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Abstract

In the field of navigation and remote sensing, maritime security is an important topic, which is supported by the high amount of attention it receives within the GMES programme [1]. It involves monitoring of shipping routes (both in open and coastal waters), anomalous navigation behaviours and illicit trafficking. In order to support the space-based maritime initiatives, the Space-based Maritime Reconnaissance and Surveillance (in short: SMRS) mission was initiated, which will be presented in this paper.

The SMRS mission is a low-cost in orbit demonstration (IOD) mission proposed by ESA for demonstration of new sensor technologies for ship detection and tracking as well as data fusion products for value added services to the maritime situation awareness community.

Currently the SMRS mission comprises selection and definition of payloads relevant to maritime applications and their consequent accommodation on a micro-satellite platform. The SMRS sensor suite consists of:

- AIS Payload (Kongsberg Seatex)
- Frequency Monitoring Package (QinetiQ)
- Navigation Radar Detector (LuxSpace)
- Maritime FMP (LuxSpace)

With the selected sensor suite, 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

In addition, the SMRS mission has the unique advantage of being able to operate sensors on the same platform, which gives the possibility to correlate the AIS reported positions with detection information from the other sensors.

Furthermore, the SMRS data products can be fused with remote sensing data received from external sources, e.g. SAR images. These data fusion activities significantly increase the confidence in the reported traffic picture, and also enable the unveiling of ships with malicious intentions or ships in trouble.

As platform for SMRS, a modification of the small satellite platform TET is foreseen. This platform will be an improvement (lower mass/power ratio, higher payload power, higher downlink rate) of TET-1, which is planned for launch in

2011. In this way, the SMRS mission has access to a high-performance, low-cost platform solution with a short development time.

The SMRS spacecraft is planned to be launched into a 600 km sun-synchronous orbit with 18:00 AM LTAN. In this orbit, it is able to cover all global waters. As an additional bonus, it will have the similar ground track as Sentinel-1 thereby simplifying data fusion.