

## IAC-06-E6.3.02

# EUMETSAT INTERNATIONAL COOPERATION ACTIVITIES

**Werner Balogh**

EUMETSAT, Germany  
werner.balogh@eumetsat.int

**Piero Valabrega**

EUMETSAT, Germany  
piero.valabrega@eumetsat.int

### ABSTRACT

Since its foundation in 1986, the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) has been involved in international cooperation activities, ranging from the interaction with its Member States and Cooperating States to the negotiation and conclusion of agreements with European and other international organisations and with non-Member States in the fields of satellite meteorology cooperation and the exchange of remote sensing satellite data. EUMETSAT is also making major contributions to a number of coordinated global Earth Observation initiatives. This paper presents a summary overview of these activities. Its main purpose is to give a general idea about the practical conduct of a wide range of international cooperation activities in an organisation which stands synonymous for the operational use of satellite-based Earth Observation applications.

### INTRODUCTION

The European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) is an intergovernmental organisation. Its legal basis is laid out in the EUMETSAT Convention which entered into force on 19 June 1986, and was subsequently amended on 5 June 1991 [1]. Its privileges and immunities are defined in a protocol registered with the Secretary General of the United Nations in accordance with Article 102 of the Charter of the United Nations [2]. EUMETSAT has its Headquarters in Darmstadt, as stated in the Headquarters Agreement signed with the Federal Republic of Germany on 7 June 1989 and replaced by a new Agreement signed on 18 June 2002 [3].

EUMETSAT's objectives are the establishment, maintenance and exploitation of European

systems of operational meteorological satellites, which provide essential information to the national meteorological services in its Member States and contribute to the operational monitoring of the climate and the detection of global climate changes. These objectives are implemented through a series of mandatory and optional programmes.

Fig.1 depicts the EUMETSAT internal organisation structure. The supreme body of the organisation is the EUMETSAT Council, supported by a number of Delegated Bodies, where Member States representatives prepare the decisional work of Council and follow up on its implementation.

The EUMETSAT Secretariat is structured into three Departments: Programme Development, Operations and Administration. The Office of the

