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

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FINE SCALE ALTIMETRY CONSTELLATION FOR GMES OCEANOGRAPHY USING A GENERIC SATELLITE PLATFORM

Abstract

Satellite radar altimetry is used for oceanography to measure globally the mean sea level, marine currents and ocean circulation; ice sheet topography and sea ice extend, El Nino and La Nina events and climate change. The data is as well used to improve wind, wave and marine meteorology models and forecasts. Since the Seasat launch in 1978 radar altimetry became more and more important for oceanography as well as for weather forecasts and climate (change) monitoring. The launch of Topex/Poseidon in 1992 marked the beginning of continuous radar altimetry ocean monitoring. The successors are the Jason series satellites with Jason-1 and -2 currently in-orbit and Jason-3 to be launched in 2013. Contributing radar altimetry missions on polar orbits are the European Earth Sensing satellites ERS-1 & 2, Envisat and Cryosat-2 which is planned to be launched early this year. Polar radar altimetry measurements will be carried on and improved by the satellites of the Sentinel-3 series with Sentinel-3A scheduled for launch some when in 2013. In this paper approaches for further improvement of data collection will be presented: constellations of small, identical satellites continuing the measurements. The orbit and constellation design will be presented and an overview on the mission tailored satellite will be provided. The presentation of the constellation design will include a parameter variation analysis of e.g.: altitude, inclination, and repeat cycles. Constellations using satellites on orbit planes with several varying parameters will be shown. Launch and maintenance strategies will addressed, including dual and multiple launch considerations. The altimetry instrumentation assumed for this study is taken from Sentinel-3 and consists of the SRAL dual-frequency (Ku- and C-Band) altimeter, a dual frequency microwave radiometer (MWR), a GNSS Receiver and a Laser Retro-Reflector (LRR). This altimetry payload suite with a total mass of 100 kg and an average power demand of 150 W will be accommodated on OHB System's generic satellite platform for low Earth orbit missions. The satellite will be based on the heritage of the five successful SAR-Lupe satellites and the national EnMAP satellite project. The generic platform has a cumulated in-orbit heritage >12 years from the SAR-Lupe satellites. In this paper the satellite accommodation will be presented. Based on the payload suite requirements, the key performance facts of the altimetry mission tailored satellite will be summarized.