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## **STATUS OF PREPARATIONS FOR MSG-3 AND MSG-4**

This paper reports on the current status of the MSG programme and the related preparations for the MSG-3 and MSG-4 satellites launch and commissioning. CGMS members are invited to take note.

## **Status of preparations for MSG-3 and MSG-4**

### **1 INTRODUCTION**

This paper addresses the status of the remaining development work for the MSG Programme, namely the status of preparation of MSG-3 and MSG-4.

### **2 LAUNCH DATES FOR MSG-3 AND MSG-4**

Taking into account the outcome of the agreement at the 67<sup>th</sup> EUMETSAT Council in June 2009:

The time frame from June to August 2012 has been agreed with Arianespace as a reduced launch period for MSG-3.

The plan for the MSG-4 launch is still in January 2014, with the understanding that the MSG-4 launch date will be revisited after the commissioning of MSG-3.

### **3 SATELLITES**

#### **3.1 MSG-3 Satellite and common MSG-3/4 activities**

The satellite is kept in storage in the clean room at the Prime contractor's premises. Work focussed on anomaly investigations and corrective actions.

The occurrence of error words experienced in orbit on the SEVIRI Main Detection Unit (MDU) of Meteosat-8 has drastically reduced, following a swap to MDU redundant side and then a return to the nominal side. The investigations on this anomaly have been completed. Following recommendations from ESA/Industry, the Secretariat has decided not to perform any changes for MSG-3 & 4.

Following the in-orbit failure of the Gauging Sensor Unit (GSU) flying on Meteosat-8/9, a development of a new concept for precise gauging based on ultrasonic technique so called Ultrasonic Gauging Sensor (UGS) has been developed for MSG-3 and MSG-4. After the new unit has been designed and qualified, delivery of all UGS flight models for both MSG-3 and MSG-4 took place in July 2010. The replacement on-board MSG-3 and MSG-4 of the GSU with the UGS will take place in the frame of the respective destorage sequence of the satellites.

Investigations associated with the uncommanded in orbit changes experienced on Meteosat-8 in May 2007 and then in early February 2008 have been completed in July 2010. The most probable root-cause is associated with the detachment of both thermal frames around the radial thrusters. Dedicated finite element modelisations have evidenced insufficient design margins to cope with inhomogeneous loads distribution combined with ageing of material in orbit. The design changes for MSG-3 & 4 are presently under final review, and development/qualification of those changes will start in September. The implementation of those changes has no impact on the satellite destorage sequence, as it can be done in parallel.

The refurbishment of Ground Support Equipment (GSE) necessary until the launch of MSG-4 is on-going. The other GSE have been placed in storage, until the development work on the Meteosat Third Generation (MTG) is finally secured.

Following the anomalies discovered on the METOP Solid State Power Amplifiers (SSPA), and through related METOP investigations, the evidence to conclude that MSG is not impacted could not be reached. Therefore EUMETSAT has decided to inspect all MSG units potentially impacted by the anomaly, i.e. the MSG SSPAs and also the S-band receivers. The work is ongoing at the time of releasing this report, according to a plan which avoids any impact to the MSG-3 launch readiness.

### **3.2 MSG-4 specific activities**

The integration and tests activities of the satellite at the Prime contractor's site were completed early March 2007 following which the MSG-4 Pre Storage Review (PSR) took place, concluding that a non conformance associated with missing lines observed once during a SEVIRI scan activation needed to be closed before the satellite readiness could be finally stated. The exchange the Drive Unit (DU), which part of the Scan Mechanisms of SEVIRI, was decided.

The manufacturing of a new DU was completed and the acceptance testing of this new DU is on-going at the time of releasing this report. The go-ahead to dismount SEVIRI from MSG-4 for replacing the DU will be given following the test results. Re-assembly of the MSG-4 satellite will take place in the 2011/2012 timeframe, with possible interruptions due to the MSG-3 activities for launch preparation. The MSG-4 readiness for long term storage is contemplated for the 3<sup>rd</sup> quarter of 2012. This is compatible with a possible launch of MSG-4 in January 2014.

The duration of a possible postponement of the launch of MSG-4 will also be associated with results of ongoing lifetime testing on satellite structural items

## **4 OTHER PROGRAMME ELEMENTS**

### **4.1 Geostationary Earth Radiation Budget (GERB)**

The GERB-3 Instrument is in long term storage configuration at RAL premises. The integration, acceptance and calibration tests of the GERB-4 Instrument have been completed in November 2009. In December 2009, the GERB-4 Instrument was placed in long term storage.

Concerning the Product Status of the GERB mission, the Averaged, Rectified, Geolocated (ARG) and Non-Averaged, Non-Rectified, Geolocated GERB products have been available for the Meteosat-8 (MSG-1) GERB since 2006, as the Edition 1 data. The same products for Meteosat-9 (MSG-2) GERB are expected to be released, as Edition 1, before end of 2010. The Binned Averaged Rectified Geolocated (BARG) and High Resolution (HR) products are currently classed as science ready, but will need additional processing before being placed in the archive as Edition 2. Work on Edition 2 of the data is on-going and includes such areas as handling of missing data

and improved aerosol optical depth, angular dependency and twilight condition modelling.

#### **4.2 MSG-3 Launch service and Launch and Early Orbit Phase (LEOP) service for MSG-3**

The kick-off for the MSG-3 Launch service is contemplated by December 2010 and the kick-off for the MSG-3 LEOP service will also in the similar timeframe.

#### **4.3 MSG Ground Segment upgrade for MSG-3**

An upgrade of the MSG Ground Segment (GS) is on going to add a 3<sup>rd</sup> imaging chain (including an additional antenna at the MSG Primary Ground Station) so that the MSG-3 and MSG-4 Operations preparation can be carried out without interrupting the Rapid Scan Service; otherwise interruptions would be unavoidable before the launch and during the commissioning periods of MSG-3 and MSG-4, each of them in the order of one year.

The implementation phase (with the exception of the 3<sup>rd</sup> antenna) is near to completion and testing of the 3<sup>rd</sup> imaging chain will start following a Verification Readiness Review during this year. A testing campaign involving the 3<sup>rd</sup> antenna will take place in Spring 2011 to complete the final end to end verification of the GS upgrade. This will allow starting the MSG-3 Operations Preparation phase well in time for an MSG-3 launch in June 2012.

## **5 CONCLUSIONS**

CGMS Members are invited to take note.