

**WORLD METEOROLOGICAL ORGANIZATION**

**COMMISSION FOR BASIC SYSTEMS**

***OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS***

**INTER PROGRAMME EXPERT TEAM ON WIGOS FRAMEWORK  
IMPLEMENTATION (IPET-WIFI)  
*(Second Session)***

**Geneva, Switzerland**

**17-21 March 2014**

**FINAL REPORT**

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Chairperson, Publications Board  
World Meteorological Organization (WMO)  
7 bis, avenue de la Paix  
P.O. Box No. 2300  
CH-1211 Geneva 2, Switzerland

Tel.: +41 (0)22 730 84 03  
Fax: +41 (0)22 730 80 40  
E-mail: [Publications@wmo.int](mailto:Publications@wmo.int)

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## EXECUTIVE SUMMARY

The second session of the CBS Inter Programme Expert Team on WIGOS Framework Implementation (IPET-WIFI) was conducted from WMO headquarters in Geneva, Switzerland between 17 and 21 March 2014, primarily by teleconference. The session was chaired by Dr Jochen Dibbern (Germany), the Chair of IPET-WIFI.

The main purpose of the session was to gauge progress against the IPET's work plan tasks, to discuss and resolve any difficulties encountered with the work, and to review and revise the detailed work plan for the coming twelve month period as necessary, to ensure that the team concludes as much of its work as possible in the lead-up to the Seventeenth Session of the World Meteorological Congress (Cg-17) and to provide required input in a timely manner for the upcoming CBS Extension Session (Paraguay, September 2014).

The session was first briefed on recent progress in related work being carried out by the ICG-WIGOS Task Teams (Regulatory Material, Metadata, Quality Management), by IPET-OSDE (Observing System Design Principles), and on the development of the OSCAR component of the WIGOS Information Resource.

The Sub-Group on Regulatory Material reported good progress since IPET-WIFI-1. Significant input had been provided to TT-WRM for the draft WIGOS text for the Technical Regulations and for the WIGOS Manual, and a transition plan for the Manual on the GOS had been developed. SG-RM benefited from the opportunity of a breakout session during the meeting to develop a detailed timeline for its upcoming work that was synchronized with the development of the WIGOS Regulatory Material. It also commenced its task of revising the Manual on the GOS to make it dovetail with the Manual on WIGOS. SG-RM scheduled a number of future teleconferences to optimize its chances of completing the ambitious target of revising the Manual on the GOS in time for consideration by CBS-Ext (2014) and submission to Cg-17 for approval, in parallel with the WIGOS Regulatory Material.

The session was informed of progress achieved by the Sub-Group on Metadata (SG-MD), which had focused its efforts in 2013-14 on providing input and assistance to TT-WMD in development of the draft WIGOS Core Metadata Semantic standard. The session was advised of several current issues associated with the work of the sub-group, most importantly the need for clear documentation and communication to enable a common understanding of generic metadata terminology of relevance across the broad domain of WIGOS, the need to clear definition of the boundary between WIGOS interpretation metadata and WIS discovery metadata and the need to agree on who will take responsibility for the technical implementation of a mechanism for the submission and maintenance of WIGOS metadata. SG-MD recommended that this leadership of this task be assigned to ISS.

The session was informed that the work of the Sub-Group on WIGOS Quality Management (SG-QM) is less advanced but underway and on-track and that there will be a need to work with the newly-formed ICG-WIGOS Task Team on WIGOS Quality Management to coordinate efforts to ensure complementary development and avoid duplication of effort. The session was informed of a draft proposal from ET-SBO for an initiative on the development of a WIGOS Monitoring and Fault Management System.

The session was informed of progress against the remaining tasks assigned to IPET-WIFI. Regarding internal and external collaboration, some modification of approach will be required: the session agreed that there would be benefit in focusing on national and regional linkages, pending further guidance from ICG-WIGOS. The example of ASECNA in Africa in advancing cooperation on observing system operations and maintenance was described, and the session agreed that WIGOS could serve as a catalyst to efforts to explore further opportunities in this regard, perhaps as part of a WIGOS regional workshop. The session was informed that the initial actions on standardization of observations had essentially been completed, and the session agreed that

henceforth the best contribution IPET-WIFI could make would be via input to ICG-WIGOS TT-WRM. Similarly, the initial actions on capacity development had been completed and IPET-WIFI now required additional guidance from ICG-WIGOS on how it could contribute further in this area.