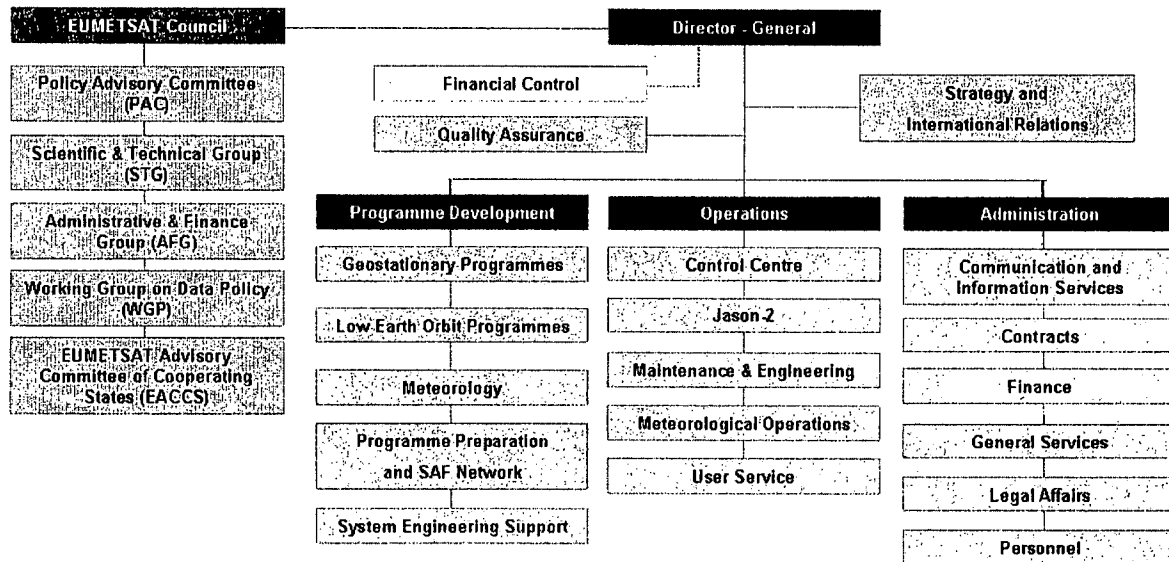


Fig. 1: EUMETSAT Organisational Structure

Director-General is comprised of two Divisions, Quality Assurance and Strategy and International Relations. The Director-General is appointed by EUMETSAT Member States and is the legal representative of EUMETSAT.

The long-term EUMETSAT Strategy, including the international relations component, is defined in a strategy document, which is periodically revised and updated by the EUMETSAT Council. The time horizon of the present version of the Strategy stretches to 2030 [4]. The responsibility for a coherent implementation of the international relations political and strategic components and their overall consistency with the EUMETSAT Strategy guidelines and targets rests with the Strategy and International Relations Division, which is coordinating EUMETSAT international relations activities. The responsibility for the legal elements of international relations rests with the Legal Affairs Division.

International negotiations are led by the Strategy and International Relations Division in cooperation with the Legal Affairs Division and involve other relevant Departments as necessary in accordance with the subject matter under discussion.

EUMETSAT's international relations activities are conducted on the basis of the Organisation's objectives set out in the Convention and as mandated by Council. They involve cooperation with EUMETSAT Members, with intergovernmental organisations, and with institutions of non-Member States. The following chapters describe these activities in detail.

## EUMETSAT MEMBERS

EUMETSAT presently encompasses 20 Member States and 10 Cooperating States. Each Member State has one vote in the Council. The organisation is funded through membership contributions calculated on a scale proportional to the gross national income of the concerned Member State.

The current Cooperating States (Bulgaria, Czech Republic, Hungary, Iceland, Latvia, Lithuania, Poland, Romania, Serbia&Montenegro\*, Slovenia) have signed cooperation agreements with EUMETSAT and contribute at a level of 50% of the full membership fee. They have un-restricted access to EUMETSAT data and services and are expected to become full members within a fixed period of time, usually within five years from the entry into force of the Cooperating State agreement.

The 16 founding Member States (Belgium, Denmark, Finland, France, Germany, Greece, Italy, Ireland, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom) were joined by Austria and Luxembourg through the conclusion of accession agreements, respectively in 1993 and 2001. The transition of two former Cooperating States, the Slovak Republic and Croatia, to full Member States was achieved in 2006.

Several bilateral agreements on satellite data relay, cooperation on satellite instruments on EUMETSAT missions, the establishment and

