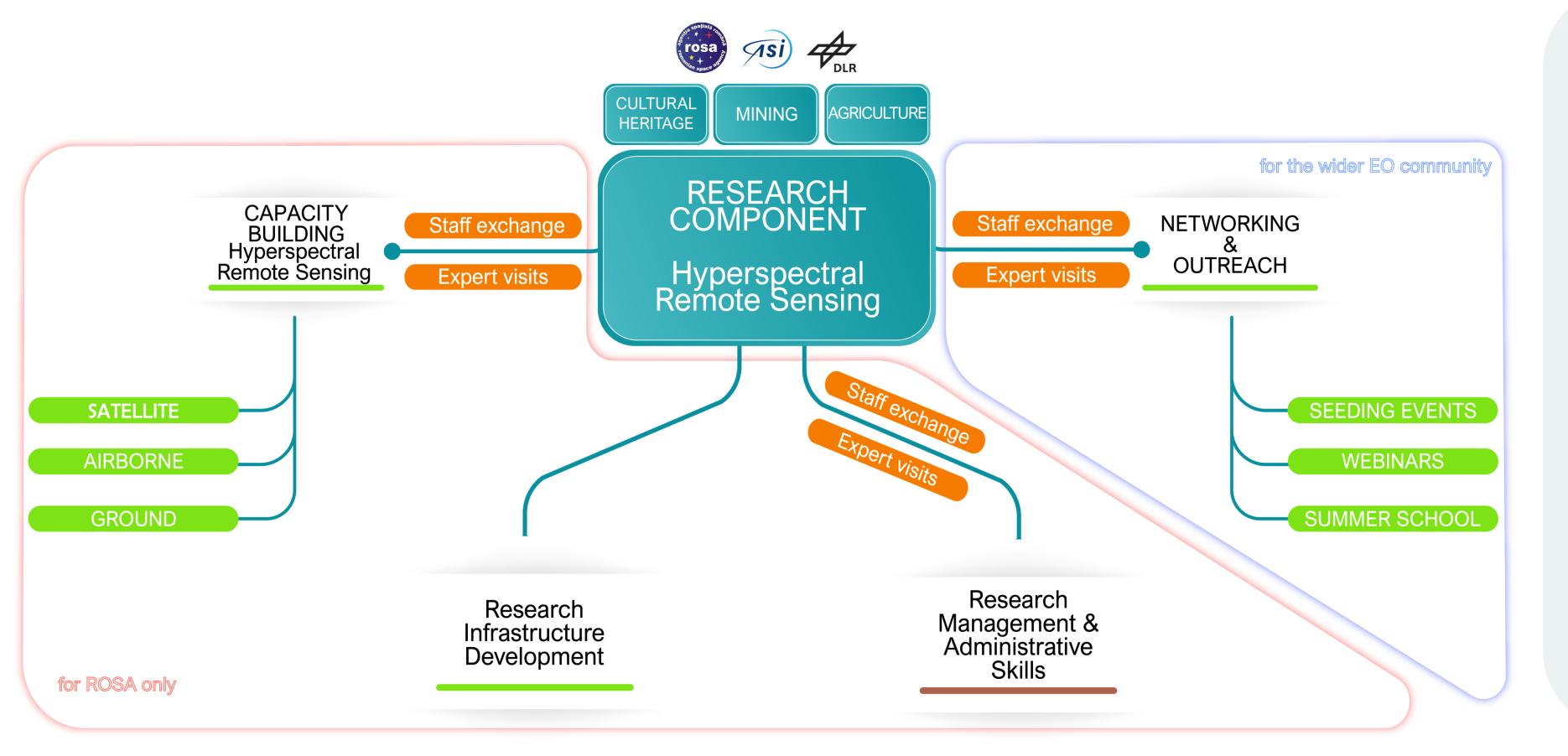


EXPERT: Vision, Collaboration, and Goals





The Horizon Europe project EXPERT (June 2024 – May 2027) aims to strengthen the Romanian Space Agency's (ROSA) capacity in hyperspectral (HS) remote sensing by transferring knowledge and best practices from the leading space agencies ASI (Italy) and DLR (Germany). Focusing on applications in agriculture, cultural heritage, and mining, the project combines training, field campaigns, and infrastructure development to enhance ROSA's data analysis and research capabilities. Partners will support ROSA through courses, seminars, and joint use of satellite data from missions like PRISMA and EnMAP, while also improving research management and integrating open science and social sciences aspects. The ultimate goal is to enable ROSA to independently lead hyperspectral research activities, increasing national and European collaboration and innovation in this field.



