

EARTH OBSERVATION SYMPOSIUM (B1)
Future Earth Observation Systems (2)

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THE MISSION AND SYSTEM DESIGN OF GMES SENTINEL-1

Abstract

The GMES Sentinel-1 System, a C-band Synthetic Aperture Radar system for Earth Observation has been designed to be a continuous and reliable source of C-band SAR imagery. As part of the complete family of GMES Sentinels, Sentinel-1 guarantees continuity of C-band SAR data and products availability to scientific and institutional users who exploit satellite radar imagery since ERS 1 operations. The system is capable to image all global landmasses, coastal zones and shipping routes at both high and medium resolution. Drivers for EO satellite missions operations typically concern a fast system reaction and response times but also, as in the case of Sentinel-1, a complete Earth surface coverage within every orbit repeat cycle (12 days). The main system requirements are presented as drivers for the design of system, satellite and relative in space operations. The major design challenges as well as the most critical development aspects are outlined, mainly focusing on the Space Segment components. The S-1 constellation of the 2 satellites directly injected in a LEO, will operate frequent orbit corrections to maintain the requested tight orbit control throughout the mission. The operating long life >7 years and requested consumables indicate a consolidated system reliability, that predict possibility of a large extension of the mission. The Satellites, being built in Europe for ESA under the responsibility of TAS-Italia, represent for a LEO spacecraft, the state of the art in terms of avionics performances, data storage and transmission capability, power production and management, and capability of large payloads accommodation with its 900 kg of mass that the PRIMA based bus will host on the Payload module.