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Status of the EUMETSAT Polar System (EPS)

This document presents the status of the EPS programme as of end of August 2006. CGMS members are invited to take note.

EPS PROGRAMME AND DEVELOPMENT STATUS

1 PROGRAMME SCOPE AND COOPERATIONS

The EUMETSAT Polar System (EPS) is the European contribution to the Initial Joint Polar System (IJPS) established with NOAA, and the first European contribution to the follow-up Joint Polar System (JPS) expected to be formed with the US “Converged” NPOESS system. The IJPS and JPS will provide global meteorological and climate data from a series of European and American sun-synchronous polar orbiting satellites, replacing the current NOAA K-L-M series.

EPS is an end-to-end system dedicated to the acquisition, processing and dissemination of observational data from the morning orbit. It provides also capabilities for cross-support and data exchange with the NOAA POES system which covers the afternoon orbit service. The EPS system is composed of a space segment, based on three successive Meteorological Operational (Metop) satellites, and a ground segment. The application component of the ground segment that will generate a variety of level-2 products, is based on the combination of central facilities and a distributed network of satellite applications facilities developed and hosted by several EUMETSAT Member States.

The first Metop satellite is being developed in the framework of the Metop-1 Programme of the European Space Agency (ESA), in co-operation with EUMETSAT. The development and procurement of the three Metop satellites is under the responsibility of a joint ESA-EUMETSAT Single Space Segment Team. In addition, EUMETSAT is directly responsible for the delivery of the MHS, IASI, ARGOS-DCS, AVHRR/3, HIRS/4, AMSU-A and SEM payloads. MHS is directly procured from industry, while the IASI advanced infrared sounder and ARGOS-DCS are procured through Centre National d’Etudes Spatiales (CNES). The other instruments are contributed by NOAA, under the IJPS co-operation agreement, which covers also the establishment and operation of the IJPS and provision of MHS instruments to be flown on NOAA N and N’.

The EUMETSAT EPS Programme is the legal framework for the development and implementation of the EPS System. Its financial envelope covers contributions to the development of the Metop-1 satellite and the IASI-1 instrument, co-funded by ESA and CNES, respectively. It also covers other major procurements including those of the MHS sounders to be flown on the NOAA-N, N’ and Metop satellites, two recurring Metop satellites and IASI instruments, three launch services and the EPS Ground Segment. Last but not least, it covers operation of the EPS System over 14 years.

EUMETSAT has established Co-operation Agreements with ESA, for the development and procurement of the three Metop satellites; with NOAA, for the exchange of instruments, data and operation cross-support; and with the CNES, for the provision of IASI and ARGOS-DCS payloads.

2 PROGRAMME STATUS

The ESA Metop-1 Programme and the EUMETSAT EPS Programme, which form the basis for the development, implementation and operations of the EPS System as part of the IJPS, were approved in 1998 and 1999, respectively.

Within EPS, all Cooperation agreements and relevant management implementation documents have been agreed and signed off with the concerned Organisations, namely ESA, CNES and NOAA. In June 2003, EUMETSAT and NOAA signed off the Joint Transition Activities (JTA) Agreement, which extends the cooperation to the Metop-3 satellite and the NPOESS timeframe.

The co-operation with NOAA is running nominally. The MHS instrument provided by EUMESTAT and embarked on the NOAA-18 satellite (first Initial Joint Polar System (IJPS) satellite) continued to work successfully and is operational. Activities with NOAA focused on the preparation of the launch of the first MetOp as well as EUMETSAT supporting the activities related to the NOAA N' satellite for MHS.

Regarding EPS, all major Contracts for the Space Segment, the Launch services, Launch and Early Orbit Phase (LEOP) services and the Ground Segment development are in place and respective developments were completed in time for the launch of the first MetOp.

