# WORLD METEOROLOGICAL ORGANIZATION

# INTER-COMMISSION COORDINATION GROUP ON WMO INTEGRATED GLOBAL OBSERVING SYSTEM (ICG-WIGOS)

## TASK TEAM ON WIGOS IMPLEMENTATION PLAN (TT-WIP)

***First Session***

Geneva, Switzerland, 27-30 March 2012

# FINAL REPORT

# DISCLAIMER

**Regulation 42**

Recommendations of working groups shall have no status within the Organization until they have been approved by the responsible constituent body. In the case of joint working groups the recommendations must be concurred with by the presidents of the constituent bodies concerned before being submitted to the designated constituent body.

**Regulation 43**

In the case of a recommendation made by a working group between sessions of the responsible constituent body, either in a session of a working group or by correspondence, the president of the body may, as an exceptional measure, approve the recommendation on behalf of the constituent body when the matter is, in his opinion, urgent, and does not appear to imply new obligations for Members. He may then submit this recommendation for adoption by the Executive Council or to the President of the Organization for action in accordance with Regulation 9(5).

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## EXECUTIVE SUMMARY

The first session of the Task Team on the WIGOS Implementation Plan (TT-WIP-1) of the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (ICG-WIGOS) was held at the WMO Secretariat in Geneva, Switzerland, from 27 to 30 March 2012, chaired by Fred Branski (USA), the president of the Commission for Basic Systems and the Chair of ICG-WIGOS.

The Task Team considered an initial draft of the WIP prepared by the Secretariat and developed a new version to be submitted to ICG-WIGOS and to EC-64. This document (WIP, version 0.8) is reproduced in Appendix III of the final report and is also available at http://www.wmo.int/pages/prog/www/WIGOS-WIS/reports.html The Task Team also considered a draft text for the General Summary for EC-64 which summarizes WIGOS implementation activities, including submission of the WIP for approval. The relevant WIGOS section of EC-64/Doc. 4.4 (1) as finalized by the Task Team is reproduced in Appendix IV.

The Task Team also had general discussion on the development of a high–level guidance document for the WIGOS-Functional Architecture (WIGOS-FA) and based on the TT-WIP ToR recommended an initial work programme until July 2013 as shown in Appendix V.

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## GENERAL SUMMARY

## 1. ORGANIZATION OF THE SESSION

### 1.1 Opening of the meeting

1.1.1 The first session of the Task Team on the WIGOS Implementation Plan (TT-WIP-1) of the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (ICG-WIGOS) was opened by its Chairman, Mr Fred Branski, the president of CBS and the Chair of ICG-WIGOS at 09:00 hours on Tuesday, 27 March 2012, at the WMO Headquarters in Geneva, Switzerland. Mr Branski summarized major tasks on WIGOS implementation activities and progress made since Cg-XVI and establishment of ICG-WIGOS by EC-63. He recalled the Terms of Reference of this Task Team and underlined that the major goal of this meeting was to develop a version of WIP to be submitted to the upcoming EC session. He formulated major requirements to be met in development/editing of the WIP content. The Chair anticipated a valuable input from participants to the deliberations of the meeting and wished every success in this effort.

1.1.2 Dr W. Zhang, Director, Observing and Information Systems Department, addressed the meeting on behalf of the Secretary-General of WMO and welcomed the participants to Geneva. He recalled that after Cg-XV, ICG-WIGOS had its 1st session (ICG-WIGOS-1, September 2011) where representatives of all regional associations and technical commissions were presented and WIGOS implementation activities were addressed. He reiterated that this Task Team has a challenging goal - to develop a final version of WIP to be submitted to EC-64 for consideration and approval. Noting the high level of expertise of the participants, Dr W. Zhang expressed the hope that the Task Team will effectively accomplish its task and wished every success to the session.

1.1.7 The list of participants is given in Appendix I.

### 1.2 Adoption of the agenda

TT-WIP adopted the Agenda for the meeting, which is reproduced at the beginning of this report.

### 1.3 Working arrangements

1.3.1. TT-WIP agreed on its working hours and adopted a work plan to consider various agenda items. Following a proposal by the Chair, it was agreed to work in 4 breakout groups with subsequent discussion of the results in plenary session (see agenda items 5 and 6).

## 2. INTRODUCTION ON TT-WIP TASK

The chair reminded the meeting of the Terms of Reference determined for this Task Team on the WIGOS Implementation Plan. The ToR and membership of TT-WIP are reproduced in Appendix II.

## 3. RECOMMENDATIONS FROM ICG-WIGOS REGARDING THE DRAFT WIP

The Chair briefed the meeting on the comments and recommendations made by ICG-WIGOS-1 related to the content of the original version of WIP (version 0.5) prepared in 2011. It was agreed to take this guidance into account when developing the new version of the WIP.

## 4. NEW DRAFT WIP - OVERVIEW

The secretariat presented to the meeting a new draft version of WIP (version 1.1). The major changes in the content included revision of original chapters 1-5 and introduction of a new, comprehensive table on key WIGOS Implementation Activities. Taking into account the current lack of staff in the WIGOS PO, the meeting appreciated the essential work on the revision of WIP being accomplished at very short notice.

## 5. ASSIGNMENT OF DRAFTING/EDITING RESPONSIBILITIES AND BREAKOUT GROUPS

Following general discussion of the WIP (version 1.1) and proposal by the Chair, it was agreed to assign responsibilities for drafting/editing the WIP during the meeting as follows:

| Drafting group | Assigned responsibility for editing the WIP | Chair | Secretary |
|---|---|---|---|
| 1 | Sec 1 – WIGOS Project Definition<br>Sec 4 – Project Management<br>Sec 5 – Resources<br>Sec 6 – Risk Assessment/ Management<br>Plus respective items from Table 3.2.2(b) | F. Branski | A. Karpov |
| 2 | Sec 2.1 - Governance and Programmes<br>Sec 2.2 - Collaboration<br>Sec 2.3 - Planning and optimized evolution of WIGOS and its national observing components<br>Plus respective items from Table 3.2.2(b) | L.-P. Riishojgaard | R. Atkinson |
| 3 | Sec 2.4 - Observing System Operation and Maintenance<br>Sec 2.5 - Quality management<br>Sec 2.6 - Standardization, System Interoperability and Data Compatibility<br>Plus respective items from Table 3.2.2(b) | R. Stringer | T. Oakley |
| 4 | Sec 2.7 - WIGOS Web Portal<br>Sec 2.8 - Data and Metadata Management, Delivery and Archival<br>Sec 2.9 - Capacity development<br>Sec 2.10 - Communication and outreach<br>Plus respective items from Table 3.2.2(b) | A. Mafimbo | E. Charpentier |

Following a proposal by the Chair, the guidance and templates for the work of the drafting groups were discussed and agreed in plenary.

## 6. REPORTS BY BREAKOUT GROUPS AND GENERAL DISCUSSION

The outcomes of the breakout groups were presented and discussed in several plenary sessions, where additional comments were made for further adjustments of relevant parts of the draft WIP. Along with elaboration/adjustments of technical issues, appropriate changes/edits were made in the draft text to ensure full compliance with the guidance and recommendations made by Cg and EC. In particular, a new table of WIGOS Implementation Activities was developed. It identifies the critical implementation activities to be performed during 2012-2015. The resulting Table 4.1 presents the description of implementation activities, associated deliverables, timelines, responsibilities, costs and associated risk. It was agreed that for each activity listed in that table, a detailed activity plan be developed by the responsible entity(s) with support of the Project Office and guidance from ICG-WIGOS. A guidance paragraph was also developed regarding the WIGOS operational period beyond 2015. The final outcomes of the breakout groups were discussed at the plenary session and incorporated into the new version of the WIP (version 0.8) attached as Appendix III to this report. It was also agreed that the Project Office should be responsible for tracking execution of the WIP upon EC approval.

## 7. DRAFT TEXT FOR EC-LXIV-DOC. 4.4 (WIGOS SECTION)

The Task Team reviewed the draft text on WIGOS activities to be included in the working document for EC-LXIV (decision and report parts). The agreed final draft of this text is reproduced in Appendix IV. The Secretariat further informed the meeting that the version of the WIP finalized by the Task Team (WIP, version 0.8) will be submitted to EC-LXIV through the document EC-LXIV-Doc. 4.4(1) as an Annex to paragraph 4.2.2 of the draft text to be included in the General Summary. If additional updates to the WIP are agreed prior to EC-LXIV then an errata sheet will be generated and those

updates will be briefed.

## 8. ANY OTHER BUSINESS

Following a proposal by the Chair, the meeting had general discussion on the implementation of another essential task of the TT – The development of a high level guidance for the WIGOS-Functional Architecture (WIGOS-FA). Representatives of CAS, JCOMM, WMO Satellite Programme, CHy and EUCOS briefed the meeting on the functional structures currently used to manage and support their observing systems. It was noted that certain observing systems (GOOS, GAW, and WHYCOS) are already making good progress in meeting some WIGOS requirements, e.g. in terms of data & metadata management, collaboration, capacity development, communications & outreach. The meeting felt that the WIGOS PO should establish closer collaboration with relevant activities of the regional associations and technical commissions through coordination with the Departments concerned to make the WIGOS-related experience gained by individual observing systems available for all WIGOS stakeholders and effectively used in WIGOS implementation activities. It was also suggested that the Secretariat should facilitate early nomination of experts from the relevant technical commissions to assist in the development of the WIGOS-FA and also the WIGOS regulatory material.

## 9. CLOSURE OF SESSION

The session closed at 16.10 hours on Friday, 30 March 2012.

