

**WORLD METEOROLOGICAL ORGANIZATION**

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**CONSULTATIVE MEETINGS ON HIGH-LEVEL POLICY ON SATELLITE MATTERS**

**EIGHTH SESSION**

**NEW ORLEANS, LOUISIANA, USA**

**15-16 JANUARY 2008**

**FINAL REPORT**





Participants at the eighth session of the  
WMO Consultative Meetings on High-level Policy on Satellite Matters

## **1. ORGANIZATION OF THE SESSION**

### **1.1 Opening of the session (*agenda item 1.1*)**

1.1.1 The eighth session of the WMO Consultative Meetings on High-level Policy on Satellite Matters (CM-8) was held at the Marriott at the Convention Center in New Orleans, Louisiana, USA from 15 to 16 January 2008 under the chairmanship of the President of WMO, Dr A.I. Bedritsky. The session was opened at 09h30 on Tuesday, 15 January 2008.

1.1.2 In Dr A.I. Bedritsky's opening remarks, the President welcomed new and returning participants to the WMO Consultative Meetings including Dr Antonio Divino Moura, Third Vice-President of WMO, Dr Mamadou Lamine Bah, President of RA I, Mr Arona Ngari, President of RA V, Dr Conrad F. Varotto, Executive and Technical Director of CONAE, Mr Mike Manore from Environment Canada, Mr Nobuo Sato from JMA and Mr Gary Davis from NOAA/NESDIS. He recalled that the Fifteenth WMO Congress reviewed the main accomplishments of the WMO Space Programme during 2004-2007 regarding improvement of the space-based GOS, enhanced access to its data and products and promotion of Members' capability to use this data through education and training and thanked the members of the Consultative Meetings that had provided guidance and oversight for the WMO Space Programme. He informed the session that there will be new challenges for WMO in the next four-year cycle including the new WMO Integrated Global Observing Systems (WIGOS) and its partner the WMO Information System (WIS). He closed by thanking the space agencies for the valuable contributions made by satellite systems to WMO Members.

1.1.3 In remarks on behalf of the WMO Secretary-General, Mr M. Jarraud, Dr Donald Hinsman recalled that the Fifteenth WMO Congress had expressed its deep appreciation to those WMO Members, EUMETSAT and ESA for their contributions to the space-based component of the GOS, which was a backbone of meteorological operations and served a wide range of other application areas. As examples, he cited the relocation by the USA of GOES-10 to 60°W, the possible mission in Highly Elliptical Orbit (Molniya orbit) based on the Russian Federation Arktica project and potential activities in the area of Space Weather. He noted the Fifteenth WMO Congress had closed by reaffirming the value of the regular Consultative Meetings on High-level Policy on Satellite Matters (CM).

1.1.4 He then described the new WMO Strategic Plan for 2008 through 2011 that contained eleven specific Expected Results. Within the strategic thrust area of Science and Technology Development and Implementation, one of the Expected Results was the establishment of a WMO Integrated Global Observing System (WIGOS) and another was the implementation of the WMO Information System (WIS). Another initiative that was a direct result of the satellite operators' commitment to WMO's Programmes was the Regional / Specialized Satellite Centres for Climate Monitoring; and he thanked EUMETSAT, and in particular Dr Lars Prahm, for his strong support to accelerate the timetable and bring the R/SSC to an initial operational status.

1.1.5 He also highlighted areas of great importance to WMO Members for discussion at the session including the transition from relevant R&D instruments to operational missions and the space-based GOS Vision for 2025. In closing, he thanked all space agency organizations for the major contributions made over the years and wished them a very pleasant stay in New Orleans. He also thanked the USA and NOAA for hosting the session.

### **1.2 Adoption of the agenda (*agenda item 1.2*)**

1.2.1 The agenda for the session was adopted and is reproduced in Annex I. The list of participants for the session is reproduced in Annex II.

### **1.3 Working arrangements for the session (*agenda item 1.3*)**

1.3.1 The working arrangements for the session were agreed upon. It was also agreed that the work of the session would be conducted mainly in Plenary. The working languages of the session were English and Russian, and the documentation and report were in English only. The session noted that documentation would include discussion documents and background information documents. Unless specifically requested, the background material (referred to as "BG" in the CM documentation) would neither be presented nor discussed in the session. Thus, the session would only discuss agenda items 1, 5, 6, 7, 8, 9, 10, 11 and 12.

