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PROPOSAL FOR INCREASED COORDINATION BETWEEN CGMS, CEOS AND THE WMO SPACE PROGRAMME

This paper identifies some areas of common interest between CGMS, CEOS and the WMO Space Programme, and summarises the current coordination arrangements.

Based on this analysis, some practical measures for improved coordination and communication are proposed.

This topic will also be discussed at the forthcoming CEOS Plenary at which the CGMS Secretariat will communicate the views of CGMS on the proposals contained in this paper.

Action/Recommendation proposed: To comment on the proposals made in the Working Paper and to propose practical measures for coordination

Proposal for increased coordination between CGMS, CEOS and the WMO Space Programme

1 INTRODUCTION

The purpose of this paper is to review the status of the existing coordination arrangements between CGMS, CEOS and the WMO Space Programme, and to propose additional measures, as appropriate, to optimise the collective efforts of these three organisations [noting that the term organisation embraces both intergovernmental organisations (i.e. WMO) and non-governmental organisations (i.e. CEOS and CGMS)].

Some preliminary discussions on this topic have place within CEOS and WMO, and a number of areas of common interest between CGMS, CEOS and the WMO Space Programme have been discussed, including:

- Evolution of the Space-based component of the Global Observing System;
- Calibration of sensors;
- Response to GCOS requirements;
- the Regional Specialised Satellite Centres for Climate Monitoring (RSSC-CM) Initiative.

Other potential areas of common interest could include the CEOS/WMO database of space-based capabilities, and more common and coordinated documentation.

2 EVOLUTION OF THE SPACE-BASED COMPONENT OF THE GLOBAL OBSERVING SYSTEM

The WMO World Weather Watch (WWW) Global Observing System (GOS) provides both in-situ and space-based observations of the state of the atmosphere and ocean surface for the preparation of weather analyses, forecasts, advisories and warnings, for climate monitoring and environmental activities carried out under the programmes of WMO and of other relevant international organizations. The GOS, a formal observing system defined within WMO regulations, is operated by its National Meteorological Services, national or international satellite agencies, and involves several consortia dealing with specific observing systems or specific geographical regions.

The space-based component of the GOS consists of both operational and agency-designated R&D satellites. Although the objectives of the R&D satellites are, in general, more loosely coupled to the objectives of the GOS (compared to the operational satellites) it is felt that there is some scope for increased coordination in this area.

As part of the re-design of the GOS, the WMO Commission for Basic Systems (CBS) has instituted a Rolling Requirements Review (RRR) for continuously reviewing the requirements of WMO Members and international programmes. Based on the collected requirements, a vision for the GOS is defined and a coordinated set of

actions to implement this vision are identified, which forms the basis for the implementation and evolution of the GOS.

The process for evolving the Global Observing System is overseen by the ET-EGOS (WMO CBS Expert Team on the Evolution of the Global Observing System) and this team is charged *inter alia* with the development and maintenance of the associated implementation plan. ET-GOS is guided by recommendations from other CBS Expert Teams, e.g. ET-SAT and ET-SUP for satellite aspects.

Separate to the WMO process for the evolution of the GOS, but considered within WMO Expert Team discussions, CEOS has adopted the concept of standards-based satellite constellations. Whilst the WMO approach starts from requirements to define a recommended observing strategy, the CEOS approach is directly based on the actual plans of agencies, and seeks synergies among national and regional satellite programs for land surface imaging, ocean surface topography, atmospheric composition, and global precipitation measurements. Four topically-focussed teams have started to define common standards, optimal end-to-end capabilities, and coordinated user requirements for future systems. The teams are also identifying opportunities for near-term gains among existing systems.

In support of this initiative, the U.S. National Aeronautics and Space Administration (NASA) has established a dedicated CEOS Systems Engineering Office (SEO) to serve all Constellation teams and the CEOS leadership in Constellations development and implementation.