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**APPENDIX I**

## LIST OF PARTICIPANTS

| | |
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**APPENDIX II**

## TERMS OF REFERENCE AND MEMBERSHIP OF ICG-WIGOS TASK TEAM ON THE WIGOS IMPLEMENTATION PLAN (TT-WIP)

### Terms of Reference:

In accordance with guidance and recommendations of CG-XVI, EC and ICG-WIGOS

1. Develop the WIGOS Implementation Plan (WIP);

2. Develop high –level guidance document for the WIGOS-Functional Architecture (WIGOS-FA);

3. Review the Implementation Plan for the Evolution of the Global Observing System (EGOS-IP), the Implementation Plan for the Global Observing System for Climate (GCOS-IP), the GFCS Implementation Plan with a major focus on the Observations and Monitoring component, the Global Cryosphere Watch Implementation Plan (GCW-IP) and other relevant implementation plans, strategic plans and implementation activities of WIGOS core observing system components to ensure consistency of the plans and coordination of implementation activities as appropriate;

4. Submit WIP through ICG-WIGOS to EC-LXV for approval and further guidance;

5. Complete initial tasks by July 2013.

### Membership

***Chair:*** Fred Branski (Chair, ICG-WIGOS, US)

GOS/CBS: Lars-Peter Riishojgaard (Chair CBS- OPAG-IOS, USA)

GAW/CAS: Emilio Cuevas (CAS, Spain)

WHYCOS/CHY: Jan KUBAT (Hydrological advisor of RA-VI, Czech Republic)

GCW/EC-PORS: Jeff KEY (EC-PORS GCW Task Team lead, US)

CCL/GCOS/GFCS: William WRIGHT (Co-chair CCl OPACE1 Climate Data Management, Australia)

CIMO/CBS: Russell STRINGER (CBS ET-EGOS, Australia)

JCOMM/IOOS: Ali MAFIMBO (JCOMM Management Committee, Vice Chair Services and Forecasting Systems Coordination Group, Kenya)

CAgM: Federica ROSSI (Vice-president of CAgM, Italy)

CAeM/Vol Ash/Space Wx: TBA

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**APPENDIX III**

# WORLD METEOROLOGICAL ORGANIZATION

# WMO INTEGRATED GLOBAL OBSERVING SYSTEM (WIGOS)

# DRAFT
# WIGOS IMPLEMENTATION PLAN
# (WIP)

**Version 0.8**

**DOCUMENT VERSION CONTROL**

| Version | Author(s) | Date | Description |
|---|---|---|---|
| **0.1** | **WIGOS-PO** | **Oct 2010** | **Initial draft** |
| **0.2** | **WIGOS-PO** | **Nov 2010** | **Feedback from SG-WIGOS-3** |
| **0.3** | **WIGOS-PO** | **Feb 2011** | **Ver. for EC-WG/WIGOS-WIS-4** |
| **0.4** | **WIGOS-PO** | **Sept 2011** | **Cg-XVI & EC-LXIII decisions incorporated** |
| **0.5** | **OSD** | **March 2012** | **New outline** |
| **1.0** | **OSD** | **20 March 2012** | **1st Version for restricted distribution** |
| **1.1** | **OSD** | **26 March 2012** | **Table 3.2(b) split in two. Comments/edits by D/OBS, D/ETR, OSD, A. Karpov, D. Thomas and S. Foreman added.** |
| **1.2** | **TT-WIP** | **03 April 2012** | **New draft text and table cleaned up for EC. Doc includes consideration of input from participants, after conclusion of TT-WIP meeting.**<br>**Table 2.1 deleted, Table 4.1 completed. Other changes made to deal better with WIGOS vs WIGOS Implementation. New section 7 - "Outlook" included.**<br>**Edits provided by R. Stringer (after the meeting) incorporated.** |
| **0.8** | **WMO Secretariat, TT-WIP Chair** | **05 April 2012** | **Final set of changes implemented, version numbering system modified. Upon approval by the EC, the document will become Version 1.0** |

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# WIGOS IMPLEMENTATION PLAN (WIP)

***Purpose and scope of the Plan***

This plan for the implementation of WIGOS addresses the activities necessary to achieve an operational WIGOS per Congress' direction. It focuses on the integration of governance and management functions, mechanisms and activities to be accomplished within the resources allocated by the regular budget. WIGOS will continue to evolve and improve through the governance and management mechanisms established by execution of this plan during the 2012-2015 implementation phase.

The plan also addresses several additional significant activities which it is felt will make substantive improvement to the operational capabilities of WIGOS. However, these activities are dependent on additional resources beyond the regular budget. If these activities are not completed, WIGOS can still be considered operational however the resulting system will be less effective in achieving its goals and benefits to members will be reduced or delayed.

This plan is laid out in several chapters that identify and describe the various activity areas needed to be addressed. Specific activities for each area are included in table 4.1, which identifies deliverables, timelines, responsibilities, costs and risks, and applicability to global, regional or national levels of implementation. The table is located in section 4. Similar activities are grouped under the title corresponding to the respective sub-section of section 2.

## 1. IMPLEMENTATION GUIDANCE

The Sixteenth World Meteorological Congress decided that the enhanced integration of the WMO observing system should be pursued as a strategic objective of the WMO and identified this as a major expected result of the WMO strategic plan.

Congress agreed with the WIGOS vision that calls for an integrated, coordinated and comprehensive observing system to satisfy, in a cost-effective and sustained manner, the evolving observing requirements of Members in delivering their weather, climate, water and related environmental services. WIGOS will enhance the coordination of WMO observing systems with those of partner organizations for the benefit of society. Further, WIGOS will provide a framework for enabling the integration and optimized evolution of WMO observing systems, and of WMO's contribution to co-sponsored systems. Together with the WMO Information System (WIS), this will allow continuous and reliable access to an expanded set of environmental data and products, and associated metadata, resulting in increased knowledge and enhanced services across all WMO Programmes.

Congress further decided that the WIGOS implementation be undertaken in an active and prudent manner in the sixteenth financial period and ***will focus on a framework for improved governance, management, integration and optimization of the multiple observing systems coordinated by WMO***, so as to achieve a smooth transition, and no effort should be spared to make WIGOS operational by 2016.

Congress emphasized that ***the implementation of WIGOS should build upon and add value to the existing WMO observing systems with emphasis on integration of surface- and space-based observations*** in an evolutionary process to satisfy requirements of WMO and WMO co-sponsored Programmes. Congress noted that***, since all WMO Programmes would benefit, each should actively participate and contribute its own expertise and resources in implementing WIGOS***.

Congress agreed that in implementing WIGOS, it is imperative that ***the current management, governance and support activities be reviewed and aligned with WMO priorities***. This alignment would promote cooperation and coordination at the technical, operational and administrative levels.

Congress reaffirmed the importance of integrated satellite systems as a unique source of observational

data for monitoring of weather, climate and the environment. It stressed the importance of further advancing instrument intercalibration, data exchange, data management standardization, user information and training, in order to take full advantage of space-based capabilities in the context of the WMO Integrated Global Observing Systems (WIGOS).

Congress also underlined that WIGOS will be essential for the Global Framework of Climate Services (GFCS), aviation meteorological services, disaster risk reduction, and capacity development as WMO priorities. It will also ensure a coordinated WMO contribution to the co-sponsored GCOS, GOOS, GTOS, and to the Global Earth Observation System of Systems (GEOSS).

## 2. KEY ACTIVITY AREAS FOR WIGOS IMPLEMENTATION

To transform the existing and currently independent observing systems - The Global Observing System (GOS), the Global Atmosphere Watch[1] (GAW), the WMO Hydrological Cycle Observing System (WHYCOS) and the Global Cryosphere Watch (GCW) – including surface-based and space-based components and all WMO contributions to GFCS, GCOS, GOOS, GTOS and GEOSS - into a more integrated single system that is WIGOS[2], focused effort is required in the following key areas:

- Management of WIGOS implementation
- Collaboration
- Design, planning and optimized evolution
- System operation and maintenance
- Quality management
- Standardization, system interoperability and data compatibility
- The WIGOS Operational Information Resource
- Data and metadata management, delivery and archival
- Capacity development
- Communication and outreach

### 2.1 Management of WIGOS Implementation

WIGOS implementation is an integrating activity for all WMO and co-sponsored observing systems: it supports all WMO programmes and activities. WMO Congress (Cg-XVI) has decided that the technical aspects WIGOS implementation will be guided by the technical commissions, with leadership provided through CBS and CIMO. Within the WMO Secretariat, WIGOS implementation will be supported by the WIGOS Project Office.

#### *Executive Council*

The WMO Executive Council will continue to monitor, guide, evaluate and support the implementation of WIGOS. Following the guidance by Cg-XVI, EC-LXIII established the Inter-Commission Coordination Group on WIGOS (ICG-WIGOS) with a view to providing technical guidance and assistance for the planning, implementation and further development of the WIGOS components. Progress on implementation of WIGOS will be reported to subsequent sessions of EC. The Council designated the President of CBS as chairperson of ICG-WIGOS.

#### *Technical Commissions*

Given the need for significant and active cooperation and enhanced coordination among the technical commissions, in particular those with responsibility for the WIGOS observing system components, the

[1] WIGOS-IP refers only to the observational components of GAW and GCW that are end-to-end programmes, from observations to services.

[2] The WIGOS Functional Architecture document provides a description of the integrated single system that is WIGOS and which represents the goal of this Implementation Plan. That document is in early draft form at the time of this version of WIGOS-IP (version 1)

ICG-WIGOS will ensure that technical aspects of WIGOS implementation are incorporated in the work programmes and implementation plans of all those WMO Technical Commissions concerned.

***Regional Associations***

Regional Associations will play an essential role in WIGOS implementation. Regional Associations through their WIGOS regional working bodies (working groups, or task teams) will coordinate planning and implementation of WIGOS on the regional level taking into account all WMO future priorities, such as GFCS and DRR. The regional working bodies, under guidance from ICG-WIGOS, will be responsible for:

a) the development of Regional WIGOS Implementation Plans;

b) the integration of WIGOS regional network components within their respective region; and

c) their evolution according to the WMO Plan for the evolution of global observing systems.

Regional WIGOS implementation plans will also address regional aspects of requirements, standardization, observing system interoperability, data compatibility, data management, Quality Management System (QMS) procedures including performance monitoring and data quality monitoring, and proposed improvements in observing networks/systems. An important role of RAs will be to assess and continuously monitor regional requirements, identify regional gaps and identify capacity development projects to address those gaps.

***WMO Members***

Members will plan, implement, operate and maintain national networks and observing programmes based on the standards and best practices stated in the WMO Technical Regulations and its WIGOS Manual. They will be encouraged to adopt a composite network approach to their networks and to include the acquisition, and onward transmission, of data from external sources, including NMHSs and other government agencies, the commercial sector and members of the public. A particular area of focus for WMO Members under WIGOS will be increased attention to site protection and radio frequency spectrum protection.