\* Pending Ratification

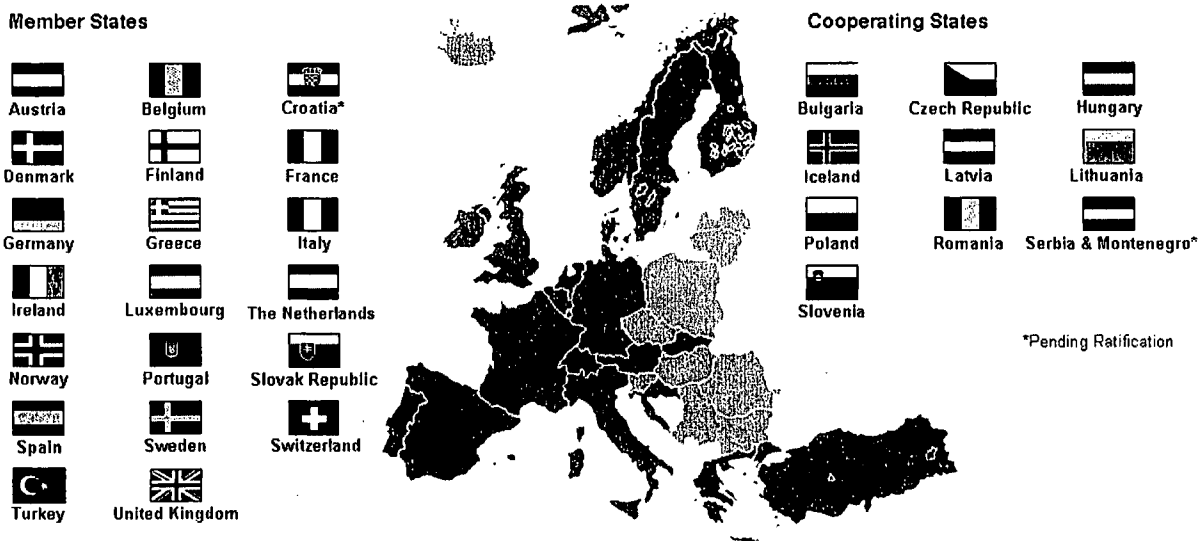


Fig. 2: EUMETSAT Member States and Cooperating States

operation of meteorological data distribution and uplink stations, EUMETCast, and the development of Satellite Application Facilities (SAFs) have been signed with EUMETSAT Member States and Cooperating States and are implemented through the National Meteorological Services (NMSs) and other relevant State entities. The EUMETSAT Member States and Cooperating States are shown in Fig.2.

### INTERGOVERNMENTAL ORGANISATIONS

EUMETSAT has an extensive network of international relations based on cooperation agreements with several intergovernmental organisations.

#### ESA

There is a long-standing history of cooperation and partnership between EUMETSAT and the European Space Agency (ESA). In the 1970s, ESA conceptualised and developed the first generation of Meteosat satellites, and was the driving force behind the formation of EUMETSAT: Following EUMETSAT's foundation in 1986, ESA transferred to it, by a set of agreements, the complete responsibility for the Meteosat First Generation Operational Programme.

Today the European Space Agency (ESA) is acting as the development and procurement agency for the mission space segment of EUMETSAT mandatory programmes, including Meteosat Second Generation, the EUMETSAT Polar System (EPS), and the planned Meteosat

Third Generation and Post-EPS programmes. The ground segment development and procurement is coordinated by EUMETSAT, whose Members typically provide 80% of the mission development cost and the total cost of mission operations.

EUMETSAT is cooperating with ESA on the development of future operational satellite missions in the Global Monitoring for Environment and Security (GMES) initiative. These satellites, called the GMES Sentinels, are planned for launch in the 2010-2020 time-frame. EUMETSAT is focusing in particular on the Sentinel-3 (ocean and global land monitoring), Sentinel-4 (GEO atmospheric composition mission) and Sentinel-5 (LEO atmospheric composition mission) missions.

#### ECMWF

Through an Exchange of Letters signed on 18 May 1988<sup>†</sup>, EUMETSAT established a fruitful long-term relationship with the European Centre for Medium-range Weather Forecasts (ECMWF) located in Reading, United Kingdom [5]. ECMWF is routinely and on a daily basis integrating millions of data points collected by EUMETSAT satellites for data assimilation. The use of space-derived data has enabled successive, considerable improvements in the accuracy and numerical modelling of weather forecasts.

<sup>†</sup> "Exchange of Letters between EUMETSAT and ECMWF Working Relationship between the two Organisations"