For what concerns the launch of the first Metop satellite (Metop-2 which will be renamed Metop-A after launch), the launch date was set to 17 July 2006. The satellite was shipped to Baikonur in April 2006. The launch campaign lasted 85 days following the arrival of the satellite at the launch site. Unfortunately, due to some Soyuz 2.1.a launcher problems and after 3 attempts to launch on 17, 18 and 19 of July 2006, the decision was taken to postpone the launch by several weeks. EUMETSAT and Starsem are confident that the causes of the launcher problems are understood and corrective measures are being implemented. The new launch date is fixed to 7 October 2006. Further information will be provided during the CGMS meeting.

3 EPS DEVELOPMENT STATUS

3.1 EPS System activities

The EPS System Integration, Verification and Validation (IVV) strategy has been completed in due time and emphasis was put on launch critical functions to support the first satellite launch. At the end of the development process, a Launch and Operations Readiness Review (LORR) was organised and was conducted by an external group. The LORR which encompassed all elements of the EPS System (including Satellite, Ground Segment, Operation preparation, Launch and Early Orbit Phase system) was successful and declared readiness for Launch on 17 July 2006. The status of the launcher was also reviewed under the leadership of Starsem (launcher authority) and concluded that the launcher system was qualified. The problems encountered during the 3 launch attempts do not put in question the

launcher hardware and were linked to software issues of the Launcher ground system. Indeed, on ground validation of this system has shown some deficiencies and this is being corrected.

The preparation of the Commissioning phase (including the Satellite In-Orbit verification) was also completed. Overall its nominal duration is planned to be 6 months with 10 weeks allocated to Satellite In Orbit Verification and the reminder being allocated to Calibration and Validation activities. The current plan is to make data available to Users in March 2007 on an operational basis.

Regarding dissemination, EUMETSAT has now adopted the EUMETCast system for EPS as well. The transition from the former dissemination system to EUMETCast was performed and tested successfully with End Users using test data.

3.2 Space Segment

The MetOp-1 (Metop-B) satellite has completed the Assembly and Integration campaign culminating in the successful MetOp-1 Flight Acceptance Review (Part-1).

For MetOp-2 (Metop-A), the satellite was fully ready to support the launch on 17 July. All anomalies were corrected including a replacement of the AMSU A1 and A2 instruments which was deemed necessary after the discovery of an anomaly on the scan motor. The root cause of the anomaly was fully understood and corrected.

For what concerns the instruments, the MHS PFM instrument was launched on-board the NOAA-18 satellite from Vandenberg on 20 May 2005. This instrument is operational.

During the re-test programme for the MHS FM2 instrument (to be flown on NOAA N') in 2005, a sudden failure occurred during the last functional check. The root cause of the problem was identified and EUMETSAT repaired the instrument which was provided in due time to NOAA for subsequent integration on NOAA N'.

All instruments are integrated on the Metop-2 satellite and successfully completed the Metop-2 Flight Acceptance Review.

3.3 Ground Segment

The development of the overall Ground Segment of EPS was completed and allowed to declare its readiness with respect to a launch of MetOp-2 in July 2006. Following its delivery to EUMETSAT in June 2005 and its usage a number of modifications and enhancements of the Ground Segment were successfully implemented. The system is now deployed on 3 sites:

- The EUMETSAT Headquarters in Darmstadt which is the prime Operation centre where satellite command, control and mission data processing and dissemination are performed.
- The Polar Site in Svalbard which hosts the two EPS ground stations and are interconnected with the Prime site via satellite and fiber optics links.

- The Back Up Control Centre in the outskirts of Madrid, which allows continuity of operations of the satellite to ensure its safety in the case of a total or partial outage of the main Darmstadt centre.

In parallel, the EPS system has adopted the EUMETCast dissemination system and end to end tests were carried out successfully with Users.

In the future and after commissioning of the first satellite MetOp-A, EUMETSAT will initiate work to improve the timeliness of data delivery to the End Users via the addition of a south hemisphere Ground Station. Several options are being looked at by EUMETSAT.