***WMO Secretariat***

The overall coordination and support to WIGOS implementation will be performed by the WIGOS Project Office under the guidance of the WMO constituent bodies and a Project Oversight Board on WIGOS (POB/WIGOS) which is responsible for the coordination mechanism within the secretariat. The WIGOS Project Office will also be in regular contact with relevant co-sponsoring organizations and other partners in relation to the implementation of WIGOS.

- **Collaboration**

WIGOS will be an integrated, comprehensive, and coordinated system primarily comprising the surface-based and space-based observing components of the GOS, GAW, GCW, and WHYCOS, plus all WMO contributions to GCOS, GOOS and GTOS. In contrast to the paradigm upon which the WWW was built, the WIGOS component observing systems thus tend to be owned and operated by a diverse array of organizations, both national and international and from both research and operations. Therefore, the interaction between these various communities is important for the implementation of WIGOS. In particular, strengthening the interaction between research and operational observing communities is important for sustaining and evolving observing systems and practices, in line with new science and technology outcomes.

***Partner Organizations***

Improved coordination and cooperation will need to be supported by a high-level reconciliation mechanism to be defined in the WMO-UNESCO/IOC-UNEP-FAO-ICSU MoU, in order to resolve possible problems in data policy, product delivery, and other governance issues. These interagency and inter-observing system coordination mechanisms will need to be complemented and supported through similar cooperation and coordination arrangements among NMHSs and through national implementation mechanisms for GFCS, GCOS, GOOS, GTOS, and GEOSS.

Congress agreed that the Architecture for Climate Monitoring from Space should be defined as an

end-to-end system, involving the different stakeholders including operational satellite operators and R&D space agencies, the Coordination Group for Meteorological Satellites (CGMS), the Committee on Earth Observation Satellites (CEOS), the Global Climate Observing System (GCOS), the World Climate Research Programme (WCRP) and the Group on Earth Observations (GEO). Within the WMO context, the Architecture shall be part of the space-based component of WIGOS. Therefore particular emphasis will be placed on their coordinated contribution to WIGOS, building on existing coordination mechanisms stated above.

***Within the WMO Community***

Within the Regions, plans will be developed to strengthen cooperation through partnership with region-wide organizations or sub-regional groupings overseeing the WIGOS observing components. Specifically, these activities aim to enhance cooperation among meteorological, hydrological and marine/oceanographic institutions/services where they are separated at the national level.

## 2.3 Design, Planning and Optimized Evolution of WIGOS component observing systems

***At the Global Level***

Coordinated strategic planning at all levels will be based on the Rolling Review of Requirements (RRR) process, which is described in detail in the current GOS Manual and Guide[1], and will be upgraded by the WIGOS manual and Guide.

The RRR process involves regularly reviewing the observational data requirements[2] for each of the defined WMO Application Areas and all required variables. The RRR process also involves reviewing the capabilities of WMO observing systems and co-sponsored systems, and the details of the networks/platforms in existence[3], for both space-based and surface-based systems, in delivering data on different variables. The comprehensive information collected for the globe on both requirements and capabilities is quantitatively recorded in the WMO RRR Database, which is currently accessible from the WMO website[4] and will ultimately be accessible via the WIGOS Portal of the WIGOS Operational Information Resource (WOpIR). The information on surface-based networks and instrumentation details is currently recorded in Volume A, but will ultimately be available, with additional metadata, in the WIGOS Operational Database, also to be accessible via the WIGOS Portal (see Section 2.7 below for further detail). Space-based capabilities are also recorded in the RRR database. By using these sets of information, Gap Analyses can then be performed to identify weaknesses in existing observing programmes.

The above steps represent the analysis phase of the RRR, which is as objective as possible. Next is the prioritisation and planning phase of the RRR in which experts from the various application areas interpret the above analysis, draw conclusions, identify key issues and priorities for action. This input is composed as Statements of Guidance from each application area. The technical commissions respond to the Statements of Guidance by formulating new global observing system requirements and the regulatory and guidance publications to assist Members to address the new requirements. Additionally, CBS draws on the Statements of Guidance to develop a Vision and an Implementation Plan for future global observing systems.

The WMO has agreed on the Vision for the Global Observing Systems in 2025[5] which provides high-level goals to guide the evolution of the global observing systems during the coming decades. To complement and respond to this Vision, an Implementation Plan for the Evolution of Global Observing

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[1] Currently specified in the Manual on the Global Observing System (WMO-No.544), elaborated in the Guide to the Global Observing System (WMO-No. 488), and described further on the WMO web site at http://www.wmo.int/pages/prog/www/OSY/GOS-RRR.html

[2] The RRR describes data requirements, which are expressed in terms of space/time resolution, uncertainty, timeliness, etc., for each of the required observed variables, and are measures independent of observing technology.

[3] Capabilities are derived from the individual platforms characteristics submitted by Members to WMO e.g. through WMO No. 9, Volume A, or its evolution

[4] Requirements: http://www.wmo.int/pages/prog/www/OSY/RRR-DB.html : Space based capabilities: http://www.wmo.int/pages/prog/sat/gos-dossier_en.php; the surface-based capabilities database is currently under development

[5] Available from the WMO website at http://www.wmo.int/pages/prog/www/OSY/gos-vision.html

Systems (EGOS-IP[1]) will be submitted to CBS-XVI for approval. This EGOS Implementation Plan will focus on the long term evolution of WIGOS observing systems components, while the WIGOS Implementation Plan will focus on the integration of these observing system components. This key WIGOS document will provide Members with clear and focused guidelines. It will recommend actions that stimulate the cost-effective evolution of the observing systems to address in an integrated way the requirements of all WMO programmes and relevant parts of co-sponsored programmes.

The space-based sub-system is already partly integrated due to the existence of a globally coordinated plan, which is maintained by WMO and CGMS, and which takes into account the needs of a number of application areas. However, it should be further developed and expanded to better support certain application areas that, at present, are not benefiting from the full potential of space-based observations, for example, other components of WIGOS (GAW and WHYCOS), and new initiatives like GFCS and GCW. In addition, further integration shall be pursued in terms of inter-calibration, data and product harmonization, and composite product generation, etc.

Concerning the surface-based sub-system of WIGOS, the current composition of mainly separate networks of observing stations comprises numerous different types of sites, for example:

(a) Surface synoptic stations (Land and Sea stations);
(b) Upper-air synoptic stations;
(c) Aircraft meteorological stations;
(d) Aeronautical meteorological stations;
(e) Research and special-purpose vessel stations;
(f) Climatological stations;
(g) GCOS Surface Network (GSN);
(h) GCOS Upper Air Network (GUAN);
(i) Agricultural meteorological stations;
(j) Hydrological stations; and
(k) Special stations, that include:
(i) Weather radar stations;
(ii) Radiation stations;
(iii) Wind profiler stations;
(iv) Atmospherics detection stations (lightning detection network stations);
(vi) Meteorological rocket stations;
(vii) Global Atmosphere Watch (GAW) stations;
(viii) Global Cryosphere Watch stations;
(ix) Planetary boundary-layer stations;
(x) Data buoys (drifting and moored) and ocean surface gliders;
(xi) Ocean profiling floats and sub-surface gliders;
(xii) Ship-based observations (surface marine, oceanographic, and upper air);
(xiii)Tide-gauge stations; and
(xiv) Tsunami monitoring stations.

With the operational implementation of WIGOS, these separate networks will be given a more prominent collective identity as the WIGOS surface-based sub-system and for some purposes may be considered as a single composite system of observing (fixed or mobile) sites/platforms. Regional Associations will adopt a broader role in coordinating the implementation of relevant elements of the WIGOS surface-based sub-system, evolving from the previous concepts of the synoptic and climatological networks.

**Table 2.3: The 12 Recognized WMO Application Areas**

| No | Application Area | No | Application Area |
|---|---|---|---|
| 1 | Global NWP | 7 | Ocean Applications |

[1] http://www.wmo.int/pages/prog/www/OSY/gos-vision.html#egos-ip.

| | | | |
|---|---|---|---|
| 2 | High Resolution NWP | 8 | Agricultural Meteorology |
| 3 | Nowcasting & Very Short Range | 9 | Hydrology[1] |
| 4 | Seasonal to Inter-annual | 10 | Climate Monitoring |
| 5 | Aeronautical Meteorology | 11 | Climate Applications |
| 6 | Atmospheric Chemistry | 12 | Space Weather |

Similarly, the space-based sub-system of WIGOS is composed of many different platforms and types of satellites. There is already partial integration due to the existence of a globally coordinated plan, which is maintained by WMO and CGMS, and which takes into account the needs of a number of application areas. However, it should be further developed and expanded to better support certain application areas that, at present, are not benefiting from the full potential of space-based observations. In addition, further integration shall be pursued in terms of inter-calibration, data and product harmonization, and composite product delivery. Regional Associations will adopt an active role for compiling the views of Members and maintaining documented requirements and priorities for data and products to be available from the WIGOS space-based sub-system.

***At the Regional Level***

The primary coordination of the RRR will lie with CBS for overall WIGOS planning at the global level. However, the Regional Associations, through their respective WIGOS regional working bodies, will be encouraged to examine the global requirements for data and make the necessary adjustments to take into account the particular requirements of the Region and international river basin authorities: in essence, to use the global data to prepare regional data requirements, then use this for planning of observing system components at the regional scale, which they will then encourage Members within the region to implement, subject to further review at the national or sub-regional level, where appropriate.

***At the National or Sub-Regional Level***

WMO Members will have available the global and regional data requirements information to use as guidance for the preparation of national requirements information which can then be used to carry out the detailed planning for evolution of national observing components of WIGOS.

In some cases, where countries are small and closely spaced together, there may be more merit in taking a sub-Regional, as opposed to National, approach to WIGOS observing infrastructure planning. In this case, it will be necessary for the Members concerned to work in close cooperation to prepare sub-Regional reviews of requirements to be used as a basis for detailed planning at that scale.

### 2.4 Integrated Observing System Operation and Maintenance

Observing system owners or custodians are responsible for operating and maintaining their systems and for complying with the regulations of the WMO and co-sponsored observing systems to which they contribute. System owners are generally NMHS or other organizations within WMO Member countries but are sometimes other entities.