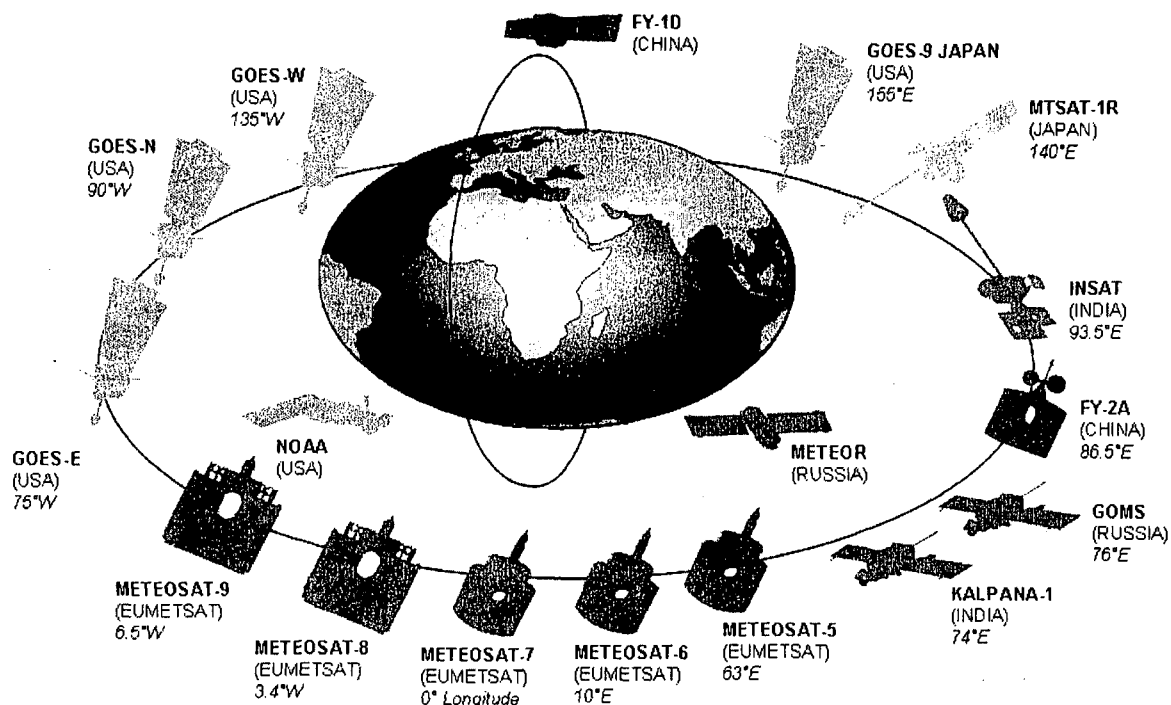


Fig. 3: Global Observing System of the World Meteorological Organisation

### WMO

The EUMETSAT Convention commits the organisation to carry out its mission in accordance with the recommendations of the World Meteorological Organization (WMO). An Exchange of Letters signed on 1 September 1988 sets out the working relationship between the two organisations<sup>†</sup>.

The WMO is a Specialized Agency of the United Nations, responsible for coordinating Member States activities related to the Earth's atmosphere, including the atmosphere's interaction with oceans and water resources and its effects on the climate [6].

For this purpose, WMO has established the concept of the WMO Global Observing System (GOS) as a component of the World Weather Watch (WWW), a planet-wide ground-, in-situ and space based observations network of the atmosphere and ocean surface [7]. The WMO GOS objectives are to improve and optimize the global observations system and to facilitate the standardisation of observing techniques and practices.

EUMETSAT is contributing its operational geostationary satellite missions to the GOS, whose capabilities will be further enhanced with the addition of the EUMETSAT Polar System satellites (see Fig.3).

To meet the information requirements of all WMO programmes, affiliated international organisations and initiatives, as well as those of other relevant users, the WMO has established the concept of an integrated information system, the WMO Information System (WIS). The WIS includes provisions for data collection, exchange, dissemination, archiving and retrieval.

One element of the WIS, implemented by the WMO Member States and Member State organisations, is the Integrated Global Data Dissemination Service (IGDDS), a circulation scheme of space-based observation data and products.

EUMETCast, EUMETSAT's Broadcast System for Environmental Data, is the EUMETSAT contribution to the IGDDS. It is a multi-service dissemination system based on standard Digital Video Broadcast (DVB) technology, using commercial telecommunication geostationary satellites to multicast files (data and products) to a wide user community.

