

Prepared by WMO
Agenda Item: C.4
Discussed in: Plenary

WMO INTEGRATED GLOBAL OBSERVING SYSTEM (WIGOS)

Submitted by the WMO Secretariat

The 65th Session of WMO Executive Council (EC-65, May-June 2013) approved the document on WMO Integrated Global Observing System (WIGOS) and revised the WIGOS Implementation Plan. Moreover, the approved document on the WMO Strategic and Operational Planning for 2016-2019 further considered the future strategic priorities and accorded high ranking to WIGOS (supported by WIS), Capacity Development, Global Framework for Climate Services (GFCS) and Disaster Risk Reduction (DRR) while recognizing the importance of Service Delivery (notably aviation and marine services) and Research.

Integrated satellite systems are an important and unique source of observational data and products for monitoring of weather, climate, water and the environment. WIGOS provides a new framework for coordination and evolution of WMO observing systems (both space-based and surface-based components), including the engagement and contributions of WMO to co-sponsored observing systems. The latest progress on WIGOS clearly need input and support from space community. The major decisions and guidance from EC-65 on WIGOS and Space Programme are as follows:

1. The WIGOS framework aims at advancing:

- Integration of governance and management functions through new regulatory material
- Design, Planning and Optimized Evolution of WIGOS component observing systems (including space-based observing systems)
- Observing System Operation and Maintenance
- Quality Management
- Standardization, System Interoperability and Data Compatibility
- Data discovery, delivery and archival (through the WMO Information System (WIS))

Input and support from the space community is required in each of these areas.

2. WIGOS Section in the WMO Technical Regulations (WMO-No. 49):

- The EC-65 agreed to the proposed eight chapter headings of WIGOS
- The chapter on “Common attributes specific to the space-based sub-system of WIGOS”, including Core Metadata specification, require input, agreement and continued support from CGMS members in order to support the WIGOS full implementation.

3. The Architecture for Climate Monitoring from Space (ACMS)

- The ACMS, when finalized, will become key part of the space-based component of WIGOS and will underpin the observation and monitoring pillar of the GFCS.
- EC-65 recommended, for further development of the ACMS, to build on the partnerships with user communities developed within the GFCS in order to integrate space and surface-based observations for the provision of climate services
- EC-65 highlighted the important role that the WMO Space Programme should continue to play in facilitating the future development of the physical and operational structure and governance scheme of the ACMS.

Action/Recommendation proposed:

- **Recommendation:** The actions related to the WIGOS, including WIGOS Regulatory Material and Metadata; Design, Planning and Optimized Evolution of WIGOS component observing systems; Climate Space Architecture; WIGOS Information Resource (WIR); Standardization and best practices (including product standards and harmonization, data/metadata standards); System Interoperability and Data Compatibility; and integration of surface and space-based systems, which contribute to advance WIGOS from the space-based observing systems perspective, should be further supported.

WMO Integrated Global Observing System (WIGOS)

1 BACKGROUND

Decision of EC 65 on WIGOS Implementation

In May-June 2013, the 65th WMO Executive Session (EC-65) approved a document package under Expected Results 4: WMO Integrated Global Observing System (WIGOS, including relevant documents on WIGOS implementation, WMO Space Programme and Global Climate Observing System-GCOS) and WMO Information System (WIS).

The key decisions and guidance from the 65th Session of EC on WIGOS and Space Programme development are summarized as follows:

1. Overall WIGOS

The Council noted that in accordance with Resolution 10 (EC-64) – WIGOS Framework Implementation Plan (WIP), steps have been taken to progress the implementation of the WIGOS Framework by the Inter-commission Coordination Group on WIGOS (ICG-WIGOS), technical commissions, regional associations and the Secretariat. CBS and CIMO, having the technical lead in the WIGOS Framework implementation, adapted their working structures/mandates/activities to support WIGOS. Other technical commissions also recognized the need to build activities in support of the WIGOS Framework implementation into their work plans and structures. The Council appreciated that ICG-WIGOS had identified many opportunities for all technical commissions to collaborate more closely on WIGOS Framework implementation, including through shared experts, alignment of activities and reduced duplication of effort and especially through active participation in its task teams.