WIGOS involves, between observing systems, a process for sharing of operational experiences, of expertise and for pooling resources for joint activities. The benefit is to realize synergies and greater efficiencies. These interactions may be between different teams within a single organization (such as an NMHS) or between organizations. These may benefit from technical guidance from relevant Technical Commissions and, while occurring primarily at a national level, may also occur at a Regional or Global level. For example:

- Maintenance visits: meteorological, hydrological and other networks often require their technicians to visit similar geographical areas to maintain observing equipment. It may be possible, where appropriate, to manage maintenance visits as a joint activity thereby realizing efficiencies.

[1] Hydrological information only; water quality monitoring and information is currently excluded.

- Spectrum management: greater influence nationally which feeds into ITU.
- Calibration and Traceability: Potential for efficiencies and improvements to observational data quality through combining efforts at a national, regional and global level.
- Procurement: considerable effort is often required to conduct procurement processes for observing systems. Where requirements allow, a joint procurement exercise can realize significant efficiencies,
- Protection of weather radar from wind turbine interference: shared risk and greater influence with planning objections
- Many synergies are achieved by satellite operators through CGMS and the WMO Space Programme by harnessing the joint efforts of satellite operators, and these best practices will be expanded further to new WMO initiatives like GFCS.

It should also be noted that WMO Members need to increase their efforts to maintain metadata and provide it to WMO so that WIGOS support tools are effective.

### 2.5 Integrated Quality Management

Congress recognized that ***meeting the quality requirements and expectations of users will be critical to the success of WIGOS***. This would require ***an in-depth examination of current practices*** used by WMO observing programmes, specific mission-related requirements that were already in place, and available technological opportunities. The WIGOS implementation strategy would specify ***all processes of the Quality Management System (QMS) for WIGOS observing components including guidance on effective management of such a component***.

The WIGOS Quality Management approach is to apply the WMO QMF to the WIGOS observing components (see Technical Regulation 49, Part 4). WIGOS quality management will strive for compliance of all components of WIGOS with international standards, such as ISO 9001/9004 and the ISO 17025 standard where appropriate (i.e. with respect to instrument calibration and traceability of data). Compliance with international standards should be pursued in all quality assurance (QA) procedures applied by Members to all their national WIGOS observing components. In addition to the WMO QMF document, further guidance to Members will be provided by WMO via the standards and best practices described in the Regulatory Materials, such as the WIGOS Manual and Guide. Such guidance, for both mandatory and desirable practices, can be referred to for the application and implementation of quality management in national observing systems. In this context, WIGOS will give attention to:

(a) the examination of current quality management practices being used by WMO observing programmes;

(b) the documentation of the quality of observation at all stages of data processing; and

(c) ensuring, where possible, traceability to the International System of Units (SI).

One component of WIGOS worthy of particular mention in the context of quality management is the space-based component. CGMS, in coordination and collaboration with WMO, supports the development of quality assurance standards and formats for satellite observations, multi-satellite and multi-sensor algorithms for estimating retrieved data and products, and advanced atmospheric sounding derivation packages for use by WMO Members. This is a well-established and effective process and it is expected it will continue to address WMO's new requirements and to make significant contributions. To assist this effort, WIGOS will also ensure that surface-based sites that are needed for calibration/validation of satellite data are specified.

A key aspect of quality management that requires particular attention under WIGOS is the systematic and rigorous performance monitoring and evaluation (PM&E) of WIGOS capabilities, in terms of both: (a) the flow of observational data/products to models, and (b) provision of products/information for decision-support tools and services in accordance with requirements specified by end users. Effective PM&E can improve the overall performance of WIGOS and its ability to effectively interact with its user community and to meet community needs and requirements.

In summary, responsibility for the development of WIGOS quality management, and for the provision of

guidance to Members on how to achieve compliance with the relevant technical standards, lies with the WMO Technical Commissions and with CGMS, while the responsibility for ensuring compliance with the WIGOS quality management principles (such as ISO 9001, 9004, 17025) will fall primarily to the WMO Members themselves.

## 2.6 Standardization, System Interoperability[1] and Data Compatibility

Congress recognized the important role of WIS in WIGOS implementation, in relation to data exchange and discovery, and the provision of effective standards and practices for data management. Congress stressed ***the importance of coordination between WIGOS and WIS implementation activities***.

Congress also stressed that taking into account the ongoing rapid progress in technology that will continue to provide a basis for further improvements in the capability, reliability, quality and cost-effectiveness of observations, ***WIGOS must utilize international standards and best practices set by WMO and partner organizations.***

The required key areas of standardization are:

A - Instruments and methods of observation across all components including surface-based and space-based elements (observations and their metadata);

B - WIS information exchange, as well as discovery, access and retrieval (DAR) services; and

C - Data Management (Data Processing, Quality Control, Monitoring and Archival).

The interoperability (including data compatibility) of WIGOS observing components is achieved through utilization and application of the same, internationally accepted standards and best practices (that is, standardization). Data compatibility is also supported through the use of standardized data representation and formats. In this regard, observing system interoperability and data compatibility is key to turning observations into effective data/products that meet real needs of various users.

All standard practices will be documented in the WMO Technical Regulations through the WIGOS Manual and other relevant Manuals. Recommended practices will be documented in the Guides and other technical documentation under the responsibility of respective technical commissions.

## 2.7 The WIGOS Operational Information Resource

The purpose of the WIGOS Operational Resource (WOpIR) is to provide a centralized point of access (web portal) to WIGOS related operational information, including observational user requirements, a description of the contributing observing networks (instrument/site/platform metadata), and their capabilities, list of standards used in the WIGOS framework, data policies applicable, and information on how to access data. It will also provide general information on WIGOS benefits, and impacts to Members. It will be a tool for conducting critical reviews as part of the Rolling Review of Requirements, and assist Members, and Regional Associations for conducting observing network design studies as appropriate. It will be providing guidance on how to develop capacities in developing countries according to WIGOS requirements, and will be providing them with a toolbox to be used nationally if and when required. The information collected is intended in particular to identify the gaps in the observational networks, identify areas where existing observing systems could be used, or their scope expanded at limited cost to address the requirements of more application areas. The information provided on standards will support the production of more homogeneous data-sets and make the observations traceable and of known quality.

The Resource will also include information on planned observing networks, and the planned evolution of existing observing systems, allowing to have a vision of the future global, regional, and national contributions to WMO networks, and how they will address user requirements.

The WOpIR is shown schematically in Figure 2.7. According to feedback from Members and users of the information resource, the need for additional functionality and/or information sources to be accessible from within it will be considered by ICG-WIGOS once it has been implemented.

[1] Interoperability is a property referring to the ability of diverse systems to work together (inter-operate)

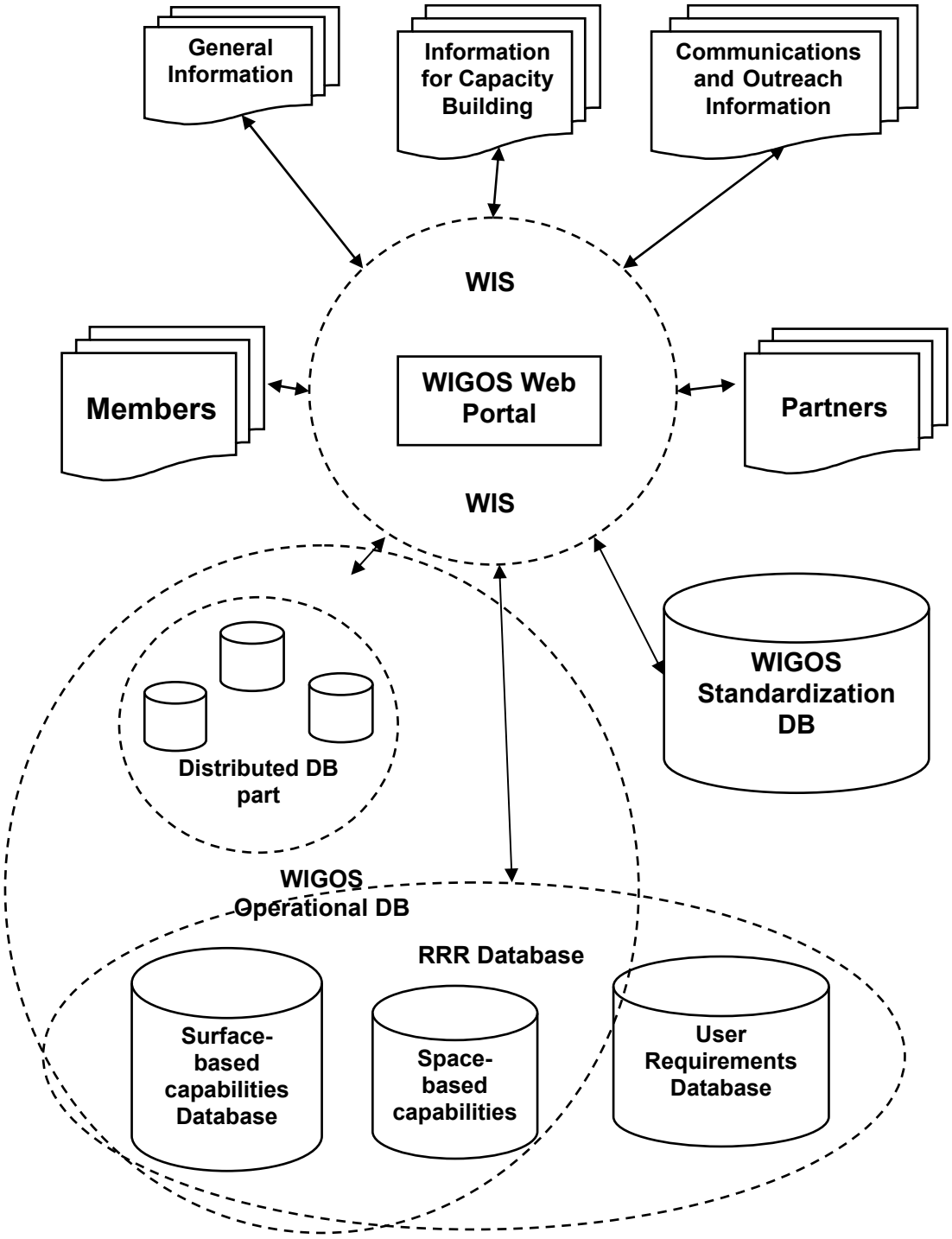


**Figure 2.7: WIGOS Operational Information Resource (WopIR) and its Key Support Tools**

The components of the WIGOS Operational Information Resource are:

- **A central web portal** (WIGOS Portal) providing access to all other components of the resource;
- **The WIGOS Standardization Database**, which provides user-friendly direct access to, and on-line search tools for all WMO standards, guidelines, best practices, procedures, etc., addressing all

aspects of observations (instruments, methods of observation, metadata format, coding, data formats, etc.). This database enables the network managers and operators to easily access the information they need to set-up and run their systems and to help the data users to understand the standards used in generating specific observations needed for their applications.