Having been updated on progress against its various WIOGS-related tasks, the session reviewed and revised its work plan and drafted its contribution to ICT-IOS-8.

## **AGENDA**

### **1. ORGANIZATION OF THE SESSION**

- 1.1 Opening of the meeting
- 1.2 Adoption of the agenda
- 1.3 Working arrangements

### **2. REPORT OF THE CHAIRPERSON**

### **3. WIGOS FRAMEWORK IMPLEMENTATION**

- 3.1 Status of WIGOS Framework Implementation
- 3.2 Relevant Recommendations of ICG-WIGOS-3
- 3.3 Status of ICG Task Teams relevant to IPET-WIFI

### **4. STATUS REPORT: IPET-OSDE**

- 4.1 Outcome of the Workshop on Observing System Design
- 4.2 WIGOS Information Resource

### **5. UPDATE ON PROGRESS AGAINST ASSIGNED TASKS AND FUTURE CONSIDERATIONS**

- 5.1 Regulatory Material
- 5.2 Metadata
- 5.3 Quality Management
- 5.4 Internal and External Collaboration
- 5.5 Observing System Operation and Maintenance
- 5.6 Standardization of Observations
- 5.7 Capacity Development & Outreach
- 5.8 RRR and WIR

### **6. REVIEW OF THE TERMS OF REFERENCE OF IPET-WIFI AND UPDATE OF THE WORK PLAN**

### **7. CONTRIBUTION TO ICT-IOS-8**

### **8. ANY OTHER BUSINESS**

### **9. CLOSURE OF THE SESSION**

## GENERAL SUMMARY

### 1. ORGANIZATION OF THE SESSION

#### ***Opening of the session***

1.1 The Second Session of the CBS OPAG IOS Inter Programme Expert Team on WIGOS Framework Implementation (IPET-WIFI) was conducted from Geneva, Switzerland from 17 to 21 March 2014. The meeting was opened by Mr Jochen Dibbern, Chair of IPET-WIFI. Mr Dibbern welcomed all participants (listed at Annex I); both those attending in Geneva (the Chair and Co-Chair of IPET-WIFI and the Chair of the Sub-Group on Metadata) and those participating remotely by electronic conferencing (17 members). Mr Dibbern then invited Dr Miroslav Ondras to address the session.

1.2 Dr Ondras welcomed the participants to WMO on behalf of the Director, Observing and Information Systems Department, noting that the work of IPET-WIFI is very important because it is largely responsible for providing the detailed GOS perspective for the various WIGOS Key Activity Areas. Dr Ondras pointed to the importance of IPET-WIFI being able to conclude as much of its work as possible in the lead-up to the Seventeenth Session of the World Meteorological Congress (Cg-XVII) which will take place in May 2015, just a little more than twelve months away. Dr. Ondras also noted the importance of IPET-WIFI providing its input in a timely manner for the upcoming CBS Extension Session to be held in Paraguay in September 2014.

1.3 Dr Ondras advised the session that the latest update to the WIGOS Implementation Plan (Version 2.9) had recently been agreed by ICG-WIGOS-3 for submission to EC-66. In the meantime it can be accessed via the WMO website as part of the ICG-WIGOS-3 meeting report. He noted that the latest version included significant changes made to the text of Sections 2.1, 2.6 and 2.8 of the WIP, following the recommendation of the first session of IPET-WIFI in June 2013. Dr Ondras advised the session of the formation of the ICG-WIGOS Task Team on WIGOS Quality Management, and commended the initial work of the CBS ET-SBO in developing a draft proposal for a quality monitoring activity aimed at establishing a global fault recognition and reporting system for the GOS.

