World Meteorological Organization | **Intergovernmental Oceanographic Commission (of UNESCO)**

JOINT WMO-IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)

THIRD SESSION
Marrakech, Morocco,
4 to 11 November 2009

JCOMM-III/BM. 10.1
Submitted by: WMO Secretary-General and UNESCO/IOC Executive Secretary
Date: 29.IX.2009
Original Language: English only
Agenda Item: 10.1

WMO INTEGRATED SYSTEMS

WMO INFORMATION SYSTEM (WIS)

BACKGROUND MATERIAL

SUMMARY

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BACKGROUND MATERIAL

1. BACKGROUND

WMO Information System (WIS)

1.1 In its mission as a world leader in weather, climate, water, and related environmental issues, the WMO contributes to the safety and well-being of people throughout the world, and to the societal and economic benefit of all nations. The current WMO Strategic Plan recognizes that understanding the state of the environment is essential, and that understanding depends upon the collection and open sharing of information, often using rapid and highly reliable methods. The challenge today is that Member nations of WMO need to achieve such ambitious results without a significant increase in resources. The WMO Information System (WIS) is a key strategy to optimize the efficiency and effectiveness of WMO services, leveraging the long-standing collaborative culture of WMO as well as new technologies.

1.2 In WMO planning terms, 'Development and Implementation of WIS' is Expected Result 5, part of the Science and Technology strategic thrust: to monitor and observe the environment; to forecast and warn of significant weather, water and climate conditions; and to understand the Earth system. WIS has also a critical contribution to Expected Result 4, 'Integration of WMO observing systems'. Beyond WMO, WIS will play a leading role in the weather, water, climate and natural disaster areas for the Global Earth Observation System of Systems (GEOSS). Interoperability between WIS and GEOSS will enhance accessibility to related Earth observations for WMO Members as well.

1.3 The Fourteenth WMO Congress in 2003 (Cg-XIV) formally adopted the concept of WIS, stating that an overarching approach was required for solving the data management problems for all WMO and related international programmes. The *Abridged Final Report with Resolutions* of WMO Cg-XIV states that WIS will:

- Be used for the collection and sharing of information for all WMO and related international programmes;
- Provide a flexible and extensible structure that will allow the participating centres to enhance their capabilities as their national and international responsibilities grow;
- Build upon the most successful components of existing WMO information systems in an evolutionary process;
- Pay special attention to a smooth and coordinated transition;
- Build on the Global Telecommunication System (GTS) for highly reliable delivery of time-critical data and products and base its core communication network on the Improved Main Telecommunication Network;
- Utilize international industry standards for protocols, hardware and software.

1.4 With regard to WMO communications networks, the Fifteenth WMO Congress (Cg-XV) has required WIS to be implemented in two parallel parts: Part A being the continued evolution of the GTS and Part B being the new functionality of WIS. Accordingly, WIS will incorporate the connectivity of GTS and the flexibility of new systems such as the Internet, whilst ensuring that a data management framework is able to encompass all WMO information. This is a natural evolution, building upon GTS while expanding the overall information system capabilities. However, there is a change in focus with introduction of WIS: from managing communication links to managing data and products.

2. JCOMM AND THE DEVELOPMENT OF WIS

2.1 JCOMM has been an active contributor to the development of WIS and a leader in implementing some of the new functionality of WIS with such projects as the End-to-End Data Management (E2EDM) project and the UNESCO/IOC-IODE Ocean Data Portal (ODP). The Data Management Coordination Group (DMCG) has participated with the Inter-commission Coordination Group on WIS (ICG-WIS) and the WMO Secretariat to ensure the ocean and marine communities' needs and activities are well catered for under WIS. This has included working with the IODE of UNESCO on data management and information exchange strategies including the adoption and review of the WMO core profile of ISO 19115 metadata standard, and the migration to Table Driven Code Forms (TDCF).

WIS Implementation Part A: Continued Evolution of the GTS

2.2 JCOMM's achievements under Part A of WIS are significant. The JCOMM Data Management Programme Area (DMPA) has worked with the IODE of UNESCO/IOC and the WMO Secretariat to ensure participation of relevant experts in WMO's Commission for Basic Systems (CBS) and inter-commission expert teams addressing data management and information exchange issues. This included contributions to the implementation of table driven code forms (TDCF[1]: BUFR and CREX) for ship and buoy observations, the adoption of BUFR table MT10 by GHRSST and the adoption of CREX for sea level observations in support of tsunami and multi hazard warning services. Collaboration with CBS led CBS to accept NetCDF as used by Argo, GOSUD, OceanSITES and GTSPP for exchanging information on WIS. DMPA has also worked with CBS on the many issues such as the use of XML. Participation in the WIGOS pilot project has assisted in bringing focus to observations issues such as standardization of codes and better awareness of different data representation systems used by JCOMM members.

2.3 The WMO Integrated Global Observing System (WIGOS) pilot has assisted in bringing better alignment to the way different communities describe their observation practices and data. The DMPA has also been working with instrument manufacturers on initiatives such as sensorML that will facilitate data sharing. All these activities, described in more detail in the JCOMM Data Management Plan (http://www.jcomm.info/DMPlan), help JCOMM to benefit from the data management and information exchange practices of the World Weather Watch (WWW) GTS that is a core part of WIS. This work is also ensuring that other WMO communities can learn from and benefit from JCOMM practices and procedures.