- **The Rolling Review of Requirements (RRR) Database**, which is used to support gap analysis, network evaluation, redesign and optimization. It contains the following parts to permit conducting the critical review by comparing the user requirements with the observing systems capabilities:

  (a) Observational user requirements for the 12 WMO Application Areas (see table 2.3) (for each variable, the requirements are expressed in terms of threshold, breakthrough, and goal for each of the space/time resolution, uncertainty, timeliness, criteria);

  (b) Space-based observing capabilities;

  (c) Surface-based observing capabilities.

- **The Operational Database**, which describes all WIGOS observing components and provides end users with relevant metadata. It is divided in two parts:

  (a) A centralized version with limited and standardized metadata consisting of two parts: (i) space-based capabilities, and (ii) an expanded version of WMO No. 9, Volume A, *Observing Stations*, with limited site/platform metadata, as well as capabilities. These two databases are those used to represent capabilities as an input to the RRR process; supplemented by

  (b) A distributed version connected to the centralized version, whereby Members make detailed metadata about the sites/observing platforms they operate available through national websites (or web services); access (e.g. web service) to the information of individual platforms is standardized internationally, but the information returned is not standardized (or it is only a national standard). Supplementary information on space-based observing systems can also be provided through distributed databases by the Space Agencies, and Members as appropriate.

Network owners and data custodians, in the case of 'external' data sources, are responsible for providing detailed and correct metadata related to all parts of their observing systems and networks. Generally, the WIGOS operational database includes the following:

- Basic observing component characteristics (governance, management, observing programme, standard compliance information, data policy, planning, etc.);
- Basic site/platform characteristics (name, number/identifier, geographical coordinates, observing programme, etc.);
- Basic instrument characteristics (siting, exposure, sensor type, principle of operation, instrument performance); data-processing, handling, transmission, quality assurance information, etc.).

The operational database is also supported by WMO and Partner's catalogues on observing programmes, related statistics and standards.

## 2.8 Data Discovery, Delivery and Archival

Within the WIGOS framework, the WMO Information System (WIS[1]) provides exchange of data and interpretation metadata[2], and management of related discovery metadata[3]. These discovery metadata play an important role in the discovery, access and retrieval of WIGOS observations and products.

Submission, management and archival of the data themselves is generally the responsibility of observing system owners / data custodians. However, several World Data Centres and a number of regional or specialized data centres exist that collect, manage, and archive basic observational data

[1] http://www.wmo.int/wis
[2] Interpretation metadata is the information required to interpret the data
[3] Discovery metadata is the information describing the data-sets, generally using ISO-19115 standard, and WMO core profile in case of WIS

that are relevant to WMO Applications.

An important aspect of WIGOS implementation is to ensure all participants adopt WIGOS and WIS standards and make their data available through WIS for delivery or for discovery, access and retrieval services. In this regard, promotion and implementation of DCPCs (Data Collection and Production Centres) will be encouraged.

### 2.9 Capacity Development

A coordinated capacity-development effort at global, regional and national levels is of paramount importance to the developing countries. This is especially the case for NMHSs of Least Developed Countries (LDCs) and Small Island Developing States (SIDSs), to enable them to develop, improve and sustain national WIGOS observing components. This needs to be complemented by capacity development efforts outside of WIGOS but in closely related areas to improve access to and effective utilization of observations, data and products, and related technologies. The WIGOS capacity development activities at national and regional levels are focused on:

(a) Providing assistance to Members to introduce or improve institutional mandates and policies that enable effective implementation, operation and management of observing systems;

(b) Filling the existing gaps in the design, operation and maintenance of WIGOS observing systems, including both the infrastructure and human capacities development;

(c) Technological innovation, technology transfer, technical assistance and decision-support tools;

Capacity development in satellite applications for developing countries, LDCs and SIDSs are also addressed in the Implementation Plan for the Evolution of the GOS (see WMO-TD 1267). The virtual lab (VL) will continue to grow and help all WMO Members realize the benefits of satellite data.

### 2.10 Communication and Outreach

WIGOS will establish an effective communication and outreach strategy through the efforts of WMO Members, Programmes, Regional Associations (RAs) and Technical Commissions (TCs), and co-sponsors. The strategy will start by describing its purpose, the target audiences and the key messages to convey to those audiences.

The strategy will provide details on WIGOS benefits, increased effectiveness, efficiency and impact on the WMO Members activities, as well as on the socio-economical benefits of WIGOS data. It will take advantage of outreach programmes developed and effectively deployed so far by WMO and its partner organizations. The communication and outreach strategy will include identification of those materials required to be developed to better convey the WIGOS message. A suggested list of such materials is shown in the table at Annex I.

The WIGOS Portal will provide convenient access to relevant information on communication, outreach and capacity development, aimed at complementing, not duplicating, others' efforts. A variety of outreach materials will be developed to educate the general public, Members, funding agencies, and policy-makers on WIGOS' importance to society. Materials include posters and other educational material for elementary and high school classes, a WIGOS brochure, a semi-annual or annual, newsletter, an online photo and video library, and information on the current state of the observing systems.

## 3. PROJECT MANAGEMENT

### 3.1 Project Framework

The WIGOS project framework consists of two parts:

I. The organizational framework set up by the WMO Executive Council in order to monitor, guide and support the implementation of WIGOS in accordance with Congress decisions. EC-LXIII established ICG-WIGOS with a view of providing technical guidance and assistance for the planning, implementation and further development of WIGOS and designated the President of CBS as chairperson of ICG-WIGOS.

II. The administrative structure within the WMO Secretariat. The WMO Secretariat, through the Project Oversight Board on WIGOS (POB/WIGOS), with WIGOS-relevant programmes and departments (OBS, RES, CLW and DRA) provides integrated support to ICG-WIGOS, its Task Teams and other relevant working bodies.

In Resolution 11.3/1, when Cg XVI decided to implement the WIGOS, it requested the Secretary-General to establish a WIGOS Project Office. The staff of the Project Office, duties and staff cost are shown in Table 5.

### 3.2 Project monitoring, review and reporting mechanism

- The Executive Council will monitor, review, guide and support the overall implementation of WIGOS;
- The ICG-WIGOS will report to subsequent sessions of the Executive Council on the progress in implementation of WIGOS;
- The WIGOS Project Office, under the institutional guidance of the WMO constituent bodies and through the secretariat internal coordination and oversight mechanism, will be responsible during the implementation phase for reporting to all WMO constituent bodies and Members on regular basis, to present and document the progress in the WIGOS implementation as well as for the purpose of their close and active involvement.

### 3.3 Project Evaluation

The evaluation methodology will be designed against WIGOS implementation activity tables, i.e. with respect to the activities, deliverables, timeline, responsibility and budget allocations. This will include a schedule of monitoring and evaluation activities and related responsibilities. Mid-term evaluation, interim progress reports and post-implementation reviews are planned as a means of providing early feedback on progress towards success, and as a means of meeting accountability and transparency requirements for the whole implementation phase. RAs, TCs and NMHSs will provide progress information on the request from the Project Office

## 4. IMPLEMENTATION

### 4.1 Activities, Deliverables, Milestones, Costs and Risks

In its discussions of WIGOS at Cg XVI (agenda item 11.3), Congress recognized the progress being made with WIGOS and decided that WIGOS implementation be undertaken with the establishment of a WIGOS Project Office and the delivery of an implementation plan by the end of 2012, with the goal of WIGOS becoming operational by 2016. Table 4.1 presents the key implementation activities that are required for WIGOS implementation within the timeframe 2012-2015. The table is arranged to correspond to the activity areas presented in Section 2. In the table each implementation activity is presented along with its associated deliverables, timelines, responsibilities, costs and associated risk.

For each activity in Table 4.1, a detailed activity plan will be developed by the responsible entity(s) with support of the Project Office and guidance from ICG-WIGOS. The Project Office has responsibility for tracking execution of these activities and this plan itself.

