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EPS PROGRAMME STATUS

This document presents the status of the EPS programme as of end of September 2005. 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 major event is the launch and successful commissioning of the NOAA-18 satellite (first Initial Joint Polar System (IJPS) satellite) embarking the EUMETSAT MHS instrument.

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 are much advanced.

For what concerns the launch of the first Metop satellite (Metop-2 which will be renamed Metop-A after launch), the launch date is set to June 2006. The satellite is planned to be shipped to Baikonur by the end of March 2006. The launch campaign is due to last 85 days following the arrival of the satellite at the launch site,

3 EPS DEVELOPMENT STATUS

3.1 EPS System activities

The EPS System Integration, Verification and Validation (IVV) strategy has been defined in order to optimise the schedule and to allow to start the system integration as early as possible with a first version of the Ground Segment, and to focus the efforts on the right priorities (launch critical functions) up to the first satellite launch.

The preparation of the Commissioning phase (including the Satellite In-Orbit verification) is progressing well and is on schedule.

The programme level System Integration, Verification and Validation Readiness Review took place in October 2004 and authorised the start of the System IVV phase. The integration was started using the Version 1 pre-delivery of the Core Ground Segment (CGS) received at the end of 2004. At the end of June 2005, a first complete version of the Ground Segment was made available to EUMETSAT and a second and final version is expected to be delivered by mid-October 2005. Since the end of June 2005, EUMETSAT is conducting System level testing including end to end tests such as the acquisition and processing of data acquired from the NOAA-18 satellite, tracking sessions with the ENVISAT satellite. Engineering validation tests are due to be completed in October and will be followed by a phase of operational qualification until the end of February 2006.

The production of the satellite operations procedures, including the necessary contingency recovery procedures, is coming close to the end. The Ground Segment operations progressed well, and several simulation campaigns were performed.

Four campaign of Satellite System Validation Tests (SSVT) tests already took place where the interfaces between the satellite in the clean room and the ground segment were thoroughly tested. These tests were successful and the next and final SSVT test will be performed in early 2006. During these tests, EUMETSAT commanded from the Headquarters a complete Metop satellite with all instruments on board.

The LEOP Verification and Validation Readiness Review was held in July 2005 and was declared successful.

After having used the Core Ground Segment for some time, it was found out that various enhancements of the system are required to resolve some launch-critical operability issues, by adding offline tools, additional Man Machine Interfaces, or further screens, etc. This is currently being implemented.

Regarding real-time dissemination of products to Users, EUMETSAT has decided to use the EUMETCast system.

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 Payload Module (PLM-2) was shipped to Astrium Toulouse, for Metop-2 satellite integration, in early July 2004, then the satellite went through its environmental test campaign (EMC/RFC and mechanical), and is now in storage awaiting call-up for launch. During the final phase of testing an anomaly was observed on the On Board Computer, the unit has been removed from the satellite and is currently under investigation at the supplier. The current approach is to replace the failed unit by a spare computer.

The Metop-2 Flight Acceptance Review was held in May – July 2005, with the Board confirming the readiness for flight subject to completion of the little remaining open work.

For what concerns the instruments, the MHS PFM instrument was launched on-board the NOAA-18 satellite from Vandenberg on 20 May 2005. Following subsequent stabilisation of the instrument temperatures and characterisation of the instrument performances, EUMETSAT declared the instrument ready for nominal operations on 3 July.

The re-test programme for the MHS FM2 instrument (to be flown on NOAA N') has continued successfully and all major tests have now been completed. The instrument has performed very well throughout the re-test campaign, but a sudden failure occurred during the last functional check. The way to tackle this problem needs to be first agreed with NOAA.

The AMSU A1 instrument (Metop-2 satellite) suffered from a failure and is being fixed by NOAA/NASA and will be delivered back to Metop in October 2005.

The IASI FM2 instrument remains integrated on Metop-2, and successfully completed the Metop-2 Flight Acceptance Review.

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

On the Launcher side, the Preliminary Cosmodrome Readiness review was successfully held in late March 2005. The Qualification Review process for the Soyuz ST/Fregat launcher configuration continues. A full qualification fairing has now been successfully manufactured and has started its test campaign.

3.3 Ground Segment

In addition to the delivery of an “early” first version (V1) of the CGS allowing EUMETSAT to start system activities, and in order to recover further delays on the final version of the CGS, it was decided to prioritise all remaining activities with regards to their criticality for the launch. This approach induces the delivery of a “launch ready” version of the CGS, called V2L.

Following successful on site testing of the V1 version in November 04, it has been used for early EPS system integration, verification activities. A lot of benefit has been achieved from this activity with much successful integration performed.

Formal testing of the CGS V2L on site was authorised in early March 2005 to confirm that the remaining issues preventing formal testing had been satisfactorily resolved.

The Verification testing phase was completed in July 2005 noting that a few verification tests need to be repeated during the validation test phase. , On-site verification testing for the “launch ready” version of the Core Ground Segment (CGS V2L) is getting close to completion.

The IASI Level 1/AVHRR processors are now considered as integrated, and ready for the Metop launch.

Overall, the schedule of the CGS has suffered from problems identified during the on-site verification and validation preparation activities. Therefore, as a mitigation action, EUMETSAT introduced a different delivery scheme: one of the two ground segments was delivered in advance of the CGS acceptance to enable the V&V activities to start in parallel with the CGS testing. As a result, one ground segment was handed-over to EUMETSAT on 27 June 2005. Then both ground segments will then be aligned and handed-over to EUMETSAT. The current CGS schedule foresees the hand-over in October 2005.

The deployment of 3 dissemination Near Real Time terminals (CNES for IASI Tec, CLS Argos and SSST at ESTEC) was completed in December 2004 and will be used for the commissioning the system.

The ESOC Telemetry, Tracking and Command (TT&C) network Radio Frequency compatibility testing using the MetOp S-Band suitcase, the TT&C ground network of ESOC and the stations has been completed.

For what concerns the Archive and Retrieval Facility (U-MARF), the On site acceptance took place in April 2005. The Provisional Acceptance Review (PAR) of the final version, which constitutes the main functionality and the full hardware delivery, was held on 10th May 2005.