It is noted that dialogue concerning the WMO and CEOS approaches is important to bridge the gap between user requirements and agencies' plans; particularly for missions traditionally addressed by R&D agencies (who are well-represented within CEOS). Currently, coordination amongst CGMS, CEOS and WMO is principally achieved through a combination of common membership and invitations to participate in meetings of mutual interest, e.g.:

- following a preliminary briefing on the Constellations Initiative in January 2007, the CEOS Secretariat contributed to the planning phase of the Workshop on the Re-design and Optimisation of the Space-based GOS (OPT-2) and was invited by WMO to provide keynote speakers on topics where the CEOS constellations were particularly advanced, i.e. Ocean Surface Topography and Atmospheric Composition. The valuable inputs provided by the CEOS Constellation Teams within the WMO process of GOS Re-design and Optimisation meetings have been recognised;
- the CEOS community was well represented in the OPT-2 workshop;
- WMO is a member of CGMS (which facilitates coordination of the evolution of the GOS with CGMS members) and WMO is an Associate Member of CEOS.

3 CALIBRATION OF SENSORS

Following an initiative from WMO, CGMS has endorsed the Global Space-based Inter-Calibration System (GSICS) concept which aims to ensure comparability of measurements provided by different meteorological and climate-related satellite missions and their traceability to absolute standards.

The goal of GSICS is to achieve operational inter-calibration of the space component of the World Weather Watch's Global Observing System that addresses the climate, weather forecasting and other environmental needs of WMO Members.

In support of this objective, an implementation plan has been developed which describes the components of GSICS, the roles of participating agencies, a timetable for implementing the programme, and coordination with other international programmes.

It is expected that the successful implementation of GSICS will result in substantial benefits to the ultimate user communities of operational environmental satellite observations (the weather and climate communities) in the form of more accurate weather forecasts and reliable climate monitoring.

Independent of the GSICS initiative, there is a long-standing CEOS Working Group that is devoted to the calibration and validation of sensors (WGCV - Working Group on Calibration and Validation).

The objectives of the CEOS WGCV are:

“to enhance coordination and complementarity, to promote international cooperation, and to focus activities in the calibration and validation of Earth observations for the benefit of the CEOS members and the international user community.

Specific objectives include:

Sensor-specific calibration and validation - To document and establish forums for the assessment and recommendation of current techniques and standards for pre- and post-launch characterizations and calibration.

Geophysical validation - To document and establish forums for the assessment and recommendation of techniques for validation of geophysical parameters derived from Earth observation satellite systems. “

To date, coordination between the GSICS initiative and the CEOS WGCV activities has been achieved through some cross-participation between the GSICS Executive Panel and the CEOS WGCV. This cross-participation helps ensure the exchange of information, the pursuit of complementary (rather than overlapping) activities, whilst taking advantage of the specific expertise of each group.

4 RESPONSE TO GCOS REQUIREMENTS

In support of GEO and climate user community objectives, CEOS agencies have embarked on an effort to better coordinate and implement satellite observations to support climate research. Through a decision of the 10th Conference of the Parties (COP-10) of the United Nations Framework Convention on Climate Change (UNFCCC) in 2004, Parties which maintain space agencies were invited to provide a coordinated response to the needs expressed in the Global Climate Observing System (GCOS) Implementation Plan. CEOS has taken the initiative to provide such a response, and has developed nearly 60 actions to address the needs articulated in the “satellite supplement” to the GCOS Implementation Plan (IP). This ambitious, long-term effort attempts to better organize space agencies to support the global change and climate research communities.

Separately, and in response to the mandate and tasking given by CBS, the WMO Space Programme and its Expert Team on Satellite Systems (ET-SAT) have also analysed the GCOS requirements for space-based observations, and provided a preliminary response to the “satellite supplement” to the GCOS Implementation Plan (IP) addressing:

- GCOS climate monitoring principles and other cross-cutting recommendations;
- Identification of relevant instruments to collect the required data;
- Comments on the description of products and related instruments;
- Suitability of current satellite plans to meet GCOS requirements.

Also, the issue of the possible re-definition of the scope of the WMO Global Observing System, to address climate-monitoring needs, has been considered.

This preliminary response was coordinated with CGMS since it formed the basis of a WMO paper presented to the CGMS Plenary in November 2006 (CGMS-XXXIV). CGMS agreed to consider the content of the paper as a preliminary CGMS response to GCOS requirements, and raised two follow-on actions:

- WMO, with the support of ET-SAT, to refine the response to GCOS requirements (on the basis of the preliminary ET-SAT response) - due date: next CGMS Plenary;
- WMO to coordinate with CEOS to ensure that CGMS and CEOS provide consistent responses to GCOS requirements and complement each other's efforts - due date: next CGMS Plenary.