The Council acknowledged that ICG-WIGOS had updated the WIP, which now provides improved estimation of resource requirements, adjusted target dates for tasks' completion and identification of risks as requested by EC-64. The Council adopted the updated version of WIP. The Council recalled that the four previously agreed WIGOS component observing systems: (a) the Global Observing System (GOS); (b) the observing component of the Global Atmosphere Watch (GAW); (c) the observing component of the Global Cryosphere Watch (GCW); and (d) the World Hydrological Cycle Observing System (WHYCOS), did not reflect fully the WMO contributions to hydrological observations. It therefore agreed with ICG-WIGOS to widen the scope of the component observing systems to replace WHYCOS by the WMO Hydrological Observing System (including WHYCOS), as now captured in the updated WIP.

The Council also noted that a key priority for the next CBS extraordinary session (2014) was the implementation of WIGOS. Therefore, the Council agreed with CBS plans to hold an extraordinary session in 2014.

The Council noted that the ICG-WIGOS reviewed the proposal of its Task Team on WIGOS Regulatory Material (TT-WRM) and agreed that the proposed eight chapter

headings can frame a consistent structure in the WMO Technical Regulations (WMO-No. 49), with greater detail on WIGOS practices to be provided in the Manual on WIGOS.

The Council noted that the ICG-WIGOS Task Team on WIGOS Metadata (TT-WMD) was developing the Core WIGOS metadata standard that, when implemented, would require all Members to record, retain and exchange specific information about instruments, observing stations and platforms, measurement characteristics and processing methods. It confirmed the importance of this work and requested technical commissions to be prepared to review the draft list of Core WIGOS metadata elements prepared by the TT-WMD.

The Council noted with appreciation that the development of the WIGOS Operational Information Resource (WIR) was now mature enough for it to be implemented operationally with limited functionality pending full implementation before Cg-17. The Council further requested Members to provide information on WIGOS relevant national best practices to the Secretariat so that such information can be shared through the WIR.

2. EC-65 Guidance on SPACE-BASED PERSPECTIVE ON WIGOS (also reference to other WMO Working Papers)

Continuity and optimization

The Council recalled that a sounding capability was necessary on three sun-synchronous orbits to maintain the accuracy of global NWP models, as confirmed by the latest impact studies. The Council appreciated the tandem operation of Metop-A and Metop-B on the mid-morning orbit by EUMETSAT. It welcomed the successful operation of the new-generation Suomi-National Polar-orbiting Partnership (S-NPP) and urged the United States of America (USA) to ensure a continuous operation of this spacecraft until the Joint Polar Satellite System (JPSS) series is available.

Noting the increasing use of FY-3 sounding data in NWP, the Council invited China to consider deploying a series of FY-3 satellites on the early morning orbit, which would allow the contributions of China, Europe and the USA to optimally complement each other in the global three-orbit sun-synchronous constellation. In this context, the Council noted with high appreciation that CMA was exploring the procedures related to the adjustment of China's Meteorological Satellite Development Plan for the period from 2011 to 2020 in order to include a series of FY-3 early-morning orbit satellites, which will contribute significantly to improvement of Earth observation and regional and global numerical weather predictions. The Council considered that such a decision by China would be a major accomplishment for the space-based global observing system. It encouraged the Coordination Group for Meteorological Satellites (CGMS), EUMETSAT, NOAA and other satellite operators and NWP centres to enhance their cooperation with CMA and requested the Secretary-General to facilitate this important initiative. The Council further noted that EUMETSAT had reaffirmed its commitment to ensuring access to and use of mid-morning satellite data and products.

The Council recalled the vital role of observation from the geostationary orbit for permanent weather monitoring and nowcasting. It welcomed the extension by EUMETSAT of geostationary Indian Ocean coverage until the end of 2016. Recalling the benefit of the operation by the USA of an additional GOES spacecraft at 60° W

since December 2006, it expressed concern that, after termination of this mission in June 2013, only a limited coverage of the South American continent will be available until the GOES-R generation of spacecraft is deployed. The Council also noted the importance of the Russian Federation's plans to implement a constellation of meteorological satellites in highly-elliptical orbits for quasi-continuous coverage of the Arctic.

