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# STATUS OF SENTINEL 3 PROGRAMME IN EUMETSAT

GMES is covering several areas of applications, among which EUMETSAT has targeted to play a key role as satellite data provider for the oceanography and atmosphere user communities.
In its role as operator of Sentinel-3 oceanography mission, EUMETSAT will:

- Generate and disseminate all Sentinel-3 products routinely required by the GMES Marine Core Service and its related downstream services;
- Serve the offline requests of the Operational Oceanography User Community for Sentinel-3 products (using a distributed network of centres of expertise);
- Monitor and control the spacecraft and flight operations segment;
- Acquire payload data, in a mode consistent with the GMES ground segment design which is under ESA's responsibility.

To fulfil this operational role, EUMETSAT has undertaken, under a co-operation agreement with ESA, the development of a ground segment to serve the needs of the Sentinel-3 mission as well as for the routine operations to be engineered, validated and rehearsed by a dedicated operations team.
The development activities have very much progressed. The detailed design of the Flight Operations Segment and of the Payload Data Ground Segment is in progress. EUMETSAT is currently deeply involved with the procurement and the development of the facilities and services constituting the Ground Segment and the engineering of the associated operations preparation.
This paper presents the status of the Sentinel-3 development activities by EUMETSAT.

# Status of Sentinel 3 Programme in EUMETSAT

## 1 INTRODUCTION

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In its role as operator of Sentinel-3 oceanography mission, EUMETSAT will:

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## 1 BACKGROUND

In response to the need for data in near real-time, together with guaranteed service levels, EUMETSAT will serve the Marine User Community both with routine and off-line products. Starting from the successful completion of the In-Orbit Commissioning of the first Sentinel-3 spacecraft, the scope of EUMETSAT's operational role will be:

Monitoring and control of spacecraft and flight operations segment;

Payload data acquisition, consistent with the overall GMES ground segment design under ESA's responsibility;

Product generation and dissemination of all Sentinel-3 products routinely required by the Marine User Community and the related downstream services;

Serving the offline requests of the Marine User Community for Sentinel-3 products.

Complementing the Marine part of the mission, ESA will serve the Land Services Community, including:

Product generation and dissemination of all Sentinel-3 Land products routinely required by the Land community and the related downstream services;

Serving the offline requests of the Land User Community for Sentinel-3 products.

The role for EUMETSAT in the provision of the Sentinel-3 Services over the mission lifetime takes benefit from, and builds upon, the significant infrastructure investments that have already been made, and will be continue to be made, by EUMETSAT in the areas of:

Multi-mission operations within a unified Operational centre (MTP, MSG, EPS and Jason);

A common gateway to enable users to have straightforward access to all EUMETSAT's data and products (via the EUMETSAT unified archive and retrieval facility and its interface to the future ESA Heterogeneous Mission Accessibility (HMA);

Ground segment infrastructure, which allows the addition of further missions/services.

This concept requires a EUMETSAT ground segment to be developed to serve the needs of the marine part of the Sentinel-3 mission as well as for the routine operations to be engineered, validated and rehearsed by a dedicated operations team.

The concept relies on a joint ESA and EUMETSAT work approach formalised in a dedicated Sentinel-3 Implementation Arrangement defining the responsibilities and the tasks to be fulfilled by the two Organisations as well as the programmatic and financial elements.

## 2 ESA – EUMETSAT CO-OPERATION STATUS

In line with the provision of the Sentinel-3 Implementing Arrangement and the Project Implementation Plan (PIP), regular interactions take place between ESA and EUMETSAT with the aim to review the development status and the progress made, to discuss the technical issues, to review and consolidate the schedule and to coordinate and plan the future activities. These meetings are essential to ensure a smooth and fully effective coordination between the ESA and EUMETSAT project teams.

