CGMS

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EUMETSAT CONTRIBUTION TO GMES (GLOBAL MONITORING FOR ENVIRONMENT AND SECURITY)

This Working Paper provides information to CGMS on the European initiative Global Monitoring for Environment and Security – GMES, in what way EUMETSAT is involved and how its satellite programmes play a highly relevant role in the initiative.

Action/Recommendation proposed: CGMS is invited to take note.

EUMETSAT contribution to GMES (Global Monitoring for Environment and Security)

1 INTRODUCTION

One of the strategic objectives of the European Space Policy is to deliver user-driven services in support to European Union policies. This objective has been reflected in the selection of a major European initiative - Global Monitoring for Environment and Security (GMES) - aiming at delivering operational services to a broad user community.

This Working Paper provides information on GMES and presents EUMETSAT's involvement and contribution.

2 WHAT IS GMES?

GMES is the European initiative for the establishment of a European capacity for Earth observation. The managing of natural resources and biodiversity, adapting to sea level rise, and monitoring the chemical composition of our atmosphere all depend on accurate information delivered in time.

Launched in 1998 by the European Commission and ESA and now in its implementation phase, the GMES programme will support EU objectives in a range of policy areas and also provide policy-makers, industry leaders and other stakeholders the precise data and information they need to coordinate policies and formulate strategies relating to the environment. In order to achieve this goal, GMES aims to develop a special portfolio of operational services based on Earth observation systems.

Responsible for developing, operating and exploiting Europe's weather satellites since 1986, EUMETSAT was chosen for its experience and expertise in reliably delivering data and products to support in particular the GMES service components for climate, marine and atmospheric monitoring. In doing so, EUMETSAT will realise its long-standing and well-proven partnership with ESA. ESA has overall responsibility for implementing the elements of the Space segment (i.e. the Sentinel satellite missions), while the European Commission, having overall responsibility for GMES, manages actions to identify and develop the services.

The objective of the EU-led GMES initiative is to provide, on a sustained basis, reliable and timely information related to environmental and security issues in support of a wide range of European policy areas for the benefit of European citizens. GMES aims to achieve its goals by developing a special portfolio of operational services, the GMES Service Component, which uses data from Earth observation systems to process and provide information. The processing and dissemination of this information comprises the following thematic areas:

Information related to

Land, marine and atmosphere;
Climate change; and
Emergency and security.

Considered as "public goods", these services shall be accessible to any organisation or citizen. The data and products will be provided on a full and open access principal.

In practice, the GMES service component consists of a complex set of systems which collects data from multiple sources (Earth observation satellites and in situ sensors), processes these data and provides users with reliable and up-to-date. Some of these systems and data sources already exist today, as well as prototype services but development is still required in all domains.

More information on the GMES Programme is available at
- http://www.gmes.info/pages-principales/overview/
- http://ec.europa.eu/gmes/index_en.htm (GMES institutional portal)

3 EUMETSAT'S ROLE IN GMES

As indicated above, the various GMES services receive the data they need from two main components: Earth and in-situ observations. The in-situ infrastructure is coordinated by the European Environmental Agency and the the space component coordinated, implemented and operated by ESA (ad-interim) and EUMETSAT.

ESA will act as the coordination and procurement agency for the Space segment on behalf of the EU, while EUMETSAT will operate GMES Sentinels (satellites) and services related to marine and atmospheric composition monitoring, as well as the supporting ground system.

In close cooperation with ESA, EUMETSAT is involved in the GMES Space Component (GSC). It is a partnership aimed at preparing an operational and sustainable system.

As some GMES activities are very close to meteorology and the meteorological user communities, EUMETSAT's participation in GMES focuses on oceanography, atmospheric composition, climate and global land monitoring as indicated previously. EUMETSAT already provides data for GMES from its current Meteosat, Metop and Jason satellites and plans to do so with future generation satellite programmes.

The meteorological community's contribution to GMES could be complemented by the other partners in the European Meteorological Infrastructure (EMI): EUMETNET, the European Centre for Medium-range Weather Forecasts (ECMWF) and the National Meteorological Services. These partners might address different aspects of the GMES thematic areas such as service support and modelling.

EUMETSAT's contribution to the operational goals of GMES focuses on:

- being the operator of Sentinels-3, -4 and -5 and making optimal use of the EUMETSAT infrastructure: The EUMETSAT archive, EUMETCast data dissemination system, and EUMETSAT's Earth Observation Portal;
- being a GMES near-real time data provider;
- taking into account long-term user needs and requirements including climate monitoring activities;
- aiming at providing third-party data to GMES from EUMETSAT partners in the US, China, India and Japan;
- actively aiming at making available GMES data to the African countries.

3.1 Operator of Sentinels-3, -4 and -5

The Space segment is composed of five GMES Sentinels where EUMETSAT will operate Sentinels-3, -4 and -5.

Sentinel-3 is a Low Earth Orbiting mission to support services relating to the marine and global land environment, with capability to serve further atmospheric- and cryospheric-based application areas. The first Sentinel-3 satellite is expected to be launched in 2013, followed by a second so that they work together to provide maximum coverage. The mission's main objective is to determine parameters such as sea-surface topography, sea- and land-surface temperature as well as ocean- and land-surface colour with high-end accuracy and reliability.

