

**OUTCOME OF WMO MEETINGS WITH RELEVANCE TO ET-SUP  
INCLUDING CBS, CONSULTATIVE MEETINGS, AND CONGRESS**

*(Submitted by the Secretariat)*

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**Summary and Purpose of Document**

The present document provides some highlights of the outcome of major WMO meetings that occurred since the fifth meeting of ET-SUP in March 2010:

- Sixth session of the Implementation/Coordination Team on the Integrated Observing System (28 June – 2 July 2010)
  - Extraordinary session of the Commission for Basic Systems (CBS-Ext. (10); 17-24 November 2010)
  - Workshop on Continuity and Architecture Requirements for Climate Monitoring (13-14 January 2011)
  - Sixteenth World Meteorological Congress (Cg-XVI; 16 May – 3 June 2011)
  - Eleventh session of the Consultative Meetings on High-level Policy on Satellite Matters (CM; 19 May 2011)
  - Sixth session of the Expert Team on the Evolution of the Global Observing System (ET-EGOS; 14-17 June 2011)
  - Thirty-ninth session of the Coordination Group for Meteorological Satellites (CGMS-39; 3-7 October 2011)
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**ACTION PROPOSED**

The sixth session is invited to:

- (a) Note how the recommendations and achievements of ET-SUP have been taken up by these bodies;
  - (b) Take into account the guidance provided by CM, CBS and the Congress.
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## OUTCOME OF WMO MEETINGS WITH RELEVANCE TO ET-SUP

### Introduction

The present document provides some highlights of the outcome of major WMO meetings occurred since the fifth meeting of ET-SUP held in March 2010.

### ICT-IOS-6 (28 June - 2 July 2010)

The Implementation/Coordination Team on the Integrated Observing System (ICT-IOS) consolidates for CBS the outcome of the various Expert Teams dealing with observations, including ET-SAT, ET-SUP, as well as the Expert Team on Evolution of Global Observing systems (ET-EGOS), and the Expert Team on Automatic Weather Stations (ET-AWS). The team took note of the achievements of ET-SUP, of the related issues, and agreed on a set of recommendations to be submitted to CBS, including an update of the ET-SUP Terms of Reference. The ET-SUP report to ICT-IOS-6 is provided as background document (ICT-IOS-6/Doc. 8.6 REV 1).

### CBS-Ext. (10) (17-24 November 2010)

#### *ET-SUP Terms of Reference*

The CBS approved the amendment of the ET-SUP Terms of Reference proposed by ICT-IOS-6. The new Terms of Reference are available on line: [http://www.wmo.int/pages/prog/sat/structure\\_en.php](http://www.wmo.int/pages/prog/sat/structure_en.php) and are provided in annex to the ET-SUP Chairman's report to ET-SUP-6 (ET-SUP-6/Doc. 2). Without changing the scope of activity of ET-SUP, the new TORs are aimed at providing a higher-level, more balanced framework for ET-SUP activities in support of the strategy to improve satellite data utilization.

#### *Requirements and capabilities database*

The Commission endorsed a strategy for the evolution and future hosting of the Rolling Review of Requirements (RRR) database, and requested the Open Programme Area Group on Integrated Observing Systems (OPAG-IOS) to invite potential candidates willing to host the RRR database and to evaluate candidates according to a process to be defined by ICT-IOS. The Commission also requested OPAG-IOS to expand existing application areas to cover specific requirements of Polar Regions, and the Cryosphere in general.

#### *Access to satellite data and products*

The Commission noted the need for increased attention to satellite data and products delivery, particularly in developing countries, and agreed that, in the context of the Integrated Global Data Dissemination Service (IGDDS) and GEONETCast, the strategy for improving data access should consider among its priorities:

- To organize the formulation of data requirements and the dialogue between data users and providers; considering the positive outcome of the RAs III/IV Satellite Data Requirements Workshop, the Commission encouraged a similar approach in other Regions where satellite data access is a limiting factor;
- To implement sustainable regional DVB-S dissemination systems offering cost efficient access to satellite data in every region;
- To integrate all relevant data types in such broadcast services, including inter-regionally exchanged data; and

- To support harmonization of future Direct Broadcast systems as well as the implementation of complementary data access and distribution services via the Internet, recognizing the different user needs.

The Commission was informed that the first Asia-Oceania Meteorological Satellite Users' Conference had been held in Beijing, China in November 2010, and welcomed the intention of China, Japan and the Republic of Korea to collaborate on the organization of similar events in the future.