1.4 Dr Ondras noted that the session had much to accomplish during the week ahead and wished it well for its work.

#### ***Adoption of the agenda***

1.5 The Session adopted the Agenda for the meeting.

#### ***Working arrangements***

1.6 The tentative working hours for the meeting were agreed upon. These working arrangements took into account the large number of Webex participants and the broad range of time zones to cater for. Morning sessions were dedicated to those agenda items involving participants primarily from RA I, II, V and VI, the afternoon sessions were dedicated to agenda items involving participants primarily from RA I, III, IV and VI, and the period around the late morning and early afternoon was used for dealing with those agenda items of a similar level of involvement of all and for recaps on items that had been considered early or late in the day.

1.7 The Team established the following breakout groups for the duration of the Session:

- QM: work plan update, chair Kevin Schrab

- RM: 2015 edition of the Manual of the GOS, chair Russell Stringer
- ICT-IOS input document, chair Jochen Dibbern

1.8 The Team acknowledged apologies from team members Branislav Chvila (Slovakia) and Federica Rossi (Italy) for not being able to attend the meeting.

## **2. REPORT OF THE CHAIRMAN**

2.1 Dr. Dibbern noted that the work of IPET-WIFI comprises taking a lead role in WIGOS Framework Implementation by providing detailed GOS-related input to ICG-WIGOS in special areas of the WIGOS framework implementation plan, those are: (i) WIGOS Regulatory Material, (ii) WIGOS Meta Data, (iii) WIGOS Quality Management, (iv) collaboration with CIMO on development of guidance for WIGOS standards and best practices, and (v) capacity development, education and outreach strategy.

2.2 Since the last meeting of IPET-WIFI in June 2013, the ICG-WIGOS-3 meeting, held from 10-14 February 2014 in Geneva, was highly relevant for the work of the IPET. Dr. Dibbern noted some aspects with special relevance to IPET-WIFI, in particular:

- The close link between ICG-WIGOS TTs and IPET-WIFI Sub Groups guarantees that GOS related aspects are included in the work of ICG-WIGOS.
- TT-WQM of ICG-WIGOS has been installed with a work plan focusing on short term deliverables, especially with priority to review the WIGOS Manual and /or WIGOS Guide. A first meeting of the TT-WQM will be end of April with the chair of SG-QM being invited to this meeting.
- The rewording of text of special sections of the WIP proposed by IPET-WIFI-1 was submitted to the Chair of ICG-WIGOS for consideration and was adopted at the ICG-WIGOS-3 meeting with only minor changes.

2.3 Dr. Dibbern noted that the Chair ET-SBO took the initiative to draft a proposal on the way forward to develop a WIGOS Observations Quality Improvement System. The aim of the proposal is to revise the current provisions and requirements for both quantity and quality monitoring within the WWW and to analyze the gaps and areas where improvement can be made. The scope of the review should be limited to the land surface-based observing systems of the GOS and that therefore SG-QM should take the lead in this development. Through the assistance of ET-SBO the group will gain more expertise. This proposal should be further elaborated at the first meeting of the ICG-WIGOS TT-WQM, to be held in April 2014.

2.4 Dr. Dibbern went on to say that the goals for the present session are to review and advise on work of the IPET-WIFI Sub Groups. He mentioned specially the contribution to finalization of WIGOS and GOS Manual, the discussion on GOS related Metadata and the cooperation between SG-QM and the TT-WQM.

## **3 WIGOS FRAMEWORK IMPLEMENTATION**

### **3.1 Status of WIGOS Framework Implementation**

3.1.1 The session was briefed on the status of WIGOS Framework implementation. The Third Session of ICG-WIGOS (ICG-WIGOS-3) was held in Geneva from 10 to 14 February 2014. During that session, the status of each of the most critical WIGOS Implementation Activities was considered, based on the evaluation of progress provided by WIGOS-PO.

3.1.2 ICG-WIGOS-3 agreed that the development of the Guide to WIGOS and WIGOS Functional Architecture, as well as WIP activities 4.1.1 and 6.1.1 cannot meet the original implementation deadlines of 2015; new target dates for their completion were suggested.