Case Studies

*Agriculture: crop drought stress

? Archaeology: buried archaeological feature identification



Capacity Building Actions implemented

- 1. Training at least 50% of ROSA's Earth Observation experts in hyperspectral remote sensing, leveraging existing expertise in multispectral and SAR domains.
- 2. Organizing 3 (so far) intensive capacity-building sessions led by ASI and DLR, including short-term staff exchanges, expert visits, and virtual training workshops to ensure knowledge transfer.
- 3. Conducting 3 practical research use-cases that demonstrate the application of hyperspectral remote sensing across diverse fields.
- 4. Organizing 2 intensive research management training modules led by ASI.
- 5. Developing and deploying dedicated research infrastructure at ROSA, including essential software and hardware tailored for hyperspectral remote sensing activities.

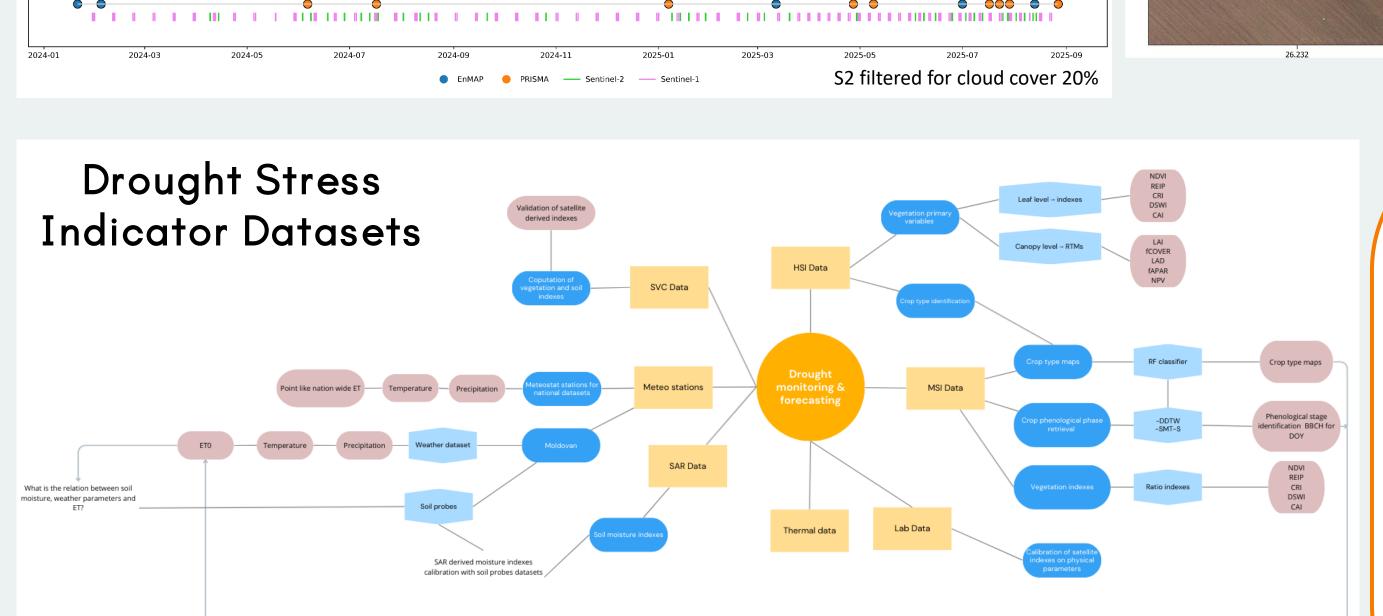
Capacity Building in practice: conceptualization of the agricultural research use-case