Hence this second action, raised at CGMS XXXIV, is the basis for the current coordination between CGMS, CEOS and WMO for the response to GCOS Requirements. This course of action, also advocated by ET-SAT, was further encouraged by the 7th Consultative Meeting and the WMO Congress.

The Director of the WMO Space Programme and the CEOS Chairperson have agreed to work together and keep each other informed of their respective activities in response to GCOS. WMO has also forwarded to CEOS the preliminary WMO-CGMS

response to GCOS and the CEOS Secretariat has communicated its report on Satellite Observations of the Climate System to the WMO Space Programme. On this basis there has been an interaction on possible joint actions.

In addition, the WMO Space Programme was invited to participate in the 20th CEOS Strategic Implementation Team on 18 and 19 June in Frascati and made use of this opportunity to provide an update on WMO activities in response to GCOS, and the potential cooperation with CEOS in this area.

One potential avenue for increased coordination could be the exploration of possible mechanisms for the development of a joint response to the GCOS requirements.

5 REGIONAL SPECIALISED SATELLITE CENTRES FOR CLIMATE MONITORING (RSSC-CM)

The 6th WMO Consultative Meeting on high-level policy on satellite matters (CM-6) reviewed a proposal to identify specific centres of excellence in thematic areas that could be designated Regional/Specialised Meteorological Centres for Satellite Products (Regional Specialised Satellite Centres).

Following on from the discussions at CM-6, EUMETSAT presented a proposal at CM-7 for a global network of Regional Specialised Satellite Centres on the thematic area of operational climate monitoring (RSSC-CM). The main aim of this initiative is to respond to the requirements of the Global Climate Observing System (GCOS), with the network utilising data from both environmental R&D and operational meteorological space agencies, as well as GSICS data for calibration. The main output of this network would be the sustained operational provision of high-quality data for the Essential Climate Variables (ECV products) on a global scale.

CM-7 strongly encouraged participants to towards the development and approval of an Implementation Plan for this initiative.

The development of such a plan, and its subsequent implementation could be a potential area for increased collaboration between WMO, CEOS and CGMS.

6 PROPOSAL FOR INCREASED COMMUNICATION AND COORDINATION

At the outset it is recognised that CEOS and CGMS have similar charters and are involved in related and, generally, complementary activities. WMO is involved in similar activity areas as well, but from a different perspective resulting from its particular status and mandate.

Given the potential confusion that could arise over seemingly similar activities being undertaken in parallel, one area that needs to be addressed is communication (both external and internal) in order to better explain the relationships and synergies between the tasks being undertaken by the three organisations.

Concerning coordination, it can be seen that, from the examples given in the preceding sections, some coordination arrangements between CEOS, CGMS and

WMO are already in place, with reliance being placed on common membership and focussed invitations to relevant technical workshops and meetings.

To further enhance coordination and communication, it is proposed that:

- i) Individuals responsible for relevant Working Groups and Expert Teams ensure that, for workshops or events of common interest, meeting dates and agendas are communicated in order to obtain the appropriate degree of participation, and to ensure that discussions are complementary;
- ii) Opportunities for jointly convening events where appropriate, or contributing to counterpart events, are exploited;
- iii) Annual meetings are instituted between top-level representatives of the WMO Space Programme, CEOS and CGMS (with a CGMS nomination for this purpose) with the aim of:
 - reviewing the adequacy of the coordination arrangements and to propose further actions as other areas of common interest emerge;
 - ensuring that appropriate internal and external communication measures are in place to provide information about the complementary nature of the activities being undertaken by CGMS, CEOS and the WMO Space Programme.

To minimise the need for additional travel, it is also proposed that such annual meetings take place within the framework of an already scheduled meeting (subject to the agreement of the involved participants).

7 CONCLUSION

CGMS is invited to take note of the current status and to:

- comment on the proposals for increased communication and coordination;
- propose other practical measures, as appropriate, to foster communication and coordination.

As this topic is also due to be considered at the forthcoming CEOS Plenary (12-15 November 2007) the CGMS Secretariat will inform the CEOS Plenary of the views of CGMS.