

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

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EMERGING MARITIME SURVEILLANCE TECHNOLOGIES

Abstract

Being an important spearhead in the GMES programme, maritime security has been deemed a priority by ESA and the European Union. Through navigation and remote sensing, various aspects of maritime security can be monitored such as monitoring shipping routes, anomalous navigation behaviours and illicit trafficking. In order to support the space-based maritime initiatives, the Space-based Maritime Reconnaissance and Surveillance (SMRS) mission was initiated by ESA. The SMRS mission is a low-cost in orbit demonstration (IOD) mission proposed by ESA for the demonstration of new sensor technologies for ship detection and tracking. SMRS will demonstrate the potential of data fusion products for value added services to the maritime situation awareness community, such as combining AIS data with SAR imagery. In order to facilitate the production of data fusion products the SMRS spacecraft has been planned to operate in a similar orbit to Sentinel-1 to ensure that the latency between radar images and AIS data is minimal which will ease the fusion of data. For this purpose, the SMRS spacecraft will operate in a 600 km sun-synchronous orbit (SSO), with an 18:00 LTAN. The platform that has been chosen for the SMRS spacecraft is the TET+ platform, which is an improvement to the platform of the small satellite TET-1, which will be launched in 2011. The modification to the TET platform increases the allowable payload power, downlink rate and leads to a lower mass/power ratio, resulting in a high-performance, low-cost platform for the SMRS mission. Additionally, the TET+ platform will adhere to requirements for a piggy back launch and will have a short development time. The sensors that are foreseen to be accommodated on the TET+ platform are as follows:

- AIS Payload (Kongsberg Seatex)

- Frequency Monitoring Package (QinetiQ)
- Navigation Radar Detector (LuxSpace)
- Maritime FMP (LuxSpace)

With the selected sensor suit, the SMRS mission is able to offer the following services:

- Ship tracking with AIS
- Ship positioning using X-band navigation radar emissions
- Ship detection and coarse positioning based on VHF and UHF emissions
- Mapping of frequency spectrum utilization in the maritime bands

After a successful preliminary requirements review, work is planned to proceed into preliminary design (phase-B) in 2011. SMRS is foreseen to be piggy-back launched at the first opportunity after flight acceptance in 2014.