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COMMISSION FOR BASIC SYSTEMS
OPEN PROGRAMME AREA GROUP ON
INTEGRATED OBSERVING SYSTEMS

ITEM: 6.3

**INTER PROGRAMME EXPERT TEAM ON
OBSERVING SYSTEM DESIGN AND EVOLUTION
(IPET-OSDE)
*First Session***

Original: ENGLISH

GENEVA, SWITZERLAND, 31 MARCH – 3 APRIL 2014

**REVIEW OF OTHER ACTIVITIES RELATED TO IPET-OSDE AND OPAG-IOS
UPDATE ON THE ARCHITECTURE FOR CLIMATE MONITORING FROM SPACE**

(Submitted by the Secretariat)

SUMMARY AND PURPOSE OF DOCUMENT

The document provides an update on the development of the Architecture for Climate Monitoring from Space

ACTION PROPOSED

The Meeting is invited to note the information contained in this document when discussing how it organises its work and formulates its recommendations.

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- References:**
1. [Strategy towards an Architecture for Climate Monitoring from Space](#): M. Dowell, P. Lecomte, R. Husband, J. Schulz, T. Mohr, Y. Tahara, R. Eckman, E. Lindstrom, C. Wooldridge, S. Hilding, J. Bates, B. Ryan, J. Lafeuille, and S. Bojinski, 2013.
 2. CEOS-CGMS-WMO ECV inventory: <http://ecv-inventory.com>
 3. [CGMS baseline for operational/sustained missions](#)

DISCUSSION

1. BACKGROUND

1.1 WMO Congress Resolution

Resolution 19 (Cg-16) (http://www.wmo.int/pages/prog/sat/documents/SAT-GEN_ST-13-Climate-space-monitoring-architecture-Res19-Cg16.pdf) decided that an architecture be developed to provide a framework for the sustained and coordinated monitoring of the Earth's climate from space, and that the development be undertaken as a major initiative of the WMO Space Programme, as an important component of WIGOS, with the support of relevant technical commissions, and in coordination with satellite operators, the Committee on Earth Observation Satellites (CEOS), the Coordination Group for Meteorological Satellites (CGMS), the Global Climate Observing system (GCOS), the Group on Earth Observation (GEO) and the World Climate Research Programme (WCRP).

1.2 Strategy

The first action in this framework was completed by an ad-hoc group composed of WMO, CEOS and CGMS representatives in developing a [Strategy towards an Architecture for Climate Monitoring from Space](#), which was published in February 2013 (Reference 1). Figure 1 illustrates the end-to-end approach of the logical view of the architecture, with four pillars from sensing (on the left) to decision making on the right.