### **2. ACTIONS DERIVING FROM CM-7**

2.1. The session noted that all recommendations from CM-7 had been addressed, with the exception of increasing the staff of the WMO Space Programme Office.

2.2. The staff resources situation was expected to be very critical in 2008, which will have an impact on the actual implementation of the current objectives of the programme and make it more difficult to expand into additional activities such as Space Weather. Priorities will have to be managed in accordance with the resource limitation. In the prospect of the forthcoming CBS session in November 2008, the preparation of a new Vision for the GOS in 2025 and the implementation of IGDDS and RARS were considered among the priorities, in accordance with strategic goals established by the Fifteenth WMO Congress.

### **3. WMO SPACE PROGRAMME ACTIVITY REPORT**

3.1 CM-8 recalled the outcome of the Fifteenth World Meteorological Congress (Cg-XV) in May 2007 as concerns the WMO Space Programme, and noted the summary of activities conducted by the Space Programme Office in 2007 in the following areas:

- Enhancing the space-based Global Observing system;
- Enhancing the availability of satellite data and products worldwide;
- Capacity building and promotion of the use of satellite data and products; and
- Relations with relevant internal and external bodies.

3.2 It was noted that for the coming year the WMO Space Programme Office would try to focus its activity on those aspects where it can best bring added value, while maintaining a balance between user-oriented and system-oriented activities.

### **International Polar Year (IPY)**

3.3 The session was provided with the summary report and list of actions and recommendations adopted by the second meeting of the IPY Space Task Group (STG-2) that was hosted by EUMETSAT in Darmstadt, Germany on 26 and 27 November 2007.

3.4 A presentation was given on actions and recommendations from STG-2 and the participants agreed to consider possible responses in their areas of responsibility.

### **Global Space-based Inter-calibration System (GSICS)**

3.5 The session was provided with a brief summary status of the Global Space-based Inter-calibration System (GSICS) project. Active progress was recorded during the year 2007, following the first Operations Plan. The third meeting of the GSICS Executive Panel, held on 4 November 2007, refined the Operations Plan for 2008, which foresaw the start of routine GEO-LEO inter-calibration.

3.6 CM-8 noted the progress of GSICS and encouraged further participation of space agencies in this project.

#### **Disaster Risk Reduction (DRR)**

3.7 CM-8 was provided information on current international developments regarding disaster risk reduction, as well as the International Charter on Space and Major Disasters, and on related specific satellite-based observation requirements for disaster risk reduction (i.e. risk identification, early warning systems, impact assessment, emergency preparedness, early recovery, risk transfer and sectoral planning).

#### **World Radiocommunication Conference 2007 (WRC-07)**

3.8 CM-8 was presented a summary of the WRC-07 outcome of direct relevance to the WMO Space Programme. Several WRC-07 agenda items included issues of prime interest for meteorology and related environmental activities.

3.9 CM-8 took note of the positive outcome of WRC-07 for meteorology and related environmental activities, and was requested to urge meteorological and environmental satellite agencies to pursue their active involvement and contribution in radio-frequency matters, including participation in the CBS Steering Group on Radio-Frequency Coordination activities.

#### **4. GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS (GEOSS)**

4.1 CM-8 was informed of WMO activities related to the Group on Earth Observation (GEO), with emphasis on the outcome of the Fifteenth WMO Congress in May 2007 and the GEO Ministerial Summit in November 2007. The concluding statements made by the ministers provided continuing strong support and commitment to GEO and GEOSS. The GEO meeting also held a plenary session in which four issues had emerged: (1) the need to establish a process to reach consensus on data sharing principles; (2) the scope of the mandate of GEO beyond earth observations to include data assimilation and earth system modelling; (3) recognition that radio frequency continuity was critical to earth observation applications; and (4) recognition of the contribution GEOSS can make through collaboration with UN agencies in response to the needs of UN Conventions. The evaluation of implementation of the first two years of the 10 year Implementation Plan was that good progress had been achieved on seven of the nine societal benefit areas (SBAs) but inadequate progress in the health and water SBAs was flagged.

