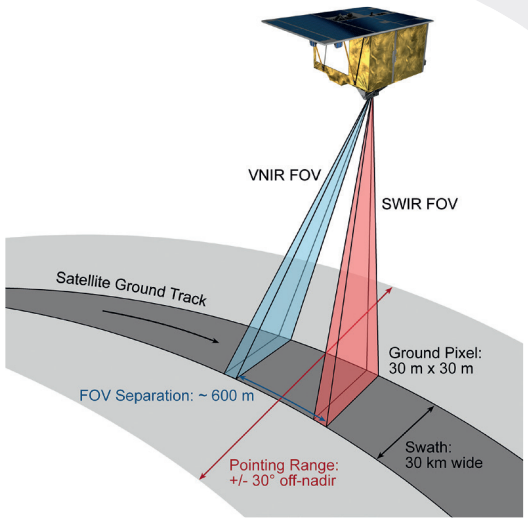
Mission and Instrument Overview

Orbit characteristics		
Orbit / Inclination	sun-synchronous / 97.96°	
Target revisit time	27 days (Viewing Zenith Angle ≤ 5°) / 4 days (Viewing Zenith Angle ≤ 30°)	
Equator crossing time	11:00 h ± 18 min (local time)	
Instrument characteristics	*VNIR (visible / near infrared)*	*SWIR (shortwave infrared)*
Spectral range	420 - 1000 nm	900 - 2450 nm
Spectral sampling interval	6.5 nm	10 nm
Spectral bandwidth (FWHM)	8.1 ± 1.0 nm	12.5 ± 1.5 nm
Signal-to-noise ratio (SNR)	› 400:1 @495 nm	› 170:1 @2200 nm
Spectral calibration accuracy	0.5 nm	1 nm
Ground sampling distance	30 m (at nadir; sea level)	
Swath width	30 km (field-of-view = 2.63° across track)	
Acquisition length	1000 km/orbit - 5000 km/day	

The EnMAP satellite has two spectrometers on board recording light from the visible to shortwave infrared in 246 bands. EnMAP has a ground resolution of 30 x 30 m and a revisit time of 27 days (off-nadir four days).



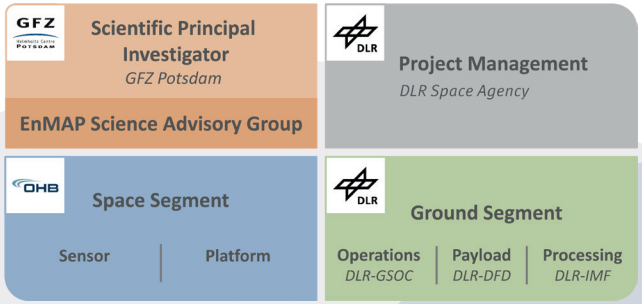
Representation of an EnMAP overpass

Scientific Principal Investigator

Sabine Chabrillat (GFZ German Research Centre for Geosciences, Leibniz University Hannover) supported by the EnMAP Science Advisory Group (EnSAG)

Mission Management

Sebastian Fischer (German Space Agency at DLR)



Schematic overview of the project organization

Funding

The core funding of the mission is provided by the German Space Agency at DLR with resources of the German Ministry for Economic Affairs and Climate Action and with contributions from the German Aerospace Center (DLR), OHB System AG and GFZ.

Supported by:

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www.enmap.org

Image credits:

GFZ Potsdam, OHB System AG, DLR, Trier University

10/2022

EnMAP

Environmental Mapping and Analysis Program

The German hyperspectral satellite mission EnMAP

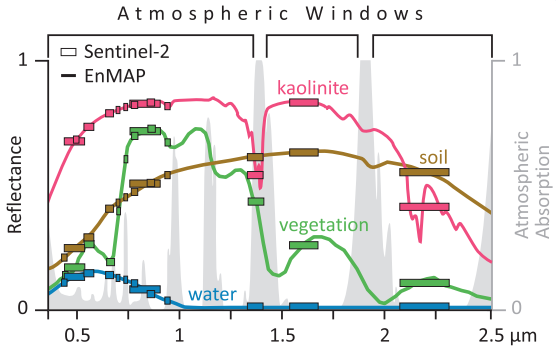
Mission goals

The Environmental Mapping and Analysis Program (EnMAP) is a German hyperspectral satellite mission that monitors and characterizes the Earth's environment utilizing its regional coverage on a global scale.

EnMAP provides quantitative surface parameters on the status and change of terrestrial and aquatic ecosystems. The primary goals are to 1) investigate globally interconnected environmental processes; 2) study the diverse effects of human interventions on ecosystems; and 3) support the management of natural resources. By quantifying and modeling crucial ecosystem processes, EnMAP contributes greatly to our understanding of the Earth System.

EnMAP allows the diagnostic identification of surface materials and the analysis of the composition of the Earth's surface for a wide range of applications. The high level of spectral detail enables novel analytical approaches that are not possible with multispectral satellites such as Sentinel-2.

Algorithms developed during the preparatory phase are accessible in the EnMAP Box, a freely available software package. In addition, the online learning platform HYPERedu is available to train students and professionals in hyperspectral remote sensing.



Hyperspectral vs multispectral imaging for selected types of surface cover

Overarching Research Themes

EnMAP's repeated observations and advanced spectral coverage and resolution open up new ecosytem research horizons. EnMAP will make a significant contribution to the following scientific questions.

Climate Change Impact and Interventions

- How does climate change affect the functioning, composition and phenology of terrestrial and aquatic ecosystems?
- What interventions can effectively combat climate change and how can their implementation be monitored?

Land Cover Changes and Surface Processes

- What is the spatial distribution and extent of land degradation and land use/land cover change?
- What processes drive land degradation and how efficient are interventions?
- How does land degradation and land use/land cover change impact food security and environmental sustainability?

Biodiversity and Ecosystem Processes

- How do ecosystems change in their composition, spatial distribution and health?
- To what extent does ecosystem change affect the loss of biodiversity and the migration of species?
- How successful are measures to achieve ecosystem stability and to combat biodiversity loss?

Water Availability and Quality

- What areas are affected by water scarcity and poor water quality?
- How do climate change and human activities reinforce water scarcity and water quality problems?

Consequences of overgrazing in the Albany Thicket Biome (South Africa)

DLR

Natural Resources

- How can natural resources, such as mineral deposits, soils, energy sources and ground water sources, be explored and managed in a sustainable way?
- What impact does industry, mining and agriculture have on natural resources?
- What is the degree and extent of environmental damage from natural resource extraction and to what extent is the damage being restored?

Hazard and Risk Assessment

- What regions are most vulnerable to natural and man-made hazards?
- In the case of a natural or man-made disaster, what areas are most affected?