#### *Architecture for climate monitoring*

The Commission endorsed the proposal for a space-based architecture for climate monitoring based on the requirements established by the Global Climate Observing System (GCOS) and the Essential Climate Variables (ECVs) that can be derived from space-based observations. The Commission noted that an end-to-end system, much like what has been developed for weather monitoring and forecasting over the last fifty years, needs to be developed for climate monitoring. The proposed architecture will enhance, and is modelled after, the end-to-end system which has been created for weather observations, research, modelling, forecasting, and services. It will be part of the space-based component of the WMO Integrated Global Observing System (WIGOS). Other components of this end-to-end system would include the inter-calibration activities of the Global Space-based Inter-calibration System (GSICS), additional calibration and validation activities to be conducted in coordination with CIMO, the product generation efforts as done within the Sustained Co-Ordinated Processing of Environmental satellite data for Climate Monitoring (SCOPE-CM) and the training and capacity building activities of the WMO/CGMS (Coordination Group for Meteorological Satellites) Virtual Laboratory (VLab).

The Commission supported the initiative to prepare a workshop focussing on the specific requirement for continuity of climate observations, and on architectural implications of these special requirements; this workshop would respond to the request from the Coordination Group for Meteorological Satellites (CGMS) to convene a "contingency planning workshop" for the climate observations reflected in the Vision for the GOS in 2025.

#### *Space Programme Office*

Given the magnitude of developing a space-based architecture for climate monitoring and the importance of this effort to the GFCS, the Commission invited Members to further support the WMO Space Programme either through secondments to the Office or voluntary contributions to the Space Programme Trust Fund.

#### *Space Weather*

The Commission expressed its support to all the Members who nominated technical experts to serve on the Inter-Programme Coordination Team for Space Weather (ICTSW), and to China and the United States for their willingness to provide co-chairs. The ICTSW was encouraged to pursue its work plan, including a review of Space Weather observing requirements, and data management standardization, as priority issues.

#### *New Centre of Excellence in Republic of Korea*

The Commission welcomed the expansion of the Virtual Laboratory for Education and Training in Satellite Meteorology (VLab) through the creation of a Centre of Excellence on remote sensing applications and satellite meteorology training at the National Satellite Meteorology Centre (NSMC) of the Korea Meteorological Administration (KMA) in Jincheon, Republic of Korea. It thanked KMA for its commitment on this training activity. The Commission congratulated the Republic of Korea for the successful launch of COMS in June 2010 and welcomed the announcement that COMS data and products will be made available in support of meteorological activities including typhoon monitoring.

*Ad-hoc expert team on atmospheric chemistry requirements for satellite observations*

The Commission noted that satellite observations are recognized as an integral part of the implementation of the IGACO strategy within the GAW programme. At the same time there is considerable activity in the satellite community including by operational satellite operators, in support of atmospheric composition observation and monitoring. These activities will result in a substantial contribution to meeting the objectives of the WIGOS/GAW programme. Taking into account the cross-cutting nature of satellite programmes and missions and the need to coordinate data requirements for satellite observations for atmospheric composition monitoring, the Commission recommended that an ad hoc team of experts be established between CBS and the Commission on Atmospheric Science (CAS) to address this issue. It requested its president to coordinate this with the president of CAS.

*Volcanic ash monitoring*

The Commission requested the OPAG-IOS to work closely with other technical commissions, ICAO and other relevant organizations to advise on the design and implementation of a sustainable capability for the observation of volcanic ash. The Commission further joined with the United Kingdom on behalf of the London VAAC in expressing sincere thanks to those Members who shared specialized observational data during the eruption of the Eyjafjallajökull volcano. The ICAO representative indicated the willingness of ICAO to contribute to the work of the OPAG-IOS related to volcanic ash, in view of its prime importance and urgency for international aviation.

**WORKSHOP ON CONTINUITY AND ARCHITECTURE REQUIREMENTS FOR CLIMATE MONITORING FROM SPACE (13 and 14 January 2011)**

In response to a request from CGMS, the Workshop on Continuity and Architecture Requirements for Climate Monitoring was convened in Geneva, in coordination with GCOS. The goal was to analyze and refine the “continuity aspects” of the GCOS requirements in order to inform the definition of a space-based architecture for climate observations. This was considered as the first of a possible series of workshops on architecture for climate monitoring from space. Documents, presentations and conclusions of the workshop can be found on: <http://www.wmo.int/pages/prog/sat/meetings/> .

Based on a Gap Analysis of the GCOS Essential Climate Variables (ECV), the workshop noted the need for additional long-term planning for several ECVs, or for specific ECV-related products. The following areas of potential gaps were highlighted as examples: Earth Radiation Budget (including solar irradiance), global precipitation, atmospheric composition (as measured by limb sounding instruments). The workshop highlighted that the process to identify needs and priorities based on a systematic Gap Analysis was a critical step in the definition of an architecture. It also recommended continuity of high-accuracy and stable reference instruments as anchors to increase the value of operational instruments for climate purpose.

The workshop furthermore suggested increasing communication and coordination among the CGMS-sponsored international scientific working groups (IPWG, IROWG, ITWG, IWWG) and the CEOS Virtual Constellations.