#### **5. STATUS OF THE SPACE-BASED GLOBAL OBSERVING SYSTEM**

5.1 CM-8 was provided an update on the contributions to the space-based Global Observing System (GOS) announced by space agencies, in response to the WMO Secretary General's letter of 18 January 2007. It noted that 13 agencies had formally responded, the most recent reply being from the National Institute of Space Studies of Brazil (INPE) that informed of the availability of data from the China-Brazil Earth Resources Satellite (CBERS) series. It was noted that nine GEO satellites and seven LEO satellites were currently in a declared operational mode. In addition, nineteen R&D satellites were also contributing to the GOS. A record number of seventeen satellites were planned for launch in 2008. It was recalled that summary status information was updated on a regular basis and available via the joint WMO-CGMS web pages: <http://cgms.wmo.int/>.

5.2 The status of the space-based component was summarized, as well as the status of the Implementation Plan for the Evolution of the Surface and Space-based Subsystems of the GOS, as reviewed by the third sessions of the Expert Team on Evolution of the GOS (ET-EGOS) and the Expert Team on Satellite Systems (ET-SAT). The session noted that the Implementation Plan itself would be updated once a new Vision for the GOS was adopted, which was the subject of the next agenda item.

5.3 CMA informed the session on the future launch of FY-2E in 2008. CONAE indicated that it would be contributing to the space-based GOS through the joint NASA-CONAE Aquarius mission.

5.4 NASA reported that, following a thorough review process, it had recently decided to extend the operation of ten NASA missions until end of 2009 and that further reviews were planned in 2009. Their operations had all exceeded initial prime lifetime and were still successfully providing data for the research and operational user community. Moreover, budget appropriations allowed NASA to confirm the planned launch schedule of future missions. Following the National Academy of Sciences Decadal Survey for Earth Observation missions, community workshops had been convened in the USA and missions had been identified and were being prioritized. NASA concluded in mentioning that the Jason-2 mission (to be launched in 2008), a joint undertaking of NASA, CNES, NOAA and EUMETSAT, should be considered as a transition between R&D and operational missions.

5.5 NOAA underlined the vulnerability of satellite systems, in the light of a recent incident it experienced on GOES-12, which was then fortunately recovered. NOAA informed that GOES-O was planned for launch in August 2008, and GOES-P one year later. It clarified that SSMI-S data from DMSP satellites were made available by NOAA and, like COSMIC data, should be considered as additional contributions to the GOS.

5.6 EUMETSAT reported that the EUMETSAT Council had agreed to fund extended operations of IODC until the end of 2010. Meteosat-8 had been damaged by a collision with a meteorite but was still fully functional and will be used for rapid scan service over Europe as of May 2008. Metop-A, launched in October 2006, had been declared operational in May 2007 and was part of the Initial Joint Polar System together with NOAA-18.

5.7 The President of CBS, highlighted that the Implementation Plan for the Evolution of the GOS was kept under review and regularly maintained and was an essential reference, together with the Vision for the GOS. The space agencies, including the R&D agencies, were thanked for the remarkable contributions they provide to the GOS.

## **6. SPACE-BASED GOS VISION FOR 2025**

6.1 In response to CBS Ext.(06) and following the Workshop on the Re-design and Optimization of the Space-based Global Observing System (OPT-2) in June 2007, the relevant OPAG-IO Expert Teams developed a draft Vision for the Global Observing System (GOS) to 2025.

6.2 The draft Vision called upon optimizing the existing operational GEO and LEO components, ensuring IR hyperspectral sensors aboard operational GEOs, consolidating the altimetry measurement strategy, enhancing atmospheric sounding with an operational radio occultation constellation, refining sea surface wind observation, and bringing several new missions to operational status: global precipitation; Earth radiation budget; atmospheric composition; specific imagery for ocean colour; and vegetation and possibly missions in Molniya orbits.

6.3 CM-8 noted that implementing the new Vision would require enhanced cooperation and coordination among operational and R&D agencies for global long-term mission planning, data sharing, data inter-comparability, and transition of relevant R&D missions to an operational status. Implementing the new Vision would also reinforce the space-based GOS as the space component of the WMO Integrated Global Observing Systems (WIGOS) as well as a major component of the GEOSS. The session was informed that CGMS-35 had welcomed the principle of such a Vision that helped agencies to develop their own planning as a contribution to the global system, and welcomed the expansion of the GOS towards climate as well as other GEO Societal Benefit Areas.