3.1.3 Regarding the RRR process, it was noted that it had been GOS/CBS centred in the past; when broadening the scope to encompass all of WIGOS, it must be updated accordingly to take into account the characters and requirements of each the other component observing systems. ICG-WIGOS recognized that the RRR documentation produced by the IPET-OSDE Chair had been used as a basis for the RRR related regulatory materials under development by the TT-WRM for consistency with the current RRR process and terminology. ICG-WIGOS agreed that the Observing System Network Design (OSND) principles drafted by IPET-OSDE, when approved by the CBS-Ext(14), should be included in the Manual on WIGOS. TT-WRM was requested to take this into account. Regarding the draft OSND principles themselves, ICG-WIGOS noted that long term/medium term funding shall be assured for sustained observing systems.

3.1.4 With regard to WIGOS Quality Management, ICG-WIGOS noted that some confusion still prevailed on the scope and purpose of WIGOS QM. ICG-WIGOS agreed that a realistic TT-WQM work plan should be developed urgently with a clear indication of what can be achieved by Cg-17 and by Cg-18, respectively. It was proposed that the CIMO Guide (Part III, Chapter on QM) could be used as a starting point for the development of corresponding guidance material needed for the regional and national WIGOS implementation.

3.1.5 When considering the WIGOS Information Resource (WIR), the importance of [OSCAR](#) was stressed, and it was noted that its launch will mark the first time that all the information regarding requirements and observing systems are available in the same place (surface capabilities are missing for the time being). ICG-WIGOS agreed that the OSCAR should be the repository of a sub-set of the WIGOS metadata; in particular those on observing system capabilities that are required for the RRR process, and those which are required for operational use such as the planned evolution of WMO No. 9, Volume A. Most of the remaining metadata will have to be collected, maintained, and archived by Members. ICG-WIGOS requested TT-WMD to clarify what metadata shall be included in OSCAR, and which shall be mandatory.

3.1.6 Regarding Capacity Development, ICG-WIGOS agreed that one or more specific and concrete CD projects should be specified as soon as possible (dedicated specifically within RA I in the first instance) in order to provide a model path that will show members how to undertake WIGOS implementation in a practical/tangible way.

3.1.7 With respect to Outreach, a need to create an open dialog with PRs and senior management of NMHSs on WIGOS implementation progress and related issues was recognized. A WIGOS standard presentation could all be used as a tool. ICG-WIGOS welcomed the initiative of CIMO to renew the International Conference on Experiences with AWS (ICEAWS) covering all aspects of the life cycle of AWS, and suggested that these could be 'WIGOS Conferences'. There was a consideration that organization of such a conference would be more effective and appropriate at a regional rather than at a global level. It was agreed that attention could be raised concerning such WIGOS Conferences at EC-66, to encourage resourcing and/or hosting offers.

## **3.2 Relevant Recommendations of ICG-WIGOS-3**

3.2.1 IPET-WIFI-2 was briefed by Dr Lars Riishojgard, WIGOS Project Manager, on the ICG-WIGOS-3 follow-up actions of relevance to IPET-WIFI. The full list of actions is contained in Appendix 3 of the Final Report of ICG-WIGOS-3

3.2.2 Action 1 of ICG-WIGOS-3 requested members of that group to further review the draft WIGOS Regulatory Material (WRM), as submitted by TT-WRM, in a short period after the session. Furthermore, ICG-WIGOS-3 endorsed a timeline and review process for the WRM in which Presidents of Technical Commissions will have the material to review over 3 months (April to June 2014). With respect to the CBS input to this process, SG-RM is seen as the group primarily responsible for carrying out the review of the WRM from the GOS perspective. This should be carried out on the version expected to become available by early April, with the review completed by the end of June 2014. SG-RM may also have a role to play in Action 3: the ad hoc workshop to refine Section 4 (Space-based Observations) of the WRM. Action 5 concerns the consideration of

appropriate provision(s) for the contribution of non-NMHS observations within the WIGOS-relevant Technical Regulations. This may also be of relevance for the work of SG-RM.

3.2.3 Actions 7, 8, 11, 12 and 14 concern further development of the WIGOS metadata specification. SG-MD will be responsible for providing a detailed GOS-related review of the draft specification by the end of June 2014 and for ensuring that the WMO Space Programme is represented in that review.

3.2.4 Action 15 concerns development of a draft proposal on WIGOS Station Identifiers. While primary CBS responsibility for this is seen to lie with OPAG ISS, participation by IPET-WIFI expertise may be worthwhile. The draft proposal will also be reviewed by ICT-IO-8.