In parallel with these technical discussions, participants discussed policy and governance aspects of the development of an architecture for climate monitoring from space in response to the concept document which had been circulated by the WMO Secretariat to CGMS, CEOS and CBS. It was agreed to establish a “badgeless writing team” involving representatives of CGMS, CEOS and WMO to develop a new document in a wider perspective. The report resulting from this writing team was circulated to ET-SUP Members for comments on 1 September. The Architecture for Climate Monitoring from Space was subsequently a major discussion item of the sixteenth Congress.

**CM-11 (19 May 2011)**

The eleventh session of the Consultative Meetings on High-level Policy on Satellite Matters (CM-11) was presented an activity report of the Space Programme, and discussed GCOS matters, SCOPE-CM, and the development of an architecture for Climate Monitoring. It agreed one action below:

**Action 1:** WMO Secretariat, in consultation with Jason partners, to consider a SCOPE-CM Pilot Project for ocean altimetry.

**SIXTEENTH CONGRESS (Cg-XVI, 16 May – 3 June 2011)**  
*(Extract of the general summary)*

- 3.7.1 Congress reaffirmed the importance of integrated satellite systems as a unique source of observational data for monitoring of weather, climate and the environment. It stressed the importance of further advancing instrument intercalibration, data exchange, data management standardization, user information and training, in order to take full advantage of space-based capabilities in the context of the WMO Integrated Global Observing Systems (WIGOS).  
 (...)
- 3.7.6 Congress stressed the need for improved accessibility of satellite data and products, particularly in developing countries, and welcomed the recommendation from CBS-Ext.(10) to consider among its priorities: (a) to organize the formulation of data requirements and the dialogue between data users and providers; (b) to implement sustainable regional Digital Video Broadcasting by Satellite (DVB-S and DVB-S2) dissemination systems (such as IGDDS or GEONETCast) offering cost efficient access to satellite data and products in every region; (c) to integrate all relevant data types in such broadcast services, including inter-regionally exchanged data; and (d) to support harmonization of future Direct Broadcast Systems as well as complementary data access and distribution services via the Internet, recognizing the different user needs. Congress welcomed the setting up of regional expert groups in RA I, RA III, RA IV and RA V to review the requirements for satellite data access as well as the Pilot Project in RA II aiming to enhance accessibility of satellite data in the Region.
- 3.7.7 Congress welcomed the expansion of the Virtual Laboratory for Education and Training in Satellite Meteorology (VLab) that included 12 Centres of Excellence (located in Argentina, Australia, Barbados, Brazil, China, Costa Rica, Kenya, Niger, Oman, Republic of Korea, Russian Federation and South Africa) sponsored by satellite operators (CMA, CONAE, EUMETSAT, IMD, INPE, JMA, KMA, NOAA, and ROSHYDROMET) which allowed organizing satellite training in all WMO Regions and all WMO official languages. It welcomed the VLab widening its scope and audience through partnerships with other training-related initiatives such as the COMET Programme of the USA. Congress recalled the usefulness of regional conferences (such as the EUMETSAT Meteorological Satellite Conferences, the GOES Users and Direct Readout conferences, and the recent Asia-Oceania Meteorological Satellite Users Conference) to raise user awareness on satellite systems and their utilization. It encouraged satellite operators to further organize such events and facilitate participation of WMO Members. It commended China, Japan and the Republic of Korea for their decision to jointly sponsor and rotate hosting future Asia-Oceania Meteorological Satellite Users Conferences.
- 3.7.8 Congress welcomed the setting-up of the Sustained Coordinated Processing for Environmental Satellite Data for Climate Monitoring (SCOPE-CM) and expected that this initiative would soon reach an operational stage and be expanded. It invited the Space Programme to consider similar initiatives to coordinate the delivery of satellite derived products responding to the requirements of other application areas including severe weather forecasting, precipitation estimation, or volcanic ash detection. Congress welcomed the orientation taken by the Commission for Climatology (CCI) to further incorporate satellite products in climate monitoring and its plan for enhancing linkages with the Space Programme and the SCOPE-CM initiative. It

expected that this collaboration would bring substantial benefits to WMO global and regional climate monitoring activities. It recommended using existing mechanisms such as workshops, seminars or expert meetings coordinated by the CCI or within SCOPE-CM to address gaps in satellite-derived products for use in the WMO Climate System Monitoring (WMO-CSM).