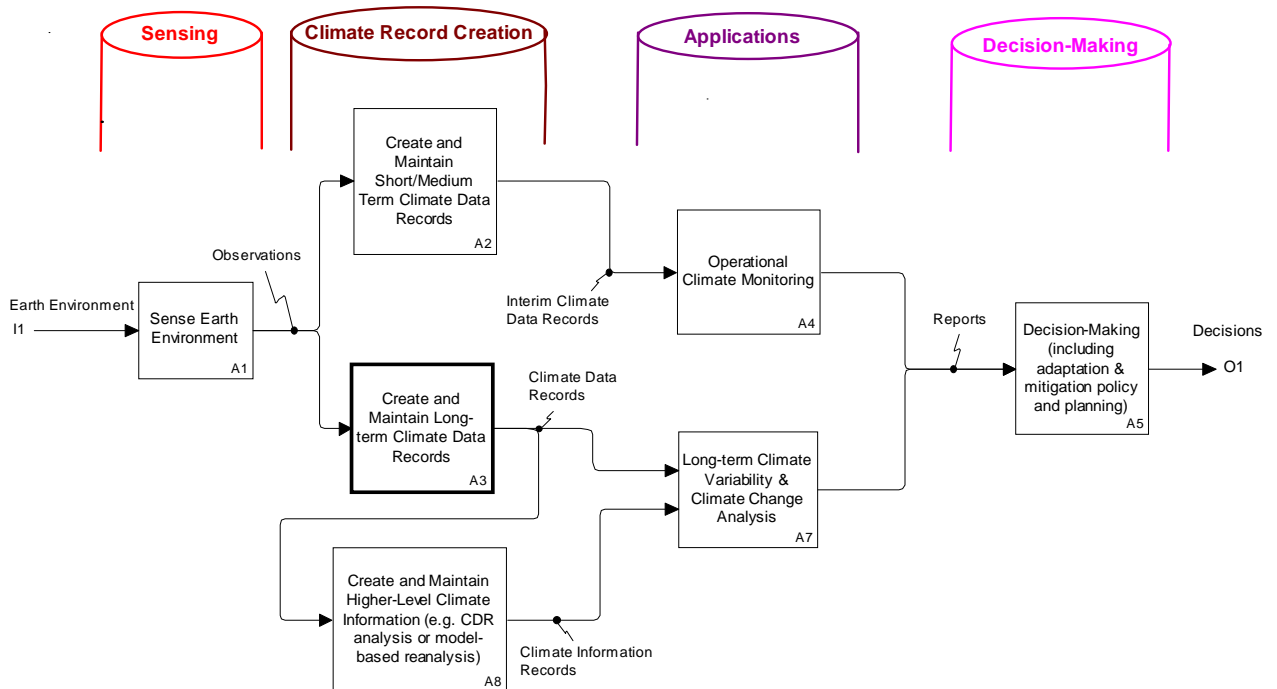


Figure 1. Decomposition of the 4 Pillars, with a focus on "Climate Record Creation and Preservation" and "Applications". (From "Strategy towards an architecture for Climate Monitoring from Space, p.31).

1.3 ECV inventory

An inventory of climate data sets related to the GCOS Essential Climate Variables (ECV) was then initiated. This ECV inventory is available on line and contains over 200 datasets related to a number of ECV in the atmospheric, oceanic or terrestrial domain (Reference 2).

2. RECENT DEVELOPMENTS

2.1 CGMS and FCDR inventory

At the 41st meeting of CGMS held in Tsukuba, Japan in July 2013, the WMO Secretariat presented a mapping of the ECV product sources which showed that most of the registered ECV data sets were relying on satellite missions identified by CGMS as part of the “CGMS Baseline” (Reference 3). The CGMS recognized that its long-term plans summarized in the “CGMS Baseline” could be a foundation for the climate monitoring architecture and took action to review this baseline and to “*define a list of Fundamental Climate Data Records (FCDRs) that CGMS Members would commit to provide on a sustained basis, building on the CGMS Baseline*”. It was furthermore proposed “*to establish an inventory of FCDRs in addition to, and in consistency with, the ECV product inventory*”. The FCDRs are data sets related to a sensor, or a series of comparable sensors, and their planning is directly resulting of the long-term satellite mission plans.

2.2 WMO FCDR study

In response to CGMS, WMO has performed, with ET-SAT guidance, an analysis of all the missions planned in the CGMS Baseline, as a first step towards an inventory of planned FCDRs. The study specifies for each mission which FCDRs they have the potential to generate, for which ECV, in which time frame, and with which degree of relevance. The study analyzes 39 ECV observable from space, involving 173 types of FCDRs, 275 classes of sensors able to produce these FCDRs, which leads to a total of around 2500 records where each record identifies a particular FCDR from a given sensor on a given satellite and supporting a given ECV.

2.3 WMO requirements analysis

As a further contribution to the analysis of the architecture, WMO initiated an action, involving the ET-SUP, to identify end user requirements for climate services and infer the satellite-based product requirements and specifications. Requirements are analyzed in particular in some of the GFCS priority areas. The aim of this action is to highlight possible gaps in terms of products and underpinning data sets that may not be included in the GCOS list of ECVs.

2.4 Joint CEOS-CGMS Working Group on Climate

In order to formalize their collaboration on the development of the architecture, CEOS and CGMS decided to establish a Joint Working Group on Climate (JWGC). WMO, being an active member of CGMS and an associate member of CEOS, is a full member of the JWGC. In practice, however, the JWGC is very much a continuation of the earlier

CEOS Working Group on Climate (WGC), with its CEOS nominated Chair and vice-Chair, the CEOS defined work programme and largely unchanged membership.

A first meeting of the JWGC (or fourth meeting of the CEOS WGC) was held in Darmstadt from 5 to 7 March 2014. The meeting focused on reviewing and improving the ECV inventory.

WMO indicated the ongoing actions related to end user requirement analysis and introduced the study performed on FCDRs. At this stage there is no clear indication however that the “Joint Working Group on Climate” will be able to address these issues that are beyond those initially defined by the former CEOS Working Group on Climate.

In the terms of reference of this JWGC, which were adopted on the CGMS side without discussion, the emphasis is on maximizing the use of existing observation data sets to generate climate data records, rather than on planning satellite missions able to acquire the required observations. Both objectives are equally important. The understanding of WMO is that the scope of the climate monitoring architecture cannot be limited to organizing the processing of observation data, but should include a high-level observing system design, including identification of sensor types, processes and respective roles of agencies and international coordination mechanisms.

3. CONCLUSION

Significant effort has been made on the analysis of the FCDRs potentially available from CGMS Baseline missions, on one hand, and on the inventory of ECV products, on the other hand. A Joint Working Group on Climate was established by CEOS and CGMS, with active participation of WMO. The way forward towards defining the Architecture for Climate Monitoring from Space, from both a logical and a physical perspective, remains under discussion.