6.4 The Chairman expected that the session would provide guidance to the Expert Teams, CBS and the Executive Council on this issue of key importance to WMO.

6.5 Strong support was expressed for the recommendations contained in the draft Vision presented to the session, and several space agencies highlighted that it was fully consistent with their approach of mission planning for the coming two decades. This illustrated the essential role of the CBS OPAG-IOE Expert Teams, with guidance provided by the WMO Consultative Meetings. The session advised that, in refining and completing the Vision, WMO should be forward looking and ambitious, bearing in mind that missions currently entering the demonstration stage would be expected to be operational by 2025. The session suggested lightning detection be considered as mandatory rather than optional, to address the lack of precise lightning observation on oceanic areas. It was also suggested greater emphasis be given to the advantages of active sensors with respect to passive microwave imagery for ocean surface wind observations.

6.6 The session recalled that the GOS was based on voluntary commitments by WMO Members and stressed that the Vision should be complemented by an implementation plan defining the commitments expected from the respective contributing agencies. The Russian Federation was ready to support such a process by providing a table of its proposed contributions, in a framework that would be defined by the Expert Teams in the third quarter of 2008. Several agencies indicated their readiness to actively contribute to the implementation of the Vision, and reported on actions undertaken in this respect.

6.7 Roshydromet and Roscosmos, confirming the importance of temporal distribution of sun-synchronous sounding missions along three orbital planes, indicated readiness of the Russian Federation to contribute to this scheme.

6.8 NASA and NOAA reported that they were actively working on the implementation of recommendations from the National Academy of Sciences Decadal Survey, which were consistent with the proposed Vision, and hoped that this process might enable the USA to implement an operational follow-on to a number of current R&D missions, including Quikscat and COSMIC. Furthermore, actions were being planned to compensate for the de-manifestation of some climate sensors aboard NPOESS such as CERES.

6.9 EUMETSAT reported that Meteosat Third Generation (MTG) would include an infrared hyperspectral sounder and indicated that lightning detection was under consideration.

6.10 The session was pleased to note that current cooperation among Europe and the USA was expected to result in an agreement providing long-term continuity of reference altimetry missions in non sun-synchronous orbit beyond 2012.

6.11 CMA highlighted that FY-3 satellites would include a RO sounder and an Earth Radiation Budget sensor. CMA will consider the possibility of flying a FY-3 spacecraft on an afternoon orbit provided that the FY-3 operational mission was successful on the morning orbit. It was suggested that WMO establish a Task Group to help formulate guidelines regarding Atmospheric Composition observations.

6.12 JMA and JAXA started discussion on cooperation towards including an IR hyperspectral sounder aboard MTSAT-follow-on.

6.13 The session emphasized the recommendation for open exchange of data and calibration information, since comprehensive observation of weather and climate was a global issue that required large efforts and could only be completed through global cooperation. Exchanging high-level products alone would not be sufficient to fully rely on data and products from each other's missions.

6.14 In conclusion, the session strongly supported the elements already identified in the Vision and recommended to complete the Vision with a forward looking approach that should not be limited to the current plans of satellite agencies. It should provide ambitious high-level goals fostering new plans in response to global needs. The Chairman underlined that the various issues submitted to CM-8 were addressing the improvements of the GOS in a consistent and comprehensive way. Decision makers should be made aware of the unique role of satellites for global climate monitoring.

### **GCOS and Related Climate Matters**

6.15 WMO (CM-8)/Doc. 6(2) described recent climate-related actions at the 2007 UN Climate Conference in Bali. It recalled the satellite requirements for climate as stated in the GCOS Satellite Supplement, the responses to these requirements by ET-SAT, CGMS, CBS, CEOS, and other follow-up activities. Finally, it was informed concerning the recent update of GCOS observation requirements, in line with the GCOS Satellite Supplement.

6.16 CM-8 space agencies were invited to maintain awareness of climate requirements; note the continued emphasis on continuity and quality of satellite observations for climate; and to continue working on implementation of GCOS Implementation Plan and Satellite Supplement, in collaboration with all relevant partners, including CGMS and CEOS.