**Table 4.1 WIGOS Implementation Activities**

Activities in bold are considered the most critical for WIGOS to gain operational acceptance by 2015.
Colour coding for the table; yellow is a Global activity, green is a Regional activity and blue is a National activity.
Key to activity numbers: **a.b.c**, where **a** is number of respective sub-section of section 2, **b** is for a global (1), regional (2) or national (3) activity, and **c** is a sequential number to distinguish activities from one another.
ARB = Available Regular Budget. RB = Regular Budget.

| No | Activity | Deliverables | Timeline | Responsibility | Estimated Costs (2012-2015) K CHF | | | *Potential Risks* |
|---|---|---|---|---|---|---|---|---|
| | | | | | *Total* | *ARB* | Shortfall | |
| **1. Management of WIGOS Implementation** | | | | | | | | |
| **1.1.1** | **Develop/Revise/Update WMO Regulatory Material (Technical Regulations, WIGOS Manual). Develop WIGOS Guide. Develop WIGOS Functional Architecture (FA)** | **Updated WMO technical Regulation No. 49 WIGOS Manual for Cg-XVII approval WIGOS Guide and Functional Architecture** | **Cg-XVII (2015)** | **ICG-WIGOS** | **400K** | **245 K** | **155K** | **Coordination, communities' interest** |
| **1.1.2** | **Incorporate technical aspects of WIGOS Implementation and continuing evolution into existing/new TCs and RAs working structures and procedures** | **1) RA &TC working structure adjusted to address WIGOS activities. 2)Cross body coordination mechanisms in place** | **2012-2014** | **CBS, CIMO CAS, CHy JCOMM,CCI RAs ICG-WIGOS** | **RB from relevant departments** | | | **Low** |
| 1.1.3 | Provide annual reports and recommendations to EC and Cg on progress in WIGOS implementation | Annual reports to EC, Cg on WIGOS implementation status | EC-65, EC-66, Cg-XVII | ICG-WIGOS | **RB from relevant departments** | | | Low |
| **1.2.1** | **Develop regional WIGOS Implementation Plans** | **Regional WIGOS Implementation Plans** | **2012/13** | **RAs** | **RB from relevant departments** | | | **Low** |
| **2. Collaboration**[1] | | | | | | | | |

[1] Congress emphasized that strong support and close collaboration among Members were needed to advance scientific knowledge and technical infrastructure to meet the WIGOS requirements. Within the Regions, it would be desirable to strengthen cooperation and partnership through region-wide organizations or sub-regional groupings overseeing the WIGOS observing components. It specifically refers to enhanced cooperation among meteorological, hydrological and marine/oceanographic institutions/services where they are separated at the national level.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **2.1.1** | **Develop guidance, mechanisms and procedures for engagement coordination and collaboration with partner organizations** | **1) Partner Strategy is published & available on the Portal<br>2) Appropriate bodies have responsibilities in their TORS** | **1) 2014<br><br>2) 2014** | **ICG-WIGOS<br><br>Partners** | **RB from relevant departments** | | | **Med** |
| **2.1.2** | **Develop the Architecture for Climate Monitoring from Space (ACMS) focusing on GFCS four priorities** | **1) ACMS design docs<br>2) Initial implementation** | **1) 2013<br>2) 2015** | **CGMS, CEOS WSP, CBS** | **RB from relevant departments** | | | **Low** |
| 2.2.1 | Examine and recommend areas where closer Regional cooperation and coordination would be beneficial | Recommendations to be included in regional WIPs | 2013-2015 | RAs | **RB from relevant departments** | | | Low |
| 2.3.1 | Establish closer collaboration at the national level, within NMHS, with other government agencies, and with potential external data providers | Reports from members (individually or through RAs) to CBS and CIMO | 2012, 2014 | Members, RAs | **RB from relevant departments** | | | Medium |
| **3. Design, planning and optimized evolution of WIGOS and its regional, sub-regional and national observing components** | | | | | | | | |
| **3.1.1** | **Complete RRR practices, procedures, responsibilities and mechanisms for all systems and agreed application areas** | **1) RRR included in the Manual<br>2) Responsible bodies have RRR responsibilities identified in their TORs** | **1) 2013<br><br>2) 2014** | **CBS<br>other TCs** | **RB from relevant departments** | | | **High** |
| 3.1.3 | Using the RRR process, and capitalizing on the recent relevant experience of some Members, develop procedures for and carry out a design for WIGOS at the global scale | Initial global-scale specification for WIGOS observing infrastructure | 2012 - 2015 | ET-EGOS, ICG-WIGOS, TCs | 250 | 0 | 250 | High |
| 3.2.1 | Update the global RRR | Refined RRR database | 2013-2014 | RAs | 80 | 0 | 80 | High |

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| | database to take into account Regional user requirements | | | | | | | |
| 3.3.1 | Update the global RRR database to take into account sub-Regional and national user requirements | Refined RRR database | 2014-2015 | Members | Members | | | High |
| **4. Integrated Observing System Operation and Maintenance** | | | | | | | | |
| **4.1.1** | **Develop guidance, mechanisms and procedures for improved integration of observational data and products** | **1) Integration Strategy is published & available on the Portal<br>2) Appropriate bodies have responsibilities in their TORS<br>3) Work is underway for some specific product integration activities** | **2015** | **ICG-WIGOS** | **RB from relevant departments** | | | **High** |
| 4.1.2 | Develop guidance for the process of sharing, between component observing systems, operational experiences, of expertise and for resourcing joint activities. | Proposed text for inclusion in Guide on WIGOS. | 2013 | ICG-WIGOS | Expert + Sec Time | | | Medium |
| **5. Integrated Quality Management** | | | | | | | | |
| **5.1.1** | **Develop WIGOS Quality Management guidance, mechanism, practices and procedures to include monitoring** | **1)WIGOS QMF to be incorporated into WIGOS Manual and Guide<br>2) Appropriate bodies responsibilities identified in their ToRs** | **2014** | **ICG-WIGOS Relevant TCs** | **RB from relevant departments** | | | **Medium** |
| 5.1.2 | Examination of current quality management practices being used by WMO observing programmes. | Report which documents processes used and identifies areas for improvement. | 2013 | ICG-WIGOS | Expert + Sec Time | | | Medium |
| **6. Standardization, System Interoperability and Data Compatibility** | | | | | | | | |
| **6.1.1** | **1) Develop guidance for WIGOS standards** | **1) Guidance to WIGOS standardization** | **2013** | **Relevant TCs WIGOS PO** | **RB from relevant departments** | | | **Low** |

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| | **2) Document the implemented standards, including best practices, procedures on instruments, methods of observations, data products, etc** | **2) Implemented standards and best practices incorporated into WIGOS Manual, Guide and Portal as appropriate** | | | | | | |
| 6.1.2 | Develop and maintain the Standardization, Operational and RRR databases. | Operational Acceptance of each of the WOpIR databases. | Cg-XVII | ICG-WIGOS | **RB from relevant departments** | | | High |
| **7. The WIGOS Operational Information Resource** | | | | | | | | |
| **7.1.1** | **Design and develop WOpIR as an information resource** | **1) Technical Specification WOpIR**<br>**2) Make decision on developments of WOpIR (internal vs. call for tender)**<br>**3) Operational Acceptance** | **1) 2013**<br>**2) 2013-14**<br><br>**3) 2015** | **Secretariat in cooperation with Members** | **330** | **97** | **233** | **Medium** |
| 7.1.2 | Investigate the need for a database describing the Global Observations Products (Satellite Data, Weather Radar) | Documented requirements for the database | 2012 | ICG-WIGOS, TCs | **RB from relevant departments** | | | Low |
| 7.1.3 | Survey WMO Members on what they could offer to support development and operations of WOpIR | Survey results and resulting decisions | 2012 | WIGOS-PO | **RB from relevant departments** | | | Low |
| 7.3.1 | Collect, maintain and provide the metadata required by WIGOS support tools. | Compliance on requirements for metadata by all Members. | Cg-XVII | Members | Members | | | Medium/High |
| **8. Data discovery, delivery and archival** | | | | | | | | |
| **8.1.1** | **Develop WIGOS metadata standards and guidance practices for maintenance of and access to WIGOS metadata** | **1) Initial WIGOS Metadata standard approved**<br>**2) Initial access to WIGOS Metadata through portal established**<br>**3) Practices established in manual & guide** | **1) 2015**<br><br>**2) 2013**<br><br>**3) 2015** | **CBS, CIMO**<br>**CAS, CHy**<br>**JCOMM**<br>**ICG-WIGOS**<br>**Members** | **RB from relevant departments** | | | **Medium** |

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| | | **4) body(s) created or identified for maintenance of MD standard** | **4) 2013** | | | |
| 8.1.2 | To initiate and develop a mechanism and outreach strategy for the integration of more relevant observation data and associated interpretation metadata. | Mechanism and outreach strategy in place | 2012-2013 | ICG-WIGOS | **RB from relevant departments** | Low |
| 8.3.1 | Outreach activities targeting more observational data available through WIS | More relevant observational data made visible and accessible trough WIS | 2014-2015 | WMO Members with support from the WMO Secretariat | Nationally funded activities; WMO Secretariat activities covered in RB budget | Low/Medium |
| **9. Capacity development**[1] | | | | | | |
| **9.1.1** | **Develop a WIGOS Capacity Development (WCD) strategy including education and training** | **1) WCD Strategy is published & available on the WOpIRI**<br>**2) Appropriate bodies have responsibilities in their ToRs**<br>**3) WCD activities underway** | **1) 2013**<br>**2) 2014**<br>**3) 2015** | **ICG-WIGOS ETR, RAs** | **RB from relevant departments** | **Medium** |
| 9.1.2 | Assistance to WMO Members regarding WIGOS integration | National observational networks better responding to WMO Applications requirements | 2012-2015 | WMO Secretariat | **RB from relevant departments** | Medium |
| 9.1.3 | Develop WIGOS related guidelines and training materials and other relevant documentation | Training materials and guidelines available | 2013 | WIGOS-PO | **RB from relevant departments** | Low |
| 9.3.1 | Resource mobilization | More resources made available to NMHSs and | 2012-2015 | WMO Members with assistance | Nationally funded activities; WMO | Medium |

[1] Congress stressed that an effective capacity-building strategy is an essential component of the WIGOS implementation. Specialized education, training activities and improvement of necessary observing infrastructure should be reflected in the regional, sub-regional and national WIGOS implementation plans, especially for NMHSs of LDCs, LLDCs and SIDS. Hence, capacity building is not to be limited to scientific and technological concerns, but also to strategic and management consideration including human resources development, resource mobilization and communications and outreach activities.

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| | | partner organizations for better integration of observational networks contributing to WMO Applications | | from the WMO Secretariat | Secretariat activities covered in RB budget | |
| 9.3.2 | Tools from the WOpIR to be used nationally for the design and management of national WIGOS networks. | WIGOS Operational Information Resource and tools used by WMO Members | 2014 | WMO Members | Nationally funded activities; WMO Secretariat activities covered in RB budget | Medium |
| **10. Communication and outreach** | | | | | | |
| **10.1.1** | **Develop an effective communication, outreach, capacity development, and education strategy** | **WIGOS Communication and outreach Strategy** | **2012** | **ICG-WIGOS** | **RB from relevant departments** | **Medium** |
| 10.1.2 | Develop communication and outreach materials (see Annex 1 for suggestions) and make them available via the WIGOS Portal | Communication and outreach materials available | 2012-2013 | WIGOS-PO | **RB from relevant departments** | Low |

## 5. RESOURCES

Congress agreed that the timely completion of the WIGOS implementation in the sixteenth financial period directly depended on the available resources. Congress assigned a high priority to the proposed budget allocations for WIGOS activities. Congress also urged Members to continue to provide resources to help support the implementation of WIGOS. Congress recognized that the key role to be played by the technical commissions in WIGOS implementation would require additional resources, and therefore further ***urged Members to also provide the resources to enable this role to be fully realized, as a part of their voluntary contributions***.