WIS Implementation Part B: New Functionalities

2.4 With regard to the new functionalities in WIS under Part B of the WIS implementation, JCOMM has made considerable progress. The work of the Expert Team on Data Management Practices (ETDMP) is a major contribution to the UNESCO/IOC-IODE Ocean Data Portal (ODP) in helping to demonstrate compliance with WIS interoperability standards so that ocean data centres can contribute to the ODP and to WIS through one system. It notes also that once compliant with WIS, a centre will also be compliant with GEOSS.

2.5 Key elements of the new functionality of WIS are the Discovery, Access and Retrieval (DAR) catalogue and use of the WMO core profile of ISO 19115 metadata standard. The marine community has already adopted the ISO19115 metadata standard for the management and sharing of metadata and, along with the IODE, has worked to establish a Marine Profile of this standard. Also, major regional developments such as SEADATANET in Europe, have adopted the same standard. One issue has been that WIS, the marine community and SEADATANET each have their own profile being developed, so a significant contribution to forwarding the adoption of this standard has been a cross comparison of the three profiles by the co-chair of IODE of

[1] TDCF – Table-driven Code Forms includes BUFR, CREX, and GRIB.

UNESCO/IOC (Mr Greg Reed) that found all profiles are compliant with the standard and therefore do not inhibit interoperability.

2.6 In addition to the WMO core profile of ISO 19115 metadata standard, WIS has adopted the use of the search standard ISO 23950, also known as Z39.50, or SRU (Search and Retrieval via URL). This search standard, also adopted by GEOSS, allows Internet search to any ISO 23950 compliant service. WIS has also developed a gateway that will allow ISO 23950 compliant servers, to interoperate with Catalogue Search for the Web (CSW). The CSW is a developing Open Geospatial Consortium (OGC) specification for search that has also been adopted by GEOSS and many Spatial Data Infrastructures such as INSPIRE in Europe. The WMO Secretariat is working with the UNESCO/IOC-IODE Project Office to incorporate ISO 23950 capability into OceanTeacher which will make information on OceanTeacher discoverable within WIS. The WMO Secretariat also participated in a workshop in Obninsk making the ODP compliant with WIS, especially for metadata.

2.7 Further implementation of metadata is being undertaken through the WIGOS Pilot Project for JCOMM, building on the ODP to ensure the interoperability of the ocean marine systems with WIS and to allow more coordination and integration of relevant observations where appropriate. To this end, UNESCO/IOC-IODE National Oceanographic Data Centres (NODC) will participate in WIS via the ODP. In addition, NODCs can also nominate through their national Permanent Representative to WMO to be designated as WIS National Centres (NC) or if they have broader regional or global roles, they can nominate as DCPCs. In the other direction, DCPCs could link also to ODP.

3. WIS DATA REPRESENTATION SYSTEM POLICY

3.1 The WMO Executive Council, at its sixty-first session (EC-LXI), noted with satisfaction that the CBS started assessing different Data Representation Systems and developing a CBS policy on Data Representation Systems driven by users' requirements. CBS-XIV (Dubrovnik, Croatia, March/April 2009) agreed that the application of the ISO 191xx series of geographic information standards to the development of a WMO conceptual model of data representation should be considered as a fundamental element of a CBS policy on data representation systems, in particular with a view to applying a standard approach for data representation, leading to the development of a WMO core profile of the ISO 191xx series for data and metadata, and with a view to facilitating the interoperability and data interchange between applications based on data representations systems associated to BUFR, CREX, GRIB, XML, NetCDF and HDF. The EC-LXI urged all WMO technical commissions, and CBS as the lead Commission, to participate actively in this activity with a view to urgently consolidating a comprehensive WIS data representation system policy.

4. PROGRESS OF THE DESIGNATION OF WIS CENTRES

4.1 The WMO Executive Council, at its sixty-first session (EC-LXI), noted that 31 WMO Members and two Organizations have identified 103 potential Data Centre or Production Centre (DCPC) and 13 potential Global Information System Centres (GISC). It has requested that CBS develop procedures to allow candidate GISCs and DCPCs to demonstrate their capabilities to the CBS extraordinary session (2010) and to submit formal designations of GISCs and DCPCs to the sixteenth WMO Congress (Cg-XVI). JCOMM has a role in this process in that the formal designation procedure for centres to participate in WIS requires the support of their relative technical commission or regional association. Centres identified for JCOMM so far include the NODCs in Obninsk, Russian Federation and Silver Spring, USA, the Global Collecting Centre in Hamburg, a Marine Observations Centre in Exeter, and a proposed Marine Meteorology Centre (Croatia) for the Eastern Adriatic.

4.2 In identifying potential centres, the ICG-WIS found that of the 13 centres offering to host a GISC, eight of them are proposing to have their centres operational before the Sixteenth

WMO Congress in 2011, and at least three of those will be functional by the last half of 2010. Similarly, many of the DCPCs are planning to make operational the new functionality of WIS in line with the availability of GISCs. To this end, and recalling that Part A of WIS is the ongoing evolution of the existing GTS, WIS has clearly moved from its development stage to an implementation stage and should be significantly functional by the next session of JCOMM.

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