<sup>†</sup> "Exchange of Letters between EUMETSAT and WMO Working Relationship between the two Organisations"

## European Commission

In the late 1990's, the European Commission (EC), the executive body of the European Union (EU), began to take a growing interest in space activities [8]. Following the publication of a Green Paper and White Paper in 2003, the European Union and ESA Member States embarked on the definition of a European Space Policy, a process that is still on-going. The European Space Policy will be based on a European Space Programme.

On 25 January 2006, the EC and EUMETSAT concluded an Exchange of Letters, setting out the basis to establish a working relationship between the two parties in the implementation of the European Space Policy<sup>§</sup>.

This agreement represents the initial step towards a formal framework agreement that shall set out a long-term framework for cooperation between the two organisations.

## GMES

The Global Monitoring for Environment and Security (GMES) is a joint initiative of the European Commission and the European Space Agency [9]. GMES was launched in 1998 and EUMETSAT has been an active contributor to GMES-related activities since then. GMES is a concerted effort to establish an operational European capacity for the timely provision of quality ground-, air-, and space-based data, information and knowledge in support of a wide range of European policy areas for the benefit of European citizens.

To implement the provisions set out in the Exchange of Letters, EUMETSAT is closely working with the European Commission's newly established GMES Bureau and with the Implementation Groups of the three GMES Fast-track Services (Marine Core Service, Land Monitoring Core Service, Information Service in Response to Crises, Disasters and Emergencies) which constitute the initial set of GMES Pilot Services. EUMETSAT has also coordinated the ground-work for establishing a future GMES Atmosphere Service.

---

<sup>§</sup> "Cooperation between EUMETSAT and EC - Exchange of Letters"

## PUMA/AMESD

Since 1996 EUMETSAT has been contributing to sustainable development in Africa with the Preparation for the Use of MSG in Africa (PUMA) initiative to set up a network of EUMETCast receiving stations across the continent, enabling African users to receive data from Meteosat Second Generation satellites. PUMA has led to the successful installation of at least one EUMETCast station in each of 53 African countries, together with the provision of extensive training efforts targeting the staff of the African National Meteorological Services.

This programme will be succeeded by the African Monitoring of the Environment for Sustainable Development (AMESD) project. It will utilise the infrastructure established by the PUMA initiative to improve environmental management policies at national and sub-regional level in Africa. PUMA and AMESD are fully funded and supported by the European Commission development cooperation policy. EUMETSAT contributes as an in-kind donor.

In this context of cooperation on satellite meteorology with the countries and institutions situated within the footprint of its geostationary satellites, EUMETSAT has also concluded various agreements with the African Centre for Meteorological Application for Development (ACMAD) and the Centre Regional AGRHYMET, both located in Niamey, Nigeria.

## CGMS

A major portion of the WMO GOS is based on the global network of meteorological satellites coordinated by the Coordination Group for Meteorological Satellites (CGMS), founded in 1972 under the name Coordination of Geostationary Meteorological Satellites.

CGMS provides a forum for the exchange of technical and operational information on geostationary and polar-orbiting meteorological satellite systems and the coordination of initiatives in these areas. Among other tasks, CGMS is also considering contingency plans for assuring operational continuity and reliability, as well as a complete global coverage.

EUMETSAT joined CGMS in 1987 and is acting as its Secretariat, especially in the context of its annual meetings [10].

## CEOS

The Committee on Earth Observation Satellites (CEOS) was established in 1994 as a coordinating mechanism for civil Earth Observation missions, comprising 25 Members and 20 Associates [11].

EUMETSAT is a Member of CEOS and represented in the CEOS Secretariat and in the Working Group on Education, Training, and Capacity Building (WG-Edu).

Through CEOS EUMETSAT is also contributing to the Integrated Global Observing Strategy (IGOS) Partnership Process and to the Global Climate Observing System (GCOS) [12], [13].