6.17 GCOS and related climate matters were reviewed in the context of the Space-based GOS Vision for 2025. The uptake of GCOS requirements for satellite observations by WMO bodies and by CEOS was welcomed. The high profile of climate observations, particularly in light of the UN Climate Conference in Bali, was noted, and the need to safeguard continuity of the satellite-based climate record was emphasized. In response, the session agreed to the following high-level goal for space agencies of the WMO Consultative Meetings: There should be no gap in the satellite-based climate records for GCOS Essential Climate Variables.

## **7. INTERNATIONAL GEOSTATIONARY LABORATORY'S FUTURE MISSIONS (IGEO LAB)**

7.1 A report was given on the status of three IGeoLab candidate test cases. The session noted that the concept of a Highly Elliptical Orbit (HEO) mission based on the Russian Federation's Arktica Project had been discussed in two HEO Focus Group meetings; and that a third meeting was being planned for March 2008 to examine a consolidated set of requirements, identify potential mission architectures and models of collaboration.

7.2 Regarding the IR Hyperspectral case, the session noted that at present, most geostationary satellite operators were either considering or planning an IR Hyperspectral instrument for the next satellite generation starting in the 2015-2020 timeframe. The session was informed that the interest for an IR Hyperspectral demonstration mission had been confirmed in the light of these plans, but no progress had been recorded since CM-7 for undertaking such a cooperative demonstration.

7.3 CM-8 was also informed that a fourth GEO-microwave Focus Group (GEO MW FG-4) had been held in April 2007 in Beijing. Facing a critical technical option, i.e. the choice among either a filled antenna or a synthetic aperture antenna, WMO was requested to establish a Task Force, draw a comparative analysis of two technical concepts and propose a way forward in a report to CGMS-35. CMA and CNSA had confirmed their readiness at CGMS-35 to lead the GEO-MW initiative on the basis of the report in cooperation with interested parties. CMA/CNSA indicated that they were planning to perform feasibility studies for FY-4-Microwave in 2008.

7.4 CM-8 noted the status of the three IGeoLab test cases. With regard to the IGeoLab for HEO, the session encouraged space agencies to participate in the third IGeoLab HEO Focus Group meeting and to support the HEO initiative through bilateral and multi-lateral cooperation on instruments, algorithms and validation, and involvement in the user and ground segments. The session was informed of CSA's intention to host HEO FG-3 in the second quarter of 2008 and of



CMA's interest in the polar regions especially for climate applications. The session was of the opinion that the HEO proposal could be the first IGeoLab proposal to achieve implementation.

7.5 However, the session expressed disappointment with the lack of progress in the IR hyperspectral sounder and GEO MW proposals. Both proposals were good and would provide valuable information towards future missions and yet had not progressed far beyond the initial concept phase. The session recalled that two missing but essential characteristics for a successful IGeoLab were involvement of R&D space agencies and a lead agency willing to actively move the proposal. Thus, the session encouraged interested space agencies to give consideration to more actively participating in IGeoLab proposals. Furthermore, it requested the WMO Space Programme to actively initiate activities to facilitate new progress in the two proposals.

## **8. TRANSITION FROM RELEVANT R&D INSTRUMENTS TO OPERATIONAL MISSIONS**

8.1 The session had a presentation on the issues linked with the transition from relevant R&D instruments to operational missions, based on the outcome of previous Consultative Meetings and on the conclusions of the Joint Third session of the Expert Teams on Satellite Systems and Satellite Utilization and Products (ET-SAT/SUP-3) in September 2007.

8.2 Two dimensions of the transition were identified:

- Instrument technology, since relevant instruments must reach the proper technology readiness level in order to be able to support operational missions; and
- Policy, since the evolution from R&D to an operational status implies the recognition of societal needs justifying new operational commitments, which is an important policy step.

8.3 It was noted that the latter dimension had important programmatic consequences. Changing status from R&D to operational would entail a number of pre-requisites, such as the identification of a user community with clear requirements, the demonstration of an expected benefit that provides rationale for long-term funding, the availability of implementing agencies or consortium of agencies, that would have to have adequate expertise, relevant operational mandate, sufficient funding and would have to maintain an active user relationship.