3.2.5 Action 18 concerns the organization of a WIGOS Quality Management Workshop which will benefit from representation by SG-QM members. It was noted that this activity is independent of the planned CIMO/WIGOS Standardization Workshop, to be held late in 2014.

3.2.6 Action 29 concerns the proposed revival by CIMO of periodic regional AWS Conferences/Workshops, with a focus on Capacity Development. Dr Dibbern advised that RA VI would prefer to broaden the topic of these events to integrated obs systems and suggested that the IPET might wish to recommend to ICT-IO-8 that the concept needs further discussion regarding a broadened scope in future.

3.2.7 Mr Stringer noted that, in regard to Action 24, the Observing System Network Design (OSND) Principles developed by IPET-OSDE are to be included in the WIGOS Manual. Hence they will be included in the relevant approval path through ICG-WIGOS to EC and Congress, rather than the approval path of the Manual on GOS (through ICT-IO-8 to CBS to Congress). Dr Dibbern suggested that the key question is whether this can be done in time and noted that it would be up to ICT-IO-8 to consider the draft material and pass it on to ICG-WIGOS if deemed ready.

### **3.3 Status of ICG Task Teams relevant to IPET-WIFI**

#### ***Task Team on WIGOS Regulatory Material (TT-WRM)***

3.3.1 The Chair of TT-WRM (Russell Stringer) informed ICG-WIGOS-3 about the key achievements of this team since ICG-WIGOS-2 and put forth several recommendations for consideration.

3.3.2 Extensive drafting efforts had successfully resulted in a key milestone being achieved, that is preparation of a consolidated version of the WMO Technical Regulations (WMO-No. 49), Volume I, PART I – WIGOS, as well as the first edition of the Manual on WIGOS. It was noted that further refinement is needed (in particular the sections for Definitions, Observational Metadata, and the Space-Based Sub-system). It was also noted that significant progress had been made in capturing advances of WIGOS in the Technical Regulations, while further advances that are still under development will be captured in future updates and editions. Some highlights of the current drafts include:

- The productive, energetic and very positive engagement between experts from all Technical Commissions and the Secretariat across all the WIGOS component observing systems and relevant WMO Programmes;
- Progress in documenting standards and recommendations for collection and sharing of observational metadata;
- Progress in the application of the WMO Quality Management Framework to the observations domain;
- Refinement of the description of the Rolling Review of Requirements process;
- Progress in elevating to regulations, for the first time, some of the procedures and practices for instruments and methods of observation;

while some topics will gain greater coverage in the future, including:

- Network design principles, guidelines and new architectures (such as the RBON),
- Further refinement of standards and recommendations for observational metadata,
- Further clarity and details regarding the application of the WMO QMF to WIGOS regulations.

3.3.3 ICG-WIGOS considered a number of recommendations from TT-WRM. The Recommendations and the related ICG-WIGOS-3 decisions are detailed in the Final Report of the session.

3.3.4 ICG-WIGOS noted that development of the WMO Technical Regulations (Vol. I, Part I – WIGOS), as recommended by EC-64, is proceeding ahead of the Parts II. – VI. Assistant Secretary General, who was consulted in the margins of the session, encouraged the progress with Vol. I. Part I, and agreed that the remaining parts should be accelerated to ensure a comprehensive approach, so that they are consistent with each other. However, ASG felt that, if necessary, Vol. I, Part I could be approved and promulgated effectively in the absence of such a harmonized Vol. I.

3.3.5 A possible “certification process” of the “third-party” (non-NMHS) data/observations was discussed; how to ensure that the quality of such data can be guaranteed and known. ICG-WIGOS suggested to TT-WRM to consider appropriate provisions for the contribution of such non-NMHS data/observations within the WIGOS relevant Technical Regulations, but agreed that the certification process was a national responsibility and the approach would likely vary from Member to Member.

3.3.6 ICG-WIGOS agreed on the importance of ensuring the availability for CBS-Ext. (14) of the draft WMO Technical Regulations (WMO-No. 49), Volume I, PART I – WIGOS, and Manual on WIGOS.