Architecture for Climate Monitoring from Space

The Council welcomed the Strategy towards an Architecture for Climate Monitoring from Space (ACMS) jointly completed by the Committee on Earth Observation Satellites (CEOS), CGMS and WMO, in consultation with GCOS and WCRP, which defined a conceptual approach for developing the ACMS. Being aware that, when finalized, the ACMS will become part of the space-base component of WIGOS and will underpin the observation and monitoring pillar of the GFCS, the Council recommended to take into account the following points for the further development of the ACMS: (i) the partnership developed with user communities within GFCS, as an essential avenue to apprehend the requirements for climate-related services, products and observations driving the architecture; (ii) the synergy to be enhanced between in-situ and space-based observing systems for calibrating and validating the space-based observations and products; and (iii) engagement of the broader user (service and science) communities for seeking feedback, monitoring the deliverables and realizing the benefits of the ACMS. The Council highlighted the important role that the WMO Space Programme should continue to play in facilitating the future development of the physical and operational structure and governance scheme of the ACMS. It invited the parties to document this architecture and report to the sixty-sixth session, in response to Resolution 19 (Cg-XVI).

Satellite instrument calibration and inter-calibration (GSICS)

The Council emphasized the importance of satellite instrument inter-calibration to ensure interoperability of space-based measurement, traceability and consistency of data series over long time periods. It invited the members of the Global Space-based Inter-calibration System (GSICS) to incorporate GSICS practices and procedures into their operational schemes.

Satellite data and products

The Council adopted a Resolution inviting regional associations to document Regional Requirements for Satellite Data Access and Exchange as recommended by CBS-15, within the regional WIGOS and WIS implementation framework.

The Council recalled the essential value of Direct Readout services to provide real-time access to polar-orbiting satellite data. Furthermore, the Council encouraged Members to implement in every Region coordinated satellite-based, sustained, rebroadcast service for global satellite data and products in Digital Video Broadcast standard (DVB-S or DVB-S2), as recommended in the Guide on the WMO Information System. The Council expressed its appreciation to EUMETSAT, CMA and NOAA for operating the EUMETCast, EUMETCast-America, CMACast and GEONetCast-Americas services. As concerns EUMETCast-America, it noted the expectation from EUMETSAT that, in the future, this service be maintained in the context of international partnership with South American Members. The Council welcomed JMA's plans to implement a DVB-S/DVB-S2 service to support the dissemination of Himawari-8 and 9 data, and the announcement of a DVB-S2 satellite broadcasting service operated by the Islamic Republic of Iran, called IRIMSAT, including satellite data.

The Council encouraged Members to support the pilot activities undertaken within the SCOPE-Nowcasting initiative.

Summary:

The EC 65 approved documents on WIGOS includes tasks related to each of the issues above, with explicit references to the actions related to the WMO Resolution on avoiding gaps in essential space-based observation, Climate Space Architecture, WIGOS Regulatory Material and Metadata, CGMS baseline, RRR database, calibration best practices, product harmonization, and data/metadata standards, and integration of surface and space-based systems, which contribute to advance WIGOS from the space-based observing systems perspective, should be further supported.

Annex: Proposed structure of the WIGOS sections in the WMO Technical Regulations (WMO-No. 49)

General Provisions

Definitions

VOLUME I – General Standards and Recommended Practices (20xx edition)

PART I. WMO Integrated Global Observing System (WIGOS)

- I.1 Introduction
- I.2 Common attributes of component systems
- I.3 Common attributes specific to the surface-based sub-system of WIGOS
- I.4 Common attributes specific to the space-based sub-system of WIGOS
- I.5 Observing component of the Global Atmosphere Watch (GAW)
- I.6 Observing component of the Global Cryosphere Watch (GCW)
- I.7 Global Observing System (GOS) of WWW
- I.8 WMO Hydrological Observing System (ref. Vol. III)