CEOS is in the process of re-defining its role as the organisation coordinating the space-based components of the Global Earth Observations System of Systems (GEOSS).

## GEO/GEOSS

The Group on Earth Observations (GEO) was formally established in February 2005, following a series of ministerial-level meetings [14]. As of September 2006 it is comprised of 65 member countries and 43 participating organizations, including EUMETSAT.

GEO aspires to establish a Global Earth Observation System of Systems (GEOSS) based on a 10-year implementation plan, covering nine societal benefit areas (Disasters, Health, Energy, Climate, Water, Weather, Ecosystems, Agriculture, Biodiversity) and five transverse areas (User Engagement, Architecture, Data Management, Capacity Building, Outreach).

EUMETSAT is closely following the activities in the GEOSS initiative and is represented in the four GEOSS committees (Architecture and Data Committee, User Interface Committee, Capacity Building Committee, Science and Technology Committee) and in the Working Group on Tsunami Activities.

EUMETSAT is contributing – either directly or through WMO, CEOS, the European GEO High-Level Working Group, and via its contributions to the European GMES initiative – to several of the tasks identified in the 2006 GEO Work Plan and will continue to do so in the framework of the future multi-year work plans.

The current focus of EUMETSAT activities in GEOSS is the GEONETCast data dissemination system based on EUMETSAT's EUMETCast environmental data dissemination scheme [15].

Furthermore EUMETSAT is also contributing to the Virtual Constellations, based on the "CEOS constellation concept" aiming at providing guidance for the planning phase of missions considered by space agencies and related organisations, ensuring better coordination of sensors, data continuity and availability, and addressing the nine societal benefit areas of GEO.

## UN COPUOS

EUMETSAT is occasionally participating as an observer in the meetings of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and its Legal and Scientific and Technical Subcommittees.

On 25 May 1998 the organisation submitted a declaration of acceptance of the Convention on Registration of Objects Launched into Outer Space ("Registration Convention") followed by the acceptance of the Convention on International Liability for Damage Caused by Space Objects ("Liability Convention") on 29 September 2005 and the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space ("Rescue Agreement") on 19 December 2005.

It should be noted that a number of EUMETSAT Member States and Cooperating States are not member States of UNCOPUOS.

## COSPAS-SARSAT

Instruments of the international COSPAS-SARSAT international search-and-rescue system are carried on board of the MSG satellites, and will be part of the instruments provided by NOAA to fly on the EPS MetOp-A and B satellites. Concerning the instrument on the MSG satellites, an exchange of letters has been signed with COSPAS-SARSAT on 28 June 2001.

## NON-MEMBER STATES

EUMETSAT has concluded agreements with various organisations and institutions in non-Member States.

## United States of America

The National Oceanic and Atmospheric Administration (NOAA) is a major cooperation partner for EUMETSAT. The two organisations will be operating together a European-US satellite system flying in complementary orbits, called the Initial Joint Polar-Orbiting Operational Satellite System (IJPS). The IJPS Agreement was signed in 1998.

The European contribution to IJPS system is the EUMETSAT Polar System., whose Metop satellites will provide the mid-morning orbit coverage.

EUMETSAT and NOAA will operate and control their respective polar orbiting satellites and ground segments; however, data collected by all the satellites will be shared and exchanged between the two organisations. It is expected that this cooperation framework will continue with the Post-EPS missions through the establishment of a Joint Polar System (JPS).

EUMETSAT and NOAA also cooperate as the operational agencies of the Jason-2 satellite, the space segment of the Ocean Surface Topography Mission (OSTM). Jason-2 is developed by the National Aeronautics and Space Administration (NASA) and the Centre National d'Etudes Spatiales (CNES) as a successor to the Jason-1 and TOPEX/Poseidon satellites. To this extent, a quadripartite Memorandum of Understanding between NASA, NOAA, CNES and EUMETSAT for Cooperation in the Ocean Surface Topography Mission has been signed on 7 April 2006.