8.4 The user involvement at the early stage of mission definition, and the early use of R&D instrument data in pre-operational context, would be important elements of the transition. The document detailed the potential role of WMO to facilitate the overall transition process.

8.5 The session stressed that ensuring a successful transition of relevant R&D missions was recognized in many countries at a very high level as a priority issue. The session welcomed a document provided by the Secretariat that contained a well articulated analysis of the transition from R&D to operations. It felt that major progress had been accomplished since the first CM discussions on this issue.

8.6 Several agencies shared their experiences, which illustrated various aspects of the process. Ocean surface topography was considered as an area where transition was on a good track. In other areas, the support of WMO Space Programme was thought to be important to help consolidating requirements of an operational community. EUMETSAT reported on the cooperation among CNES, ESA and EUMETSAT that had allowed the implementation of innovative instrument technology, IASI, in the Metop-A operational programme. NASA and NOAA recalled the establishment of the Joint Centre for Satellite Data Assimilation and reported on a plan under consideration to create a dedicated Joint NASA/NOAA Office in charge of the R&D to operations transition. The session also expressed its deep appreciation for the direct broadcast of data from NASA's Aqua and Terra missions, which were widely used within the operational community and have allowed for the early development of new applications. The session expressed the strong view that all these initiatives regarding early use of R&D data and partnership among R&D and operational agencies were highly beneficial to all parties involved.

8.7 The Space Programme was encouraged to collect information, and to post it through the website, regarding the availability of R&D data and practical means to access them.

8.8 The Chairman concluded in expressing his high satisfaction with the progress achieved. He pointed out that ensuring a smooth transition from R&D to operations was of direct importance for the evolution of the WMO GOS. He congratulated R&D agencies for the steps taken in support of early use of R&D data by the operational community and expressed his particular appreciation for the role played by NASA in this respect.

8.9 It was agreed that the document provided by the Secretariat would be used as a basis by the Space Programme Office to derive guidelines on the transition from relevant R&D instruments to operational missions that would be submitted to the Executive Council. Such guidelines would be a useful reference for WMO Members faced with the issue of transition from R&D to operations.

## **9. WIGOS AND WIS**

9.1 The session noted that in response to guidance and recommendations given by the Fifteenth WMO Congress (Cg-XV) and the fifty-ninth WMO Executive Council (EC-LIX) towards implementation of the WIGOS concept, the Executive Council Working Group on WIGOS-WIS developed a Concept of Operations (CONOPS) and an initial draft WIGOS Development and Implementation Plan (WDIP). The CONOPS contained an overview of WIGOS including assumptions, responsibilities, operational framework, data policy, benefits, challenges, and resources. The WDIP contained a description of: a strategic roadmap for integration; a preparatory and four phases between now and the next WMO Congress; five pilot projects (*I*: Joint GOS-GAW Pilot Project to accelerate implementation of WIGOS/WIS; *II*: Initiation of Global Hydrological Network addressing a GCOS Requirement; *III*: Integration of AMDAR into WIGOS; *IV*: Elaboration of the underpinning and cross-cutting role and responsibilities of the Instruments and Methods of Observation Programme in the context of WIGOS; and *V*: Integration of Marine Meteorological and other appropriate Oceanic Observations into the WMO Global Observing Systems); Demonstration Projects on the Development and Implementation of WIGOS at NMHSs in Kenya, Namibia (RA I), Republic of Korea (RA II), Brazil (RA III), United States of America (RA IV), Australia (RA V) and the Russian Federation (RA VI); Policy and Governance Aspects; WMO Technical Regulations (TR); WMO Programmes and Technical Commissions; jointly sponsored observing systems; and three integration levels within WIGOS.

9.2 The session was informed of initial activities towards establishing WIGOS and the important role to be played by the space-based components of the various observing systems that will constitute the space-based component of WIGOS. CM-8 noted initial activities in the establishment of WIGOS and was requested to provide guidance on CONOPS in particular as concerns the space-based aspects; to consider the implications of the draft WDIP for the space-based component of the GOS; and to indicate potential space-related activities that could or should contribute to the WDIP.