Congress agreed that the full staffing requirement would need to be met primarily through the secondment of experts from NMHSs. In this connection, Congress ***urged Members to provide secondment services to the Secretariat during the WIGOS Implementation to ensure its successful completion***.

The investment for fully implementing WIGOS should be given a high priority in Members' development and implementation plans. In addition, extra resources will need to be provided to the WMO Secretariat for both staff (see table 5 below) and non-staff costs for the implementation and coordination that are beyond the normal programmatic activities of the Secretariat. To ensure the funding needed for WIGOS implementation, provision of the following resources should be considered:

(a) WMO Regular Budget for WIGOS implementation support activities;
(b) WIGOS Trust Funds to supplement WMO Regular Budget;
(c) In kind contributions;
(d) Staff secondments;
(e) Voluntary Cooperation Programme funds for WIGOS related technical cooperation and capacity-development activities;
(f) Regional fundraising activities to support WIGOS; and
(g) Operational hosts for information systems.

The strong need to assist the two regular staff must be met primarily through the secondment of experts, including Junior Professional Officer (JPO) from Members, for completion of the key Project Office tasks, as follows:

- To assist the regular staff for the management and coordination of WIGOS project (JPO, Extra budgetary 200 KCHF is needed);
- To design, develop and maintain the WIGOS Operational Information Resource (JPO, Extra budgetary 200 KCHF is needed);
- To assist the development of WIGOS technical documentation (secondments);
- To assist the WIGOS global and regional activities (secondment), and coordinate the management of the content of the WIGOS Operational Information Resource.

***Table 5: WIGOS Project Office Regular staff resources needed for a period 2012-2015***

| No | Position | Activities/Duties | Staff cost for 2012-2015 (CHF) |
|---|---|---|---|
| 1 | WIGOS Project Manager | To lead the WIGOS Implementation Project Office to ensure the management of, and support to, the WIGOS implementation process and activities, including support to the ICG-WIGOS sessions and it's Task Team meetings, CBS and other Technical Commission WIGOS relevant working structure meetings and activities.<br>Coordinate with Members, the technical commissions and the regional associations to identify needs for nominated experts, including National Focal Points, and to work with Members to fill those needs<br>Oversee and coordinate the development of appropriate regulatory documentations;<br>Undertake the necessary liaison within the Secretariat and stakeholders to ensure effective coordination and collaboration with partner organizations and programmes in WIGOS activities. | 900,000<br>Needed from Extra budgetary support |
| 2 | WIGOS | To review existing Technical Documentation and Regulations for observing systems | RB |

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| | Scientific Officer | and to support the production of WIGOS technical material, such as WIGOS Manual, Guide and WIGOS Metadata and related guidelines;<br>To provide technical support to the WIGOS global and regional working bodies meetings;<br>To oversee and guide the development of WIGOS Operational Information Resource (WOpIR);<br>To collaborate with Development and Regional Activities (DRA) department to provide technical assist to Regional Associations (including the Members in the regions, especially in least developed countries) for their WIGOS implementation activities.<br>To work together with WMO Education and Training programme to support WIGOS education, training and outreach activities. | |
| | | **TOTAL:** | **900 KCHF** |

## 6. RISK ASSESMENT/ MANAGEMENT

The Risk Management Plan (RMP) will be developed for each implementation activity/projects, including risk mitigation. The following risk areas were identified:

(a) Complexity of WIGOS;
(b) Availability of basic infrastructure;
(c) The firm commitment of all stakeholders to implement initial activities/projects within the agreed time frame, including a provision of required resources, both human and financial;
(d) The requirement for appropriate leadership for the implementation of activities/projects;
(e) Partial interests of stakeholders not converging into the stated objectives;
(f) Coordination of interdependent projects;
(g) Provision of an effective interface between users of services and entities operating observing systems;
(h) Authority and responsibilities of entities and individuals for the implementation of projects;
(i) Lack of transparency in the management of the implementation;
(j) The potential for inadequate implementation if human resources are not available.

## 7. OUTLOOK

This document has described the Key activities for the period 2012 to 2015. As determined by Cg-XVI, the goal is to have WIGOS operational by 2016. This is a challenging task. The reality and the experience gained during the WIGOS test of the concept phase clearly shows that it will be not possible to complete integration of all observing systems on global, regional and national levels in only 4 years. While WIGOS operations should start in 2016, there still will be a strong need to continue quite a number of implementation activities. It is essential that additional resources will be needed to ensure the secretariat support for the continuation of the implementation process. However, it is too early to make a precise statement on how many resources in terms of staff and funding should be made available. The decision on these matters should be taken by the time of Cg-XVII.

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**Annex I**

## SUGGESTED WIGOS COMMUNICATION AND OUTREACH MATERIALS

| | ***Targeted audience*** | ***Type and size of document*** | ***Activity*** | ***Time-frame*** | ***Status*** |
|---|---|---|---|---|---|
| Web portal | WMO Members<br>RAs, TCs<br>Space Agencies<br>Partner Organizations<br>General Public | Web pages with links to other materials | WIGOS-PO to oversee development of the portal | 2012-2013 | To be done |
| WIGOS Imperative | WMO Members | 10-page document (pdf) | WIGOS-PO to update doc. | 2012 | Done |
| WIGOS brochure | General Public | 2-page brochure (pdf) | WIGOS-PO to produce draft brochure, circulate to ICG-WIGOS and relevant experts, updated and seek approval from ICG-WIGOS Chair | 2012 | Materials exist |
| WIGOS standard Presentation (to be used at various events and adjusted as needed) | WMO Members | 20-page presentation (ppt) | WIGOS-PO to produce draft standard presentation, circulate to ICG-WIGOS and relevant experts, updated and seek approval from ICG-WIGOS Chair | 2012 | Materials exist |
| WIGOS standard Poster (to be used at various events and adjusted as needed) | *Ad hoc* Conferences | Poster (A2, pdf) | WIGOS-PO to produce draft poster, circulate to ICG-WIGOS and relevant experts, updated and seek approval from ICG-WIGOS Chair | 2012 | Materials exist |
| WIGOS rationale | WMO Members<br>Space Agencies<br>Partner Organizations | 1-page document (pdf) | WIGOS-PO to consolidate information on WIGOS rationale from various existing materials | 2012 | Materials exist |
| WIGOS benefits in terms of, observing systems implementation effectiveness, and efficiency | WMO Members<br>Space Agencies<br>Partner Organizations | 2-page document (pdf) | WIGOS-PO to draft first version, circulate to ICG-WIGOS and relevant experts, updated, and seek approval from ICG-WIGOS Chair | | To be done as new document |
| Socio economical benefits of WIGOS data | Governments<br>WMO Members<br>Funding Agencies<br>Space Agencies<br>Partner | 2-page document (pdf) | WIGOS-PO to draft first version, with other Departments (WDS, RES), update document, circulate to ICG-WIGOS and relevant experts, updated and seek | 2012 | To be done as new document |

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|---|---|---|---|---|---|
| | Organizations General Public | | approval from ICG-WIGOS Chair | | |
| Impact on WMO Members of WIGOS implementation | WMO Members | 5 to 10 page document (pdf) | WIGOS-PO to draft first version, consult Members via survey, update document, circulate to ICG-WIGOS and relevant experts, update and seek approval from ICG-WIGOS Chair | 2012-2013 | To be done as new document |

**Annex II**

## REFERENCED DOCUMENTS

***Reports of WMO Constituent bodies***


1. Fifteenth World Meteorological Congress, Abridged final report with resolutions (WMO-No. 1026)
2. Sixteenth World Meteorological Congress, Abridged final report with resolutions (WMO-No. 1077)
3. EC-LVIII, Abridged final report with resolutions (WMO-No. 1007)
4. EC-LIX, Abridged final report with resolutions (WMO-No. 1027)
5. EC-LX, Abridged final report with resolutions (WMO-No. 1032)
6. EC-LXI, Abridged final report with resolutions (WMO-No. 1042)
7. EC-LXII, Abridged final report with resolutions (WMO-No. 1059)
8. EC-LXIII, Abridged final report with resolutions (WMO-No. 1078)
9. CBS-XIV, Abridged final report with resolutions and recommendations (WMO-No. 1040)
10. CBS-Ext.(2010), Abridged final report with resolutions and recommendations (WMO-No. 1070)
11. Final report of the 1st session of the EC WG on WIGOS-WIS (December, 2007)
12. Final report of the 2nd session of the EC WG on WIGOS-WIS (May, 2009)
13. Final report of the 3rd session of the EC WG on WIGOS-WIS (March, 2010)
14. Final report of the 4th session of the EC WG on WIGOS-WIS (February, 2011)
15. Final report of the 1st session of the Subgroup on WIGOS of the EC WG on WIGOS-WIS (November, 2008)
16. Final report of the 2nd session of the Subgroup on WIGOS of the EC WG on WIGOS-WIS (October, 2009)
17. Final report of the 3rd session of the Subgroup on WIGOS of the EC WG on WIGOS-WIS (October, 2010)
18. Final report of the 1st session of ICG-WIGOS (September, 2011)


***Other relevant documentation***


19. Vision for the GOS in 2025 (CBS-XIV, 2009)
20. WIS Project and Implementation Plan (v. 1.2, February, 2010)
21. Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC (GCOS-138, WMO/TD-No. 1523)
22. WMO Global Atmosphere Watch (GAW) Strategic Plan: 2008-2015 (WMO/TD No. 1384)
23. Implementation Plan for Evolution of Space-and Surface-based Subsystems of the Global Observing system (WMO/TD-No. 1267)
24. WCRP Implementation Plan 2010-2015 (WMO/TD-No. 1503
25. The first U.S. Integrated Ocean Observing System (IOOS) Development Plan, Washington, DC, January 2006
26. Global Earth Observation System of Systems GEOSS 10-Year Implementation Plan (GEO 1000, February 2005)
27. EUCOS programme management documentation
28. THORPEX International Research Implementation Plan (WMO/TD-No.1258)