## China, India, Russia

Agreements have been signed with the China Meteorological Administration (CMA) on cooperation in the field of meteorological satellites and satellite meteorology, the Russian Federal Service for Hydrometeorology and Environmental Monitoring (ROSHYDROMET) on cooperation and exchange of images from geostationary meteorological satellites in support of weather analysis and forecasting, and the Indian Space Research Organisation (ISRO) on cooperation and exchange of images from geostationary meteorological satellites in support of weather analysis and forecasting and other areas.

Cooperation agreements with meteorological services in other space-faring non-Member States are under consideration or are being negotiated.

## SUMMARY AND CONCLUSIONS

The data and products acquired and disseminated by EUMETSAT satellites enable more accurate daily weather forecasting, provide support to industry, such as the aviation and maritime transport sector; assist human forecasters in diagnosing and monitoring the development of hazardous weather systems and contribute to global climate and climate change monitoring.

The wide range of EUMETSAT's international cooperation activities serve the purpose to make relevant data, products and services readily available to all potential users and user organizations around the globe. Through this EUMETSAT contributes to sustainable development of Planet Earth.

Not least to its long history, the world-wide meteorological community is being considered a mature and well-organised user community of data collected by Earth Observation satellites. International cooperation activities in space-based meteorology therefore appear to provide a particularly successful and useful example for cooperation in other disciplines that may benefit from the use of Earth Observation data.

## REFERENCES

- [1] Convention for the Establishment of a European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) as amended by the EUMETSAT Council in Resolution EUM/C/Res. XXXVI of 5 June 1991, and subsequently accepted by all EUMETSAT Member States, EUMETSAT Basic Documents, Vol.1, April 2005
- [2] Headquarters Agreement between the Government of the Federal Republic of Germany and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), EUMETSAT Basic Documents, Vol.1, April 2005
- [3] Protocol on the Privileges and Immunities of the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) as amended in accordance with notification of the Depository of the Protocol on Privileges and Immunities dated 12 January 2004, EUMETSAT Basic Documents, Vol.1, April 2005

- [4] EUMETSAT Strategy: 2030, EUM.05, Version 1, 1 October 2005, [www.eumetsat.int/groups/cps/documents/document/pdf\\_br\\_eum05\\_en.pdf](http://www.eumetsat.int/groups/cps/documents/document/pdf_br_eum05_en.pdf)
- [5] ECMWF Homepage, [www.ecmwf.int](http://www.ecmwf.int)
- [6] WMO Homepage, [www.wmo.int](http://www.wmo.int)
- [7] Global Observing System Homepage, [www.wmo.ch/web/www/OSY/GOS.html](http://www.wmo.ch/web/www/OSY/GOS.html)
- [8] European Space Policy, [ec.europa.eu/enterprise/space](http://ec.europa.eu/enterprise/space)
- [9] GMES Homepage, [www.gmes.info](http://www.gmes.info)
- [10] CGMS Documents, Calibration Publications and Meeting Reports are available at [www.eumetsat.int/Home/Main/Publications/CGMS\\_Publications](http://www.eumetsat.int/Home/Main/Publications/CGMS_Publications)
- [11] CEOS Homepage, [www.ceos.org](http://www.ceos.org)
- [12] IGOS Partnership, [www.igospartners.org](http://www.igospartners.org)
- [13] Global Climate Observing System Homepage, [www.wmo.ch/web/gcos/](http://www.wmo.ch/web/gcos/)
- [14] Group on Earth Observations Homepage, [www.earthobservations.org](http://www.earthobservations.org)
- [15] GEONETCast - The EUMETCast Contribution - Delivering operational services to users, E.01, Version 2, 2<sup>o</sup>September 2006,

*Disclaimer: The views expressed in this paper are purely those of the authors and do not necessarily reflect the position of EUMETSAT.*