9.3 The session agreed WIGOS and WIS were major undertakings that would be of fundamental value to WMO Members for many years. The session stressed the importance of the space component of WIGOS. It agreed that since there was only one space component, it would serve as the common "integrator" across all other observing systems. With regard to the hydrological networks, the session noted the potential role that satellite systems could play in enhancing information necessary to better measure and understand the hydrological cycle including river runoff. The session was pleased to see WIGOS was intended to ensure that broader governance frameworks and relationships with other international entities would be sustained and strengthened. The session also recalled that all WMO observing systems and information systems had already been declared by WMO Members to be contributions to the Global Earth Observing System of Systems (GEOSS). Furthermore, the session was pleased to note that the interoperable arrangements between WIGOS and WIS were fully consistent with the

interoperable arrangements with GEOSS such that information would be able to flow both from and to GEOSS to the benefit of WMO Members and worldwide GEO communities. With entry points through WIS National Centres to both WMO and GEOSS information, national visibility and importance for NMHSs would be increased and enhanced.

9.4 The session agreed it was important for space agencies to have an active role in future Executive Council (EC) Working Group (WG) WIGOS-WIS activities and that the WMO Space Programme should serve as the focal point for coordination. Thus, it requested the Chairman of the EC WG WIGOS-WIS to take into consideration the valuable role to be played by space agencies and include space agencies in its future activities.

## **10. REGIONAL / SPECIALIZED SATELLITE CENTRES ON CLIMATE MONITORING**

10.1 The session noted the progress with the Regional / Specialized Satellite Centres for Climate Monitoring (R/SSC-CM). Following the guidance from CM-7, there had been three meetings on the subject, first a concept workshop and then two potential participants meetings. These meetings resulted in a finalized Implementation Plan which foresaw three phases of activity including the delivery of first products by 2010. It is planned that R/SSC-CM participants will convene for a planning meeting in the first quarter of 2008 for the purpose of starting the assessment process of the current capabilities and the strategy for establishing centres for the generation of R/SSC-CM products. Additionally, the first meeting of the R/SSC-CM Executive Panel should take place in the second quarter of 2008.

10.2 CM-8 agreed to encourage participating agencies to contribute to the planning and implementation process as well as support the meetings planned for 2008. CM-8 further noted with appreciation the coordination of efforts among WMO, CGMS and CEOS in this area of mutual interest.

10.3 The session agreed that the R/SSC concept was an extremely valuable contribution to the space component of the GOS. The R/SSC-CM should be viewed as the first important milestone since it responded directly to the GCOS Essential Climate Variables. The session agreed that it was appropriate to expand the concept into other application areas such as ocean, hydrological and atmospheric composition. Thus, it requested the WMO Space Programme to work directly with appropriate space agencies to identify potential future R/SSCs and report to the next Consultative Meetings.

## **11. SPACE WEATHER**

11.1 The session had a presentation addressing the relevance of Space Weather observations for WMO activities and the potential role of WMO in that area. The presentation underlined the critical importance of Space Weather events for GOS satellites, the contribution of GOS satellites to Space Weather observations, and the possible impact of Space Weather phenomena on climate variables and on a number of human activities. It was noted that while Space Weather was not within the current mandate of WMO, it had a direct impact on GOS satellites. It was further noted that there was a large potential synergy between Space Weather and existing WMO activities in terms of observations, possibly modelling, and delivery of services. The Fifteenth WMO Congress requested the Space Programme to consider the possible scope of Space Weather activities. Bilateral contacts with several WMO Members currently involved in Space Weather have all suggested that WMO would provide an appropriate framework to support global cooperation in this area. This was reinforced with contacts made with representatives of the International Space Environment Service (ISES) and was furthermore encouraged by ESA in the context of its initiative to foster international cooperation on Space Situational Awareness.

11.2 Practical activities that WMO would potentially support would be, e.g:

- Harmonizing the observing requirements and the specifications of Space Weather instruments aboard GOS satellites;
- Harmonizing data and calibration practices to ensure that they are comparable;
- Facilitating exchange of data, products, advisories and warnings e.g. through the WIS;
- Interaction with operational users and harmonization of public warnings and other products
- Exchange of experience between the NWP and the Space Weather communities .

11.3 Given the lack of available resources within the WMO Secretariat, it was assumed that such a new activity would be limited in scope and rely mostly on resources seconded by interested parties.