#### ***Task Team on WIGOS Metadata (TT-WMD)***

3.3.7 ICG-WIGOS-3 was briefed by Dr. J. Klausen, representing the Chair, TT-WMD, on the key achievements of the Team since ICG-WIGOS-2. Dr. Klausen also put forth several recommendations for consideration.

3.3.8 Regarding classification of WIGOS metadata (as mandatory, complementary and optional), president of CIMO suggested proceeding with a 2-level/stage process (“a pragmatic approach”) as follows:

- During the first stage, a decision should be made on which WMD are mandatory, i.e. on “the minimum set of required WIGOS core metadata”, minimum both in the sense of being necessary to use an observation, and in the sense of “achievability” by all (or most) Members worldwide, i.e. be available in real time. It has to do with the less demanding specifications and metadata required for observations dedicated to security issues, now-casting and short-term weather forecasting.
- During the second stage, a complete set of WMD relevant for climate applications, expressing uncertainty, etc. shall be available by Members. In order to achieve this, the criteria for distinguishing between these two levels of metadata and applying them to the current proposal should be specified.

3.3.9 Regarding a more comprehensive composition of the TT-WMD, ICG-WIGOS noted the interest of CAgM (by its President via WebEx) in becoming involved in the further development; Dr. Akira Miyata (NIAES, Japan) was proposed to represent CAgM.

3.3.10 ICG-WIGOS further discussed the role of OSCAR in managing, utilizing and archiving WIGOS metadata. It was noted that OSCAR has the role to a certain extent, however, it is not anticipated that OSCAR will be used for archival of all WIGOS metadata.

3.3.11 The break-out group on this topic:

- Considered an overall structure for a complete WMD metadata profile;
- Identified a core subset of elements that are of highest priority for all application areas;

- Considered how to capture the 'mandatory' elements in the WMO Technical Regulations (Vol. I, Part I, and the Manual on WIGOS).
- Considered the way for the development of the profiles for application areas, using a staged approach.

3.3.12 ICG-WIGOS (in Action 8) decided to include the draft specification of WIGOS Core metadata in the WIGOS Technical Regulations, which are to be reviewed by Technical Commissions over three months from April to June 2014.

3.3.13 ICG-WIGOS requested the WIGOS-PO to make all arrangements needed for TT-WMD-2, which will further work on the Draft specification of the WIGOS Core Metadata standard, in late May 2014.

3.3.14 ICG-WIGOS agreed that the current semantic standard should be formalized in a next step. It was underlined that interoperability requires certain fixed vocabularies (e.g., variable names, Station IDs); however, various stakeholders exist, such as WMO, GEO, EU, CEOS, etc. Therefore, a decision is needed on who will drive the process of establishing governance, who will take responsibility for hosting and maintaining such vocabularies.

3.3.15 TT-WMD requested that ICG-WIGOS urgently recommend to EC-66 to decide on the role of WMO with regard to maintenance of vocabularies needed for metadata management (unanimous support for an engagement of WMO is needed).

3.3.16 Under this Agenda Item, a system for the WIGOS Station Identifier was presented. ICG-WIGOS acknowledged that the proposed system has capability to meet the request by EC-65 to instigate procedures for expanding the range of station identifiers for use with Table Driven Code Forms, so that Members could assign these numbers to stations operating in their territories, including stations operated by intergovernmental and international organizations.

3.3.17 In general, ICG-WIGOS agreed with the principles of the proposed structure for WIGOS station identifiers. However, it was noted that there are many technical issues to be further considered and solved. Therefore, ICG-WIGOS requested CBS to deal with this issue and submit the proposal for Cg-17.

### ***Task Team on WIGOS Quality Management (TT-WQM)***

3.3.18 A short presentation was made by J. Zimmermann, Chair, TT-WQM, on the TORs, composition and work plan of the Team.

3.3.19 ICG-WIGOS noted that some confusion remains regarding WIGOS QM, its purpose and scope, and how it should be reflected in WIGOS regulatory material.

3.3.20 ICG-WIGOS agreed that more dedicated work is needed to improve the current quality control and monitoring practices and procedures, including availability of monitoring results in real-time and feed-back to the data providers; the team should build on experiences and lessons learned by EUMETNET, AMDAR and other observing systems, as well as on the relevant sections on QM in the CIMO Guide.

