sentinel-1

→ GMES RADAR MISSION FOR LAND AND OCEAN SERVICES

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MISSION OBJECTIVES

European polar orbiting radar observatory providing continuity of SAR data for operational applications. These applications include:

› monitoring sea ice zones and the arctic environment
› surveillance of marine environment
› monitoring land surface motion risks
› mapping of land surfaces; forest, water and soil, agriculture
› mapping in support of humanitarian aid in crisis situations

MISSION PROFILE

› Sentinel-1A launch date: 2nd quarter 2013
› Sentinel-1B launch date: 2015
› Sentinel-1A launcher: Soyuz from CSG (Kourou)
› 7 years lifetime (consumables for 12 years)
› Sun-synchronous orbit at 693 km altitude
› Inclination: 98.18°
› Mean LST: 18:00h at ascending node
› 12-day repeat cycle, (at Equator with 1 satellite) 175 orbit/cycle
› 96h operative autonomy
› Max eclipse duration: 19 minutes

SATELLITE PLATFORM

› 3 axis stabilized, yaw/pitch/roll steering (zero Doppler)
› 0.01° attitude accuracy (each axis)
› Right looking flight attitude
› 10 m orbit knowledge (each axis, 3σ) using GPS
› Spacecraft availability: 0.998
› Launch mass: 2300 kg (incl. 130 kg fuel)
› Solar array power: 5900 W (End-of-Life)
› Battery capacity: 324 Ah
› Science data storage capability: 1410 Gbit (End-of-life)
› Communication links: X-Band data downlink and Optical data link through EDRS for Payload Data at 520 Mbit/s; S-Band 64 kbit/s uplink and 128 kbps/2Mbps downlink for TM/TC

SATELLITE PAYLOAD

C-Band SAR

› Centre frequency: 5.405 GHz
› Polarisation: VV+VH,HH+HV
› Incidence angle: 20° - 45°
› Radiometric accuracy: 1 dB (3σ)
› NESZ: -22 dB
› DTAR: -22 dB
› PTAR: -25 dB

Four nominal operational modes designed for inter-operability with other systems:

› Strip Map Mode with 80 km swath and 5x5 m (range x azimuth) spatial resolution
› Interferometric Wide-Swath Mode with 250 km swath, 5x20 m (range x azimuth) spatial resolution and burst synchronisation for interferometry
› Extra-Wide-Swath Mode with 400 km swath and 20x40 m (range x azimuth) spatial resolution
› Wave Mode with 5x5 m (range x azimuth) spatial resolution leap-frog sampled images of 20x20 km at 100 km along the orbit, with alternating 23 deg and 36.5 deg incidence angles.