Conceptualization & Approach

- 1. Study site located in proximity of Bucharest, in Moara Domnească, at the didactic farm of the University of Agronomic Sciences and Veterinary Medicine of Bucharest.
- 2. Scientific goals are defined according to the stakeholder suggestions and translated into: development of a vegetation drought stress indicator (I.) and investigation of soil health (II.) combining HS remote sensing and ancillary datasets.
- 3. Site (a), a scientific experiment managed by TERRASIGNA, is equipped with soil moisture probes useful for drought analysis. Site (b) presents uneven crop growth patterns related to localized, shallow soil depressions
- 4. Three field campaigns performed in 2025. The first field campaign focused on data collection strategies and correct sampling of field spectra with an SVC spectrometer. The latter two allowed ROSA's team to consolidate skills in data collection observations. Soil and vegetation samples were collected compatibly with field conditions.
- 5. PRISMA and EnMAP were tasked to match field surveys and achieve the highest possible time series density. HS and Sentinel-2 multispectral are used both individually and in combination.
- 6. Soil-plant vigor modifications are investigated with HS data, focusing on both soil and plant spectra. HS indices are computed to test the accordance with field observations.
- 7. The drought monitoring approach encompasses multiple data sources as climate, plant phenology, crop type maps, field spectroscopy, thermal data and Sentinel-1 data.
- 8. The approaches adopted for the agricultural case study help ROSA learning about the organizational aspect of data collection and its relation with the methodological definition.

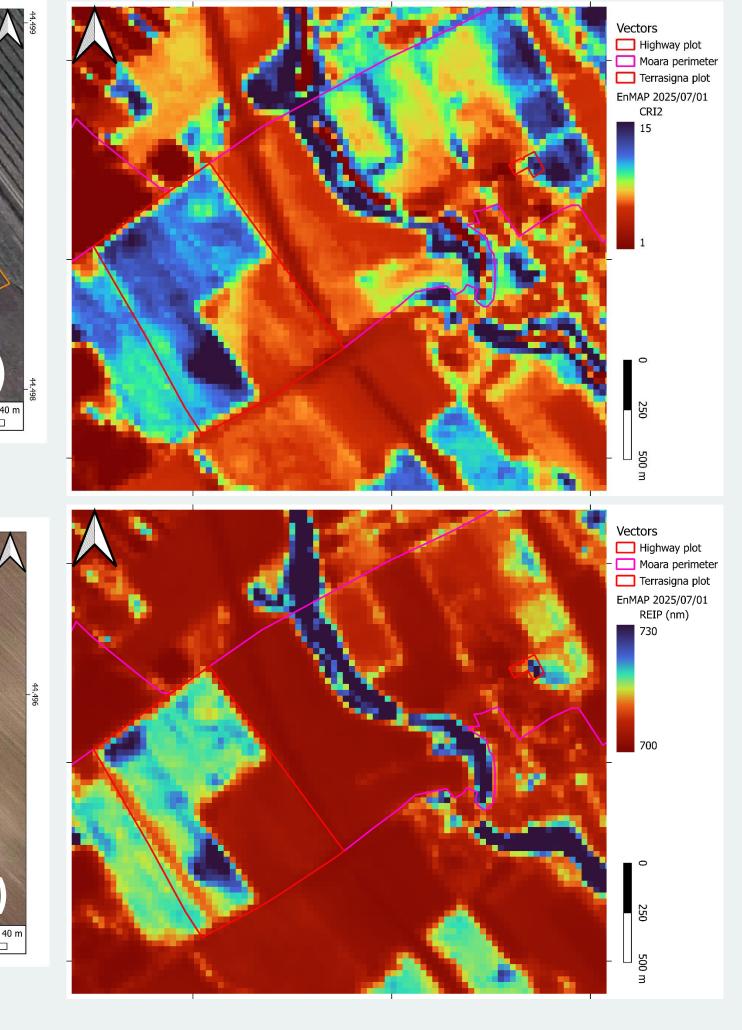
Site Overview and Satellite Acquisitions

Moara Domnească didactic farm perimeter 26.250



Field Campaigns

Spectral Indices



Project Expected Results

- Expert knowledge on HS remote sensing
- 2. An extended network of potential collaborators
- 3. Guidelines regarding the use of HS remote sensing for cultural heritage / mining / agriculture R&D activities
- 4. Publication of research outcomes in scientific journals (high-ranked)
- 5. Best practices for research management
- 6. Enhanced research management roadmap