#### *Architecture for climate monitoring from space*

- 3.7.9 Noting the request from EC-LXII, Congress agreed that an architecture for sustained climate monitoring from space should be defined and implemented, based on the requirements established by the Global Climate Observing System (GCOS) for the Essential Climate Variables (ECVs) that can be monitored from space. It welcomed the effort initiated to formulate a concept for such an architecture as included in the Annex to draft Resolution 3.7/1 (Cg-XVI), noting that the architecture should enhance, and be modelled after, the system which has been developed for weather monitoring and forecasting over the last fifty years, to the extent possible. Congress further noted the importance of enhancing synergies between in-situ and space-based observing systems, and recommended that this be taken into account in the development of the architecture. Specifically with regard to ocean observations, it recognized the potential importance of the existing JCOMM Observing Programme Support Centre (JCOMMOPS) to provide some coordination mechanism, and to the enhancement of such synergies.
- 3.7.10 Congress agreed that such architecture should be defined as an end-to-end system, involving the different stakeholders including operational satellite operators and R&D space agencies, the Coordination Group for Meteorological Satellites (CGMS), the Committee on Earth Observation Satellites (CEOS), the Global Climate Observing System (GCOS), the World Climate Research Programme (WCRP) and the Group on Earth Observations (GEO). Within the WMO context, the architecture shall be part of the space-based component of WIGOS. Other components of this end-to-end system would include the intercalibration activities of the Global Space-based Inter-Calibration System (GSICS), additional calibration and validation activities to be conducted in coordination with the Commission for Instruments and Methods of Observation (CIMO), the product generation efforts as done within the SCOPE-CM and the training and capacity building activities of the VLab. Congress therefore adopted Resolution 3.7/1 (Cg-XVI).

#### *Space Weather*

- 3.7.11 Congress noted with appreciation that the Inter-Programme Coordination Team for Space Weather (ICTSW) involved experts nominated by 13 WMO Members and six international organizations, and had adopted an initial work plan focusing in priority on the review of Space Weather observing requirements and data management standardization issues, in consultation with relevant CBS expert groups. It encouraged Members to provide extrabudgetary financial and staff resources to support this coordination activity, given the severe impact of Space Weather on observation and telecommunication infrastructure and on aviation safety, as well as the potential synergy between Space Weather warnings and meteorological service delivery. Congress noted the outcome of a Side Event on Space Weather (...). It noted that a coordinated effort by Members is needed to address the observing and service requirements to protect against the global hazards of Space Weather. It invited the WMO Space Programme, in coordination with the Inter-programme Coordination Team on Space Weather and with the support of the relevant technical commissions, to develop near-term and far-term action plans, including education and training, and work with the WMO Regional Associations to implement a coordinated strategy for Space Weather.

#### *Radio Frequency Coordination*

- 3.7.12 Congress appreciated the substantial efforts made by Members in protecting the radio frequency bands allocated to meteorological systems and environmental satellites. It urged all Members to ensure continuous coordination with their national radio communication

authorities, and to participate actively in national, regional, and international activities involving radio communication regulatory issues for the defence of radio frequency bands for meteorological and environmental activities. It also supported the Council's request to the Secretary-General to give priority to this subject. Congress also noted with appreciation the effective work of the CBS Steering Group on Radio Frequency Coordination (SG-RFC) in addressing radio frequency issues of concern to the Space Programme, and the need to maintain this effort at a high level.

(...)

3.7.14 Congress agreed with the Space Programme description (...). (See Background information document ET-SUP-6/Inf. 2)

### **ET-EGOS-6 (14-17 June 2011)**

A major activity of the Expert Team on Evolution of Global Observing systems (ET-EGOS) at its sixth session was to review the updated Statements of Guidance of the various application areas, to review the status of the observing requirements, and to define a roadmap for completing the Implementation Plan for Evolution of Global Observing systems (EGOS-IP) to be submitted to the CBS at its next session.

The latest status of Statements of Guidance is available on line now at the following URL: <http://www.wmo.int/pages/prog/www/OSY/GOS-RRR.html>

ET-EGOS acknowledged the Observing Requirements Database developed by the Space Programme (See ET-SUP-6/Doc.14.2) and the progress made in reviewing the selection and definition of variables to be observed.

The EGOS-IP is meant to define the actions necessary to implement the Vision of the GOS for 2025. A draft of this plan had been widely circulated, including to ET-SUP members. The ET-EGOS further reviewed this implementation plan. The current draft is available on line:

### **CGMS-39 (3-7 October 2011)**

The thirty-ninth session of the Coordination Group for Meteorological Satellites (CGMS-39) was held in St Petersburg, Russian Federation. ET-SUP members have been informed of the many documents submitted to CGMS by WMO, which addressed many items of interest to ET-SUP, including: regional data requirements, product requirements of various application areas, climate monitoring architecture, training, access to data and products, website, and questionnaire. The outcome of these discussions will be provided as part of the relevant ET-SUP-6 agenda items.

An important step was the adoption by CGMS of a new "baseline for contributing to the GOS"; once endorsed by CBS, this new baseline will raise the commitments of space agencies to a new level that will be close to satisfy the Vision of the GOS for 2025.

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