

EnMAP

Germany's hyperspectral satellite mission



Brief description

EnMAP (Environmental Mapping and Analysis Program) is the first German hyperspectral satellite mission, financed by the German Space Agency at DLR with funding from the BMWK. Imaging spectrometers measure solar radiation reflected by Earth's surface, from visible light through to short-wave infrared. This allows precise conclusions to be drawn about the condition of and changes to the planet's surface.



Aims

EnMAP is designed to provide high-quality hyperspectral data on a regular basis. This will make it possible to answer current questions in the fields of environment, agriculture, land use, water management and geology on a global scale. The mission is scheduled to launch in April 2022 and has a lifetime of five years.



Parties involved

German Space Agency at DLR, GFZ Potsdam, OHB System AG, German Space Operations Center at DLR, German Remote Sensing Data Center, DLR Remote Sensing Technology Institute



Applications

- Precise statements about the state of and changes to Earth's surface
- Spectrally high-resolution data also provide quantitative information, e.g. nutrient supply of arable crops, water quality of lakes or identification of soil minerals

Outlook

- Global and long-term data collection to answer questions in the fields of environment, agriculture, land use, water management and geology
- Building up and expanding expertise in the field of 'System Earth'



Facts and figures

Launch: April 2022 on a SpaceX Falcon 9 rocket from Cape Canaveral (USA)
Orbit altitude: 653 km, Sun-synchronous
Satellite size: 3 × 2.1 × 1.5 metres
Satellite mass: approx. 850 kg
Energy consumption: 800 W
Mission operations/commanding: German Space Operations Center Oberpfaffenhofen and Weilheim (DLR)
Data reception/processing: DLR ground station Neustrelitz, DLR IMF

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EnMAP (Environmental Mapping and Analysis Program) is the first German hyperspectral satellite mission for Earth observation. Imaging spectrometers measure solar radiation reflected by Earth's surface from visible light to short-wave infrared. This allows precise conclusions to be drawn about the condition of and changes to the planet's surface. The mission is scheduled to launch in April 2022 and is designed to operate for five years. The data from EnMAP will help to answer current questions in the fields of environment, agriculture, land use, water management and geology on a global scale. Conventional multispectral sensors record the radiation reflected from the Earth in a few, spectrally very broad channels. From these, reliable qualitative information can be derived, for example about land cover and its spatial distribution. For quantitative information, on the other hand, such as the nutrient supply of arable crops, the water quality of lakes or the identification of soil minerals, spectrally high-resolution data are required.

EnMAP carries an imaging spectrometer instrument that will map Earth's surface in spectra within 242 narrow channels. This allows quantitative, diagnostic information to be obtained about vegetation, land use, rock surfaces and bodies of water. These data will provide information about the mineralogical composition of the rocks, the damage to plants caused by air pollutants or the degree of soil pollution.

The satellite will acquire data from an altitude of approximately 650 kilometres with a ground resolution of 30 metres by 30 metres. The ability to slew EnMAP perpendicular to the direction of flight by up to +/- 30 degrees will allow comparative observations with a four-day revisit rate. In this way, the satellite will be able to document spatio-temporal changes – such as erosion processes or vegetation cycles – and provide insights into how the ecosystems of different natural areas spread and how they are structured.

