

EnMAP HSI Instrument Specification

Spectral range:	420 nm - 2450 nm
Spectral sampling distance:	6.5 nm (420 nm - 1000 nm; VNIR) 10 nm (900 nm - 2450 nm; SWIR)
Spectral accuracy / stability:	0.5 nm / 0.5 nm (VNIR) 1.0 nm / 0.5 nm (SWIR)
Signal-to-Noise ratio*:	> 500 (at 495 nm; VNIR) > 150 (at 2200 nm; SWIR)
Smile and keystone:	< 0.2 pixel
Polarization sensitivity:	< 5%
Radiometric resolution:	≥ 14 bits
Radiometric accuracy / stability:	5% / 2.5% (between two consecutive calibrations)
On-board calibration:	Full aperture diffuser Integrated sphere with various calibration lamps Shutter for dark measurements
Telescope:	Three-mirror anastigmat Focal length: 522.4 mm Aperture: 174 mm in diameter F-number: 3.0
Geometric resolution:	30 m × 30 m (swath width: 30 km) (IFOV 9.5 arcsec × integration time 4.4 ms (FOV 2.63 deg)) swath length of 5000 km per day with 512 Gbit on-board mass memory
Modulation Transfer Function:	> 0.25 @ 60m across track > 0.16 @ 60m along track > 0.64 @ 240m across track > 0.62 @ 240m along track
Geometric co-registration:	< 0.2 pixel (at Level 1C)
Pointing:	Accuracy: < 500 m Knowledge: < 100m Stability: < 1.5 m in 4 ms Agility: 30° in 5 min with pointing stabilization

*reference radiance level represents 30% surface albedo, 30° Sun zenith angle, ground at sea level, and 40 km visibility with rural atmosphere

EnMAP Orbit and Communication Specifications

Orbit repeat cycle:	398 revolutions in 27 days
Orbit altitude:	653 km (7021.8 km semi-major axis)
Inclination angle:	97.96° (polar, sun-synchronous)
Orbital period:	5856 s
Local time descending node:	11:00 h \pm 18 min.
Revisit:	4 days ($\pm 30^\circ$ off-nadir tilt) 21 days ($\pm 5^\circ$ off-nadir tilt)
Communication:	4 Kbit/s (S-band uplink) 32 Kbit/s (S-band downlink) 320 Mbit/s (X-band downlink)

EnMAP Platform and Launcher Specifications

Size of satellite:	3.1 m \times 2.0 m \times 1.7 m
Launch mass of satellite:	980 kg (including 55 kg hydrazine)
Launcher:	Falcon 9 by Space X
Launch site:	Florida, USA
Launch date:	April 2022
Operational lifetime:	> 5 years
Power of satellite:	nominal 32 V 6.1 m ² solar panels providing 970 W (EOL) Li-Ion cells with 2 modules and 87 Ah (EOL)
Attitude control of satellite:	3-axis stabilized Sensors: Star Sensors, Sun Presence Sensors, Magnetometer, Gyroscope Navigation: GPS Actuators: Reaction Wheels , Magnetic Torquers
Orbit control of satellite:	2 thrusters with 1 N each