Sentinel-4 and **Sentinel-5** will provide data for atmospheric composition monitoring from geostationary and polar orbits respectively. The Sentinel-4 and -5 payloads will focus on providing services related to the analysis of air quality/pollution, monitoring climate change, stratospheric ozone and solar radiation. The launches are planned for 2017 and 2019 respectively.

EUMETSAT will serve the marine user community with near-real-time (via EUMETCast) and off-line products (via the EUMETSAT Earth Observation Portal and archive) from Sentinel-3. Instruments needed for the GMES Sentinel-4 and -5 missions will be integrated and flown onboard EUMETSAT's future Meteosat Third Generation (MTG) and second generation EUMETSAT Polar System (EPS-SG) missions. The ESA GMES long-term scenario also envisages developing a family of missions called Jason-CS related to high precision altimetry as the successor to the successful current Jason-series already supported by EUMETSAT.

In July 2009, ESA and EUMETSAT signed a Framework Agreement concerning GMES-related cooperation between the two agencies. Under this agreement, EUMETSAT will be responsible, among other tasks, for the contribution of its mission data, products and services to GMES and for the operation of the Sentinel-3 marine

element. Implementing arrangements for cooperation on GMES Sentinels-4 and -5 is also under preparation.

3.2 Data provider and related data policy

As previously indicated, EUMETSAT will provide relevant data from its operational fleet of satellites to GMES. In 2009, EUMETSAT's Council granted free access to all data, products and services from EUMETSAT satellites to the GMES Core Services, on the basis that both EUMETSAT and the European Commission make their respective contributions to GMES and exchange the resulting data and products on a reciprocal basis. The EUMETSAT data dissemination system (EUMETCast) is used to distribute the data to GMES Core Services together with archived data to be made available via the EUMETSAT Earth Observation Portal.

3.3 Listening to long-term user requirements

Discussions with the European Commission and ESA related to future missions are ongoing regarding activities that might be carried out by EUMETSAT in support to GMES.

The analysis of the satellite data needs of GMES, based on the reports of the different Implementation Groups of the GMES Services and on the ESA Data Access Portfolio document derived from these reports, demonstrates that the satellites operated under EUMETSAT mandatory and optional programmes are significant contributors. This is particularly true for the GMES Oceanography and Atmosphere Core Services. Also for the GMES Land Service there is a non-negligible contribution from EUMETSAT, particularly for its global dimension. Finally, satellite missions operated by EUMETSAT are also providing an important contribution to Climate Monitoring activities, which are planned to be covered by GMES in the future.

3.4 Climate activities and GMES

In 2009, the EUMETSAT Council also reaffirmed that EUMETSAT should support the European Union in the preparation of user requirements for Space observations related to Climate Monitoring to encompass international cooperation elements. Coordination on climate activities was therefore extended to the European Commission Climate activities and ESA Climate Change Initiative (CCI), globally through the WMO programmes (including GCOS and WCRP), and also CEOS and GEO activities, where the main target is the generation of Essential Climate Variable data products.

A Resolution on EUMETSAT Activities in Support to Climate Monitoring was adopted by the EUMETSAT Council, recalling that the focus should be on the generation of Fundamental Climate Data Records, both through the EUMETSAT Central Facility and the EUMETSAT Satellite Application Facility (SAF) Network.

As a consequence, a small coordination group between ESA, EUMETSAT and the European Commission was set up for the purpose of coordination of the respective climate activities, and to support the dialogue on climate aiming at shaping a

European response to requirements for climate data from Space.

Furthermore, EUMETSAT actively participates in the European Commission FP7 research and development projects:

- EUGENE (Improving coordination, visibility and impact of European GEOSS contributions by establishing a EUropean GEo NEtwork) where EUMETSAT is leading the work package on climate; and

- ERA CLIM (an ECMWF led project on model-based reanalysis to develop, produce and disseminate state-of-the-art atmospheric reanalysis datasets).

EUMETSAT will also contribute to the planning of the GMES Climate service, once the scope has been defined by the European Commission.

3.5 Third-party data provision

EUMETSAT has developed a number of international cooperation agreements to grant access to its Member States to data from third-parties. In the context of these agreements, EUMETSAT will try to ensure that data could also be made available to the GMES community. Through this, EUMETSAT is aiming at acting as interface between GMES and third-party data providers, for all type of satellite data which are in the remit of EUMETSAT's contribution to GMES. The discussion with third-parties will be established on a case-by-case basis.

3.6 GMES and Africa

EUMETSAT has been very active in ensuring that GMES is also made available to African countries, and strongly supported the Lisbon Process which launched the GMES and Africa process in 2007. EUMETSAT expects that a large quantity of relevant GMES data could be made available to African countries. Again, the data dissemination infrastructures of EUMETSAT (EUMETCast) would play a key role in making the data available to African countries.

4 CONCLUSION

CGMS is invited to take note of the European initiative GMES and EUMETSAT's contribution and involvement.