11.4 CM-8 was invited to consider the potential synergy between Space Weather and WMO activities; to express its views on potential involvement of WMO in this field of activity, its relevance, its scope and implications; to provide guidance to the Secretariat and, if relevant, express a recommendation that will be forwarded to CBS for consideration at its next session.

11.5 The session widely supported the view that Space Weather events were of major importance and that the developments occurred in that area in recent years had reached a stage where Space Weather observation and forecasting activities were providing operational benefit to a growing number of applications. It was emphasized that such phenomena affecting the Earth-sun system should best be addressed at global scale, and were anticipated to play a significant role in the climate system.

11.6 The session acknowledged that international coordination was necessary to support these activities and ensure that all countries could benefit of the observations and warnings of relevance to them. It was furthermore acknowledged that no UN body was currently providing technical coordination in that area, and WMO was deemed to be the most appropriate organization for that, because of its experience in operational coordination and of the potential synergy with core WMO activities. The session noted WMO's unique technical capability to distribute global advisories through WIS, similar to what has been done for volcanic ash and tsunami warnings.

11.7 The session recommended proceeding stepwise, recognizing the complexity of this new field of activity. Caution was necessary regarding the implications on staff resources, being aware that in the context of Zero Nominal Growth the Secretariat had no margin in this respect.

11.8 The Space Programme office was requested to prepare a proposal to be submitted to the Executive Council highlighting the cost and benefit of WMO involvement in Space Weather . The President of CBS suggested that a Rapporteur be appointed as a matter of urgency, in order to present a report to the next session of CBS on this matter. The report would review existing activities on Space Weather among the NMHSs and would identify in more detail the possible tasks where a contribution of WMO would be beneficial.

## **12. ANY OTHER BUSINESS**

12.1 Referring to the review of actions from CM-7, the session acknowledged that the staff resources of the Space Programme office had not been increased and thus remained far below the level required to ensure sustainability of the many activities that have been initiated in accordance with the Implementation Plan. The recent accomplishments within the Space Programme confirmed that this programme was providing significant benefit to WMO members. While recognizing that the activity is also relying on substantial participation of space agencies, the session reiterated the need to consider increasing the staff resources within the office as well as contributions to the WMO Space Programme Trust Fund, to ensure sustainability and further enhancement of this activity.

### **13. CLOSURE OF THE SESSION**

13.1 In closing, the Chairman reviewed the many accomplishments made during CM-8 including the participation of INPE in the GOS, guidance on the new Vision for the GOS to 2028, progress on the IGeoLab for Highly Elliptical Orbit, guidelines for the transition from R&D to operations, involvement in the space component of WIGOS, initiation of the R/SSC for Climate Monitoring and Space Weather. He stressed the importance of international coordination and cooperation prevalent during CM-8 discussions. He was confident that CM-8 recommendations would be valuable input to the Fifteenth WMO Congress. The Chairman expressed particular gratitude to Dr Donald Hinsman for his dedication since the beginning of WMO satellite activities, which developed a strong cooperative spirit among space agencies and resulted in the successful implementation of a major cross-cutting WMO Programme. He then closed the session at 12h30 on Wednesday, 16 January 2008.

## ANNEX I

### AGENDA

#### PROVISIONAL AGENDA

1. ORGANIZATION OF THE SESSION
    - 1.1 Opening of the session
    - 1.2 Adoption of the agenda
  2. ACTIONS DERIVING FROM CM-7
  3. WMO SPACE PROGRAMME ACTIVITY REPORT
  4. GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS (GEOSS)
  5. STATUS OF THE SPACE-BASED COMPONENT OF THE GLOBAL OBSERVING SYSTEM
  6. SPACE-BASED GOS VISION FOR 2025
  7. INTERNATIONAL GEOSTATIONARY LABORATORY'S FUTURE MISSIONS (IGEOLAB)
  8. TRANSITION FROM RELEVANT R&D INSTRUMENTS TO OPERATIONAL MISSIONS
  9. WIGOS AND WIS
  10. REGIONAL SPECIALIZED SATELLITE CENTRE ON CLIMATE MONITORING
  11. SPACE WEATHER
  12. ANY OTHER BUSINESS
  13. CLOSURE OF THE SESSION
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## ANNEX II

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