CGMS-36 EUM-WP-6
v1, 15 September 2008

Prepared by EUMETSAT
Agenda Item: C.1

PLANS FOR POST-EPS

EUMETSAT is running a Phase 0 for the definition of the Post-EPS Programme, in line with established preliminary mission requirements and with the support of ESA whose Pre-Phase A competitive studies started in 2008 fort completion in 2009.

Action/Recommendation proposed:

CGMS is invited to take note of the progress of preparation of the Post-EPS Programme at EUMETSAT.

Plans for Post-EPS

1 INTRODUCTION

This paper presents the status and planning for the preparation of the EUMETSAT Post-EPS Programme, providing some information on the addressed applications and the process leading to consolidation of mission requirements.

2 STATUS OF ACTIVITIES

The EUMETSAT Post-EPS Programme is under preparation at EUMETSAT and in its Phase 0, whose Activities are focused on the User Consultation process and the definition and consolidation of mission requirements.

Post-EPS mission requirements and programmatic assumptions and requirements have been preliminarily established, following the completion of a first phase of the Users Consultation process. To support the generation of mission requirements, the Post-EPS Mission Experts Team (PMET) continue to be involved.

Mission and programmatic requirements have been documented in relevant documents (MRD and PARD), reviewed within the Secretariat and with the support of the PMET and ESA. The documents provide the basis for Phase 0 industrial studies led by ESA on sensor and system architecture concepts, started the first in February 2008 and the second in July 2008.

Good progress is registered in terms of preliminary discussions with NOAA on the future cooperation in view of establishing a Joint Polar System (JPS) following the Initial Joint Polar System (IJPS), to which EUMETSAT contributes with EPS. A Working Group devoted to the preparation of the draft of the future agreements for the JPS has been setup and a draft concept paper has been drafted in 2008 for consolidation by end of the year; it will provide a basis for detailded assessment of possible instruments exchange between EUMETSAT and NOAA.

The Phase 0 studies, with logic similar to the one adopted for the Meteosat Third Generation (MTG) Phase 0 activities, cover the Post-EPS missions and address the end-to-end addressing:

The critical analysis and consolidation of the mission technical and programmatic requirements;
The definition of candidate system concepts for the implementation of all elements of the system architecture, with trade-offs focussing on elements of technical maturity, system dependability and affordability in line with the operational nature of the system as specified via the relevant programmatic constraints;
A more detailed analysis of selected implementation concepts up to a pre-feasibility level, with provision of relevant programmatic elements and rough order of magnitude cost estimates, as well as consolidation identification of required technology pre-developments.

The results of the study shall allow EUMETSAT and ESA to consolidate the missions, the system and programmatic requirements, and to narrow down the architectural options prior to more detailed feasibility studies in Phase A.

The selection steps of the candidate Post-EPS observation missions has been performed jointly by ESA and EUMETSAT in the definition of the scope of the studies based on the following criteria:

1. Missions implemented in GMES, i.e. oceanography missions on Sentinel-3 and atmospheric chemistry missions on Sentinel-5, do not require a specific effort, apart from the study of the accommodation of Sentinel-5 payload (as agreed between EUMETSAT and ESA for the implementation approach of the space component of GMES).
2. Missions already addressed in the framework of Earth Explorer follow-on studies will be considered at programmatic and possibly system level only.
3. Missions will not be addressed when their potential for operational implementation cannot be proven prior to the Post-EPS Implementation Phase.

To further proceed in the selection of candidate missions in Phase A, the following milestones are defined:

Joint EUMETSAT / ESA Preliminary Assessment Review (PAR); this was performed in 2008, with confirmation of the approach taken for the start of the ESA Studies
Mid-Term Reviews (MTR) of the ESA Studies (end of 2008);
Second Post-EPS User Consultation Workshop (Darmstadt, January 2009, TBC);
EUMETSAT Phase 0 Mission Definition Review (2009).

In each of these reviews, recommendations will be given for retaining or excluding candidate missions from the scope of the Phase A activities.

Following the implementation of the PAR outcomes, the candidate missions to be studied in details in Phase 0 are as per following table.

The Nadir viewing UV/VIS/NIR - SWIR Sounding (UVNS) mission, in line with the assumption that GMES Sentinel 5 will be implemented as a payload in Post-EPS, will be studied at the level of payload accommodation only, the payload itself being analysed and defined in the frame of the GMES Sentinel 4/5 Phase 0 study.

The Doppler Wind Lidar (DWL) mission, due to its specific nature requiring an implementation on dedicated platform(s) flying in a lower orbit, will be assessed at system and programmatic level only, the relevant definition (technical and programmatic) being available from the ADM follow-on study.

An Aerosol Profiling Lidar (APL) is currently flown on the CALIPSO spacecraft and another one will be part of EarthCARE by 2013. Considering that the APL payload technical definition is available from EarthCARE, the APL mission will be studied at system and programmatic level only. A combined DWL/APL mission will be explored at system and programmatic level on the basis of the current requirements and definition of the ADM and EarthCARE payloads. This will include an assessment of the impacts on the ADM follow-on concept of including the APL mission.

Observation Mission (strikethrough if not in scope of studies)	**Study Approach (limitations are in bold character)**
High-Resolution Infrared Sounding (IRS)	Full scope including sensor and system aspects
Microwave Sounding (MWS)	Full scope including sensor and system aspects
Scatterometry (SCA)	Full scope including sensor and system aspects
VIS/IR Imaging (VII)	Full scope including sensor and system aspects
Microwave Imaging (MWI) – Precipitation	Full scope including sensor and system aspects
Multi-viewing, Multi-channel, Multi-polarisation Imaging (3MI)	Full scope including sensor and system aspects
Radio Occultation Sounding (RO)	Full scope including sensor and system aspects
Nadir viewing UV/VIS/NIR - SWIR Sounding (UVNS)	**Accommodation only, payload from GMES Sentinel 5 provided by ESA**
Dual View Radiometry (DVR)	Not to be addressed, part of Sentinel 3
Radar Altimetry (ALT)	Not to be addressed, part of Sentinel 3
Microwave Imaging (MWI) - Cloud	Full scope including sensor and system aspects
Radiant Energy Radiometry (RER)	Full scope including sensor and system aspects

Table 1 Candidate Missions studied in Phase 0

A similar approach is foreseen for the Microwave Imaging (MWI) - Ocean and Land – mission as concerns the 1.4 GHz channel which is being implemented for the SMOS mission and most likely needs to be implemented on a dedicated spacecraft.

The Dual View Radiometry (DVR), Radar Altimetry (ALT) and Ocean Colour Imaging (OCI) missions will not be considered in the context of the Phase 0 study as they will be implemented in the frame of GMES Sentinel 3. The Differential Absorption Lidar (DIA), the Limb Infra-Red (LIR) and Millimetre-Wave (MMW) sounding missions will not be considered as they will not reach a demonstrated maturity status for operational implementation in Post-EPS.

3 PLANNING

The following main planning elements are assumed for the preparation of the Post-EPS Programme:

Phase 0: 2004-2009, on-going
Phase A: 2009-2011, planned
Phase B: 2011-2013, planned
Phase C/D: 2013-2018
Need date: 2018, for the first in-orbit elements for priority missions.
Phase E: Operations and Utilisation: 15 years after commissioning of the first in-orbit elements.

4 CONCLUSIONS

CGMS is invited to take note of the progress of preparation of the Post-EPS Programme at EUMETSAT.