29. JCOMM Observing System Implementation Goals for Building a Sustained Global Ocean Observing System in Support of the Global Earth Observation System of Systems (2009)

30. Overarching Implementation Plan for the Ocean Data Portal and WIGOS Pilot Projects for IODE and JCOMM (6 November 2008)

**Annex III**

## LIST OF ACRONYMS

| | |
|---|---|
| CEOS | The Committee on Earth Observation Satellites |
| CGMS | The Coordination Group for Meteorological Satellites |
| CONOPS | Concept of Operations |
| DAR | Discovery, Access and Retrieval |
| DB | Database |
| DCPC | WIS Data Collection or Production Centre |
| ET | Expert Team (of WMO Technical Commission) |
| FAO | Food and Agriculture Organization |
| GAW | Global Atmosphere Watch |
| GCOS | Global Climate Observing System |
| GEO | Group on Earth Observations |
| GEOSS | Global Earth Observation System of Systems |
| GISC | WIS Global Information System Centre |
| GFCS | Global Framework for Climate Services |
| GOOS | Global Ocean Observing System |
| GTOS | Global Terrestrial Observing System |
| ICG-WIGOS | Inter-Commission Coordination Group on WIGOS |
| ICPC | Interagency Coordination and Planning Committee for Earth Observations |
| ICSU | International Council for Science |
| IOC | Intergovernmental Oceanographic Commission |
| ISO | International Standards Organization |
| LDCs | Least Developed Countries |
| MOU | Memorandum of Understanding |
| NMHS | National Meteorological and Hydrological Service |
| NOS | National Observing System |
| OSEs | Observing Systems Experiments |
| OSSEs | Observing System Simulation Experiments |
| QA | Quality Assurance |
| QC | Quality Control |
| QMF | Quality Management Framework |
| QMS | Quality Management System |
| RA | Regional Association |
| RCC | Regional Climate Centre |
| RIC | Regional Instrument Centre |
| RMIC | Regional Marine Instrument Centre |
| RRR | Rolling Review of Requirements |

| | |
|---|---|
| SIDS | Small Island Developing States |
| SLA | Service Level Agreement |
| TC | Technical Commission |
| TOR | Terms of Reference |
| UNEP | United Nations Environment Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| WCRP | The World Climate Research Programme |
| WIGOS | WMO Integrated Global Observing System |
| WIP | WIGOS Implementation Plan |
| WIS | WMO Information System |
| WOpIR | WIGOS Operational Information Resource |
| WHYCOS | World Hydrological Cycle Observation System |

**APPENDIX IV**

***Draft text for the General Summary (EC-LXIV-Doc. 4.4(1), WIGOS section)***

**APPENDIX A:**
**DRAFT TEXT SUPPORTING THE DECISIONS OF THE COUNCIL –**
**FOR INCLUSION IN THE GENERAL SUMMARY OF EC-64**

**4. IMPLEMENTATION OF THE STRATEGIC PLAN, WITH FOCUSSED PRIORITY AREAS (AGENDA ITEM 4)**

**4.4 Enhanced capabilities of Members to access, develop, implement and use integrated and interoperable Earth- and space-based observation systems for weather, climate and hydrological observations, as well as related environmental and space weather observations, based on world standards set by WMO (agenda item 4.4)**

***Implementation of the WMO Integrated Global Observing System (WIGOS)***

4.4.1 The Council noted that in the light of Resolution 50 (Cg-XVI) – Implementation of the WMO Integrated Global Observing system (WIGOS), the Inter-Commission Coordination Group on WIGOS (ICG-WIGOS) had started activities to coordinate the implementation of WIGOS. The Council noted with appreciation that the WIGOS Implementation Plan (WIP) developed by ICG-WIGOS and its Task Team addresses the key implementation activities which can be accomplished in the financial period.

4.4.2 The Council considered and approved the WIGOS Implementation Plan as given in the Annex to this paragraph, and requested the ICG-WIGOS and technical commissions to start key implementation activities outlined in the WIP. The Council also requested regional associations to develop their regional WIGOS implementation plans as a matter of urgency.

4.4.3 The Council noted with appreciation the initial establishment of the WIGOS Project Office, and was especially pleased that a Project Oversight Board on WIGOS (POB/WIGOS) was established within the Secretariat to coordinate WIGOS activities across all relevant Departments and Programmes.

4.4.4 The Council recognized that the WIGOS project office is under-staffed, and some of the key activities have not been fully resourced, and that these activities are critical to the success of WIGOS Implementation as presented in the Plan. Therefore, the Council urged Members to continue to provide resources, through the WIGOS Trust Fund and/or seconded experts, or provide Junior Professional Officers, to help support the implementation of WIGOS. The Council also requested the Secretary-General to consider allocating resources to the WIGOS Project office according to the recommendation of the EC Working Group on WIGOS and WIS (Geneva, 10-11 February 2011).

**… … …**

**APPENDIX C: PROGRESS REPORT FOR INFORMATION –**
**NOT TO BE INCLUDED IN THE GENERAL SUMMARY**

**WMO INTERGRATED GLOBAL OBSERVING SYSTEM (WIGOS)**

References:

1 The fifteenth session of the Commission for Instruments and Methods of Observation (CIMO-XV), Helsinki, Finland, 2-8 September 2010;

2 The Extraordinary Session of the Commission for Basic Systems (CBS-Ext.(10), Windhoek, Namibia,17-24 November 2010;

| | |
|---|---|
| 3 | Resolution 50 (Cg-XVI) – Implementation of the WMO Integrated Global Observing system (WIGOS); |
| 4 | The first session of the Inter-Commission Coordination Group on WIGOS (ICG WIGOS), Geneva, 26-30 September 2012; |
| 5 | The first session of the ICG WIGOS Task Team on WIGOS Implementation Plan, Geneva, 27-30 March 2012; |

***Implementation of the WMO Integrated Global Observing System***

1. The first session of the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (ICG-WIGOS-1) was held at the WMO Secretariat in Geneva, Switzerland, from 26 to 30 September 2011. The session was chaired by Mr Fred R. Branski (USA), Chair of ICG-WIGOS and the president of CBS.

2. Based on the decisions by Cg-XVI and EC-LXIII, ICG-WIGOS addressed all key components of WIGOS implementation:

(a) WIGOS Concept of Operations - Functional Architecture;

(b) Manual on WIGOS;

(c) WIGOS Communications and Outreach Strategy;

(d) WIGOS Capacity Building Strategy;

(e) WIGOS Implementation Plan (WIP);

(f) Guidance on WIGOS activities to be implemented by Members

3. ICG-WIGOS formulated recommendations and guidance on the key WIGOS implementation components (see reference 4). Subsequently a draft WIP was finalized by the ICG-WIGOS Task Team on WIP (Geneva, 27-30 March 2012) that is presented to EC-64 as Annex to paragraph 4.4.2 of the EC-64/Doc. 4.4(1). The WIP addresses WIGOS Key Activity Areas: a) Management of WIGOS Implementation, b) Collaboration, c) Design, planning and optimized evolution of WIGOS and its regional, sub-regional and national observing components, d) Integrated Observing System Operation and Maintenance, e) Integrated Quality management, f) Standardization, System Interoperability and Data Compatibility, g) The WIGOS operational information resource, h) Data and Metadata Management, Delivery and Archival, i) Capacity Development, j) Communications and Outreach.

... ... ...

**APPENDIX V**

**TT-WIP Work Plan 2012-2013**

| ToR | Action | Responsible | Deadline | Deliverable | Status |
|---|---|---|---|---|---|
| 1. Develop the WIGOS Implementation Plan (WIP) | (a) Review the initial draft WIP prepared by the Secretariat, taking into account recommendations by ICG-WIGOS-1<br>(b) Convene the first TT-WIP meeting with representatives of all TCs concerned | ICG Chair, Secretariat | I Q 012 | Draft WIP to be further considered by ICG-WIGOS members | Done, draft WIP (version 0.8) developed |
| 2. Develop high –level guidance document for the WIGOS-Functional Architecture (WIGOS-FA); | (a) Review the initial draft WIGOS-FA prepared by the Secretariat, taking into account recommendations by ICG-WIGOS-1<br>(b) Convene the second TT-WIP meeting to develop a new version of WIGOS-FA<br>(c) Circulate the new draft of WIGOS-FA among ICG-WIGOS members and Departments concerned for comments<br>(d) Incorporate comments received into the final draft of WIGOS-FA to be approved by ICG-WIGOS for distribution among Members, RAs and TCs | ICG Chair, Secretariat | III Q 012<br>IV Q 012<br>IV Q 012<br>I Q 013 | WIGOS-FA to be used by Members, RAs and TCs in their WIGOS implementation activities | |
| 3.Review the Implementation Plan for the Evolution of the Global Observing System (EGOS-IP), the Implementation Plan for the Global Observing System for Climate (GCOS-IP), the GFCS Implementation Plan with a major focus | (a) Nominate responsible experts and initiate a review of relevant Implementation Plans (IPs)<br>(b) Circulate results of review by responsible experts among TT-WIP | ICG Chair, Secretariat | | Coordination mechanism on implementation of WIP and relevant IPs | |

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| on the Observations and Monitoring component, the Global Cryosphere Watch Implementation Plan (GCW-IP) and other relevant implementation plans, strategic plans and implementation activities of WIGOS core observing system components to ensure consistency of the plans and coordination of implementation activities as appropriate | members for comments and proposals<br>(c) Arrange for the revision of WIP, if required<br>(d) Convene TT-WIP meeting to develop a mechanism to coordinate implementation of WIP and relevant IPs to be approved by ICG-WIGOS | | I Q 013 | | |
| 4. Submit WIP through ICG-WIGOS to EC-LXV for approval and further guidance | (a) Circulate the draft WIP (version 0.8) among ICG-WIGOS members and Departments concerned for comments.<br>(e) Incorporate comments received into the final draft WIP to be included in the EC working document. | ICG Chair, D/OBS | May 012 | Final draft WIP included in the EC-64 working document for consideration and approval | |
| 5. Complete initial tasks by July 2013. | | | | | |