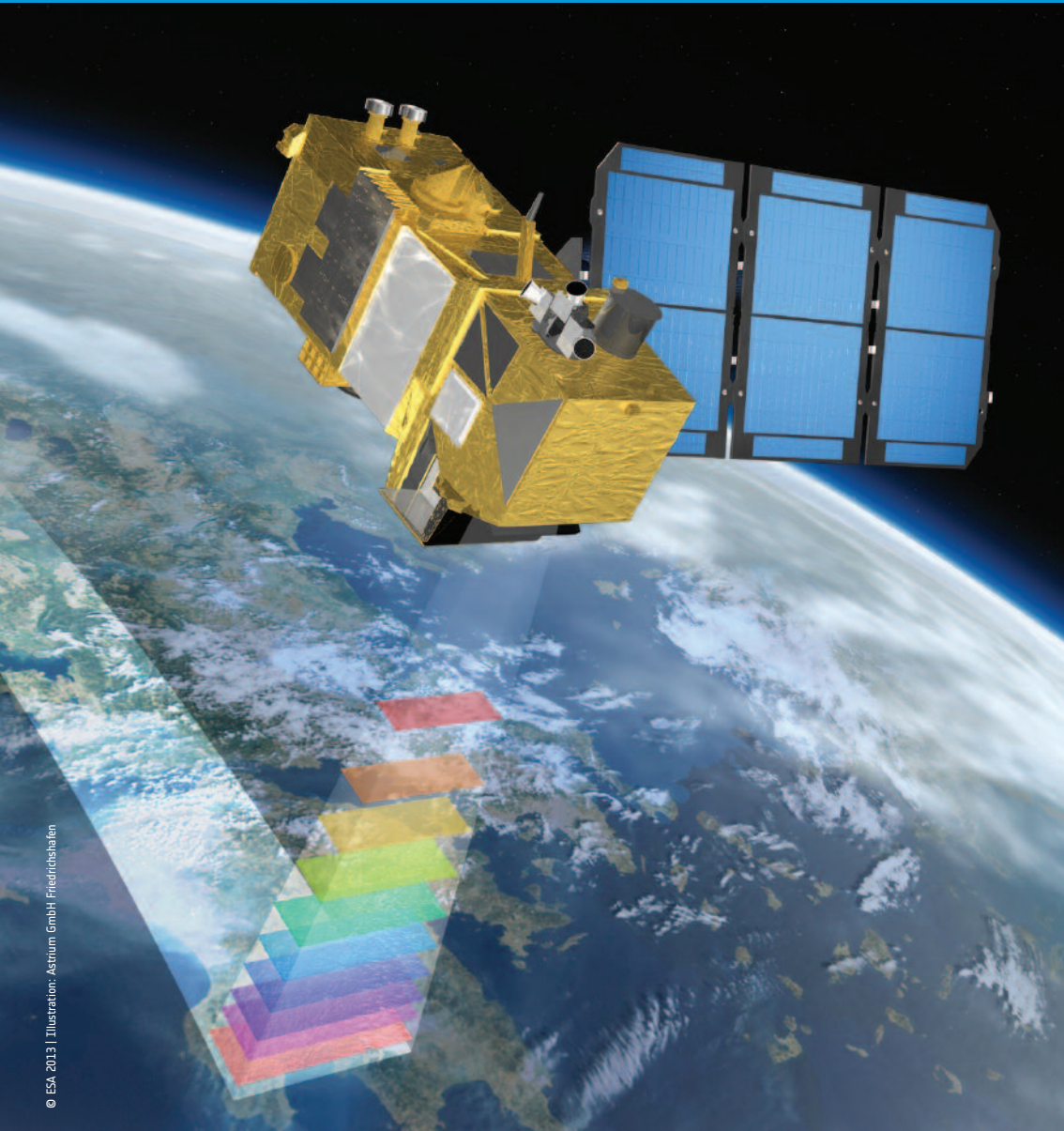


sentinel-2

→ THE OPERATIONAL COPERNICUS OPTICAL HIGH RESOLUTION LAND MISSION





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Last update August 2013

MISSION OBJECTIVES

European wide-swath high-resolution twin satellites super-spectral imaging mission designed for data continuity & enhancement of Landsat and SPOT-type missions, for COPERNICUS operational land and security services. These applications include:

- > land cover, usage and change-detection-maps
- > geophysical variable maps (leaf chlorophyll content, leaf water content, leaf area index, etc.)
- > risk mapping
- > fast images for disaster relief

MISSION PROFILE

- > Launch: 2014 > Launcher: Vega or Rocket
- > 7 years lifetime (consumables for 12 years)
- > Sun Synchronous Orbit at 786 km mean altitude
- > Mean Local Time at Descending Node: 10:30
- > Global revisit time: 5 days with 2 satellites flying concurrently (3 days at 45° latitude)
- > Twin satellites on the same orbit, 180° apart from each other

- > Land coverage: -56° to + 83° latitude
- > Maximum imaging time per orbit: 40 minutes
- > Nominal nadir pointing, extended viewing capabilities
- > Geo-Location: 20 m (2σ) without Ground Control Points
- > Calibration: radiometric calibration on-board
- > Security: TC authentication
- > Operational configuration comprises 2 satellites

SATELLITE PLATFORM

- > 3 axis stabilized earth pointing
- > Star tracker, inertial measurement unit and 2-band GPS receiver for precise attitude and position knowledge
- > Rate measurement unit, coarse earth sun sensor, magnetometer and magnetic torquers, thrusters, wheels
- > Propellant: 117 kg Hydrazine (N_2H_4)
- > Onboard position knowledge: <20 m (3σ)
- > Onboard attitude knowledge: <10 μ rad (2σ)
- > Launch mass: 1200 kg
- > Satellite dimensions (Stowed): 3.4 m x 1.8 m x 2.35 m
- > Electrical power: > Solar Array: 7.2 m², 1700 W (EOL), GaAs Triple Junction Cells > Battery Capacity: 87Ah (EOL)

- > Satellite power consumption: 1.4 kW (nominal mode)
- > Payload data storage capacity:
 - > 2 Gbits (End-of-Life) TM/TC storage capacity;
 - > 2.4 Tbit (EOL) mission data storage capacity
- > Communication links: > X-Band Science Data: effective 520 Mbps (8 PSK); > Optical Communication Payload for mission data retrieval through EDRS; > S-Band TT&C: 64 kbps up (SPL/PM), 128 kbps (SPL/PM) / 2048 kbps (OQPSK) down
- > Thermal control: passive with Deep Space Radiator. Thermistor controlled Heater Circuits
- > Reliability: > 0.7 > Availability: 97%

SATELLITE PAYLOAD

- MSI** (Multi Spectral Instrument)
- > Imaging principle: filter based push broom imager
 - > Telescope design: Three mirror anastigmatic telescope with Silicon Carbide mirrors and structure, and dichroic beam splitter to separate VNIR and SWIR spectral channels
 - > Focal plane arrays: Si CMOS VNIR detectors, HgCdTe SWIR detectors, passively cooled (190 K)
 - > Electronics: front end, video and compression electronics, including state-of-the-art wavelet-based data compression

- > Combination of on-board absolute calibration with a solar diffuser covering the full FoV, dark calibration over ocean at night, and vicarious calibration over ground targets
- > 13 spectral bands: 443 nm– 2190 nm (including 3 bands for atmospheric corrections)
- > Spectral resolution: 15 nm– 180 nm
- > Spatial resolution: 10 m, 20 m and 60 m
- > Swath: 290 km
- > Radiometric resolution/accuracy: 12 bit / $<5\%$