Fruitful discussions at working level meetings between ESA and EUMETSAT have taken place addressing some important issues of the co-management of the routine operations phase. Such discussions addressed issues such as coordinated maintenance of the operational processor, operational quality control, mission performance and experts support. Such discussions falling inside the overall definition of the respective tasks and responsibilities associated to the performance of the routine operations phase will continue with the final goal to build in the next several months a joint operations management plan covering the routine operations phase.

# 3 SENTINEL-3 DEVELOPEMENT STATUS

## 3.1 Overall Development Status

The EUMETSAT part of the Ground Segment is mainly composed by two distinct segments:

The EUMETSAT Flight Operations Segment (FOS) responsible for the satellite monitoring and control activities during the routine operations following the In-Orbit Commissioning Review (IOCR).

A Payload Data Ground Segment (PDGS) responsible for the instrument data acquisition and product generation, dissemination and archiving. The subset of the PDGS dealing with data products generation, dissemination and archiving will be located at EUMETSAT HQ.

The preliminary design phase of the FOS and of the PDGS was completed in respectively Q4 2010 and Q2 2011. This has allowed for the facility level requirements specification to be finalised and for the procurement actions by ESA and EUMETSAT to be initiated. It is expected that all facilities and services will be kicked off before the end of 2011 with the exception of the GMES Space Component (GSC) overall network and the Mission Performance Centres. The procurement of those is currently scheduled to be initiated in Q1 2012.

## 3.2 Flight Operations Segment Status

The EUMETSAT FOS definition continues to advance with updates to the technical documentation set to reflect agreed clarifications, evolutions and associated action items. In addition the documentation sets associated with the Flight Dynamics Facility (MCS), the Satellite Simulator (SIM) and the Mission Control System (MCS) procurements have been finalised. These facilities are now being developed by industrial contractors, except the FDF to be kicked off in a few months as the procurement action is still in progress.

Regarding the development of the Mission Control System, EUMETSAT decided to adopt an alternative procurement approach whereby the development of the S-3 MCS could be handled as an extension to the S-1 (and S-2) MCS development contract recently awarded by ESA to GMV in lieu of a specific and standalone S-3 MCS development.

Further progress has been made on the FOS Integration, Verification and Validation Contractor procurement with internal EUMETSAT iterations on the detailed approach ongoing and the SoW under preparation for iteration with ESA and target release of the procurement to industry early Q4 2011.

## 3.3 Payload data Ground Segment Status

The PDGS Preliminary Design Review (PDR) completed early May 2011 with a number of issues to be subject to further actions. It is expected that the PDR closure actions will be completed in October. Regarding the procurement and development of the various PDGS facilities, the status is as follows:

The joint Sentinels Demodulator and Front End Processor (DFEP) development covering the instrument data demodulation and ingestion function for the PDGS, is progressing well. A small delay to the DFEP consortium's integration and verification activities (caused by a delay in the delivery of components to the card manufacturer) means that these activities will now start in October 2011.

Final preparations for the MPF procurement were completed. The MPF ITT was subsequently released in June 2011. The MPF ITT closed in August and evaluation of the received offers is underway.

The Core Ground Stations ITT ("Preparation and Operations of the Core X-band Acquisition and Near Real Time Facilities for the GMES Sentinel Satellites") was issued in May, followed few weeks later by the release of the thematic Production and Archiving Centres (PACs) ITT. The Tender Evaluation Boards are planned to take place in the coming few weeks (Q4 2011).

The Mission Performance Centres (MPCs) is expected to be released in Q1 2012.

The Global Network for exchange of data between the various centres including the Marine PDGS Centre in EUMETSAT is expected to be released in Q1 2012.

The Precise Orbit Determination (POD) service is expected to be released in Q4 2011.

In parallel to the above activities, EUMETSAT is currently completing the Preliminary Delta Design of the EUMETSAT Multi Mission Elements (MME). These are the EUMETSAT operational facilities serving all operational missions, and requiring to be upgraded to support the Sentinel-3 mission, such as the Dissemination, Data Centre, Earth Observation Portal, User Services.

## 4 CONCLUSIONS

CGMS is invited to take note of this document.