

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Sensors and Technology (3)

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FUTURE EARTH OBSERVATION – ENMAP SENSOR CHARACTERISTICS

Abstract

The Environmental Mapping and Analysis Program (EnMAP) is a German hyperspectral satellite mission (www.enmap.org), which will provide accurate and diagnostic information on the state and evolution of terrestrial and aquatic ecosystems. The EnMAP space segment is realized as a single satellite hosting a hyperspectral imaging sensor, fully developed, integrated and qualified at OHB System. The imaging spectrometer implements a novel prism based dual spectrometer concept. The spectral range of the mission covers 420 nm to 2450 nm with a spectral sampling distance between 4.8 nm and 12.0 nm. Dedicated on-board calibration devices allow for a spectral registration knowledge accuracy of better than 1.0 nm and radiometric accuracies better than 3% in VNIR and 5% in the SWIR spectral ranges. The signal-to-noise ratio (SNR) for 30 deg sun zenith angle, 30% albedo and 10 nm equivalent spectral sampling has been characterized to be greater than 500 at 495 nm and greater than 200 at 2200 nm. Level 1 data product (Top-of atmosphere radiance) quality is further enhanced by the use of in-flight closed shutter and non-linearity measurements. The high quality of L1 data is guaranteed for all observations and at any S/C attitude by a high quality opto-mechanical system and a precision thermal control of all relevant elements of the sensor. The results of the qualification and acceptance test campaign incl. the sensor characterization and calibration measurements will be presented demonstrating the outstanding quality and stability of the technologically advanced EnMAP sensor. Moreover, as the launch is scheduled for April 2022, first results operating EnMAP will be available. Particular emphasis will be given to the comparison of the first in-flight calibrations with the final pre-flight calibrations, focusing on radiometric and spectral aspects. Eventually, the first Earth Observations will be analyzed and presented.