3.3.21 A break-out group on this topic:

- Noted that the scope/specification of WIGOS QM is now quite well defined in the draft Manual on WIGOS developed by TT-WRM. There are two major parts of QM in the Manual:
  - Application of WIGOS QM provision in the QMS of Members; this will possibly require guidance material on how Members can implement WIGOS QM provisions as a component of their QMS.
  - Overarching WMO aspects of WIGOS QM provisions: Focus should be on the international quality monitoring system; Revision of the current approach to observational data monitoring should be undertaken.
- Identified two issues: (1) a TT-WQM member with satellite expertise should be nominated as soon as possible. Action for ICG-WIGOS: to nominate such an expert with assistance of WIGOS-PO. (2) Sustainability of quality management in the future.

- Suggested the following tasks/actions to be undertaken (actions for TT-WQM):
  - Review of the current practices in the observational data monitoring system, and recommendation on the way forward, which must include:
    - modernisation of the monitoring system
    - near-real time reporting
    - quality evaluation leading to quality improvement
    - fault management with feedback mechanisms
    - extension of the observational data monitoring to non-weather areas (i.e. beyond the GOS), where appropriate and possible
    - documentation of how revision of the observational data quality monitoring system will be coordinated by TT-WQM and which teams would be responsible for what aspects;
  - Meeting of TT-WQM by March-April (both the satellite representative and chair of IPET-WIFI/SG-QM should attend) (action for WIGOS-PO)
  - Workshop on Quality Management (Concept of a Workshop on Quality Management has been raised already): (action for WIGOS-PO - arrangements; a) and b) - actions for TT-WQM)
    - Regulatory Material on Quality Management to be reviewed.
    - All WIGOS component observing systems should be represented and tasked with undertaking a critical review of their observing systems using the Manual on WIGOS as a basis.

#### **4. STATUS REPORT: IPET-OSDE**

##### **4.1 Introduction**

4.1.1 Mr Charpentier provided the session with a summary of the activities of the OPAG IOS Inter Programme Expert Team on Observing System Design and Evolution (IPET-OSDE). He advised the session that, while the primary focus of IPET-WIFI is WIGOS Framework Implementation, IPET-OSDE is

- Successor of the former Expert Team on the Evolution of Global Observing Systems (ET-EGOS)
- Established by CBS-15 under OPAG IOS, and tasked to:
  - Keep observational user requirements under review
  - Keep observing systems capabilities under review
  - Carry out Rolling Review of Requirements (incl. Statements of Guidance for application areas)
  - Look at gaps and provide guidance for new observing systems
  - Carry out impact studies
  - Monitor progress of actions of the EGOS-IP
  - Promote activities which enhance progress against EGOS-IP
  - Propose updates to the “Vision for the GOS in 2025”
  - Propose guidance regarding observing system network design principles
  - Prepare documents to assist Members, TCs & RAs
  - Provide advice & support to OPAG-IOS Chair on WIGOS Implementation

4.1.2 Mr Charpentier stressed that IPET-OSDE is essentially addressing Key Activity Area 3 of the WIP: the design, planning & optimized evolution of WIGOS and its regional, sub-regional and national component observing systems. He noted that the ‘evolution’ activity largely has historically comprised development and maintenance of the Rolling Review of Requirements, as enunciated in the EGOS-IP ([www.wmo.int/egos](http://www.wmo.int/egos)). He noted that the EGOS-IP, which responds to the Vision of the GOS in 2025, has just been approved by EC and published. He noted the ongoing need for IPET-OSDE to monitor progress against the EGOS-IP, but in addition to focus now on ‘Observing System Network design’.

## 4.2 Outcome of the Workshop on Observing System Network Design

4.2.1 Mr Charpentier briefed the session on the recent Workshop on Observing System Network Design, which was held in Geneva from 12 to 14 November 2013. He noted that under this 'design' activity of IPET-OSDE, the Expert Team will contribute to the preparation of WIGOS regulatory material.

4.2.2 The workshop first reviewed past, present, and planned activities related to observing system network design (OSND):

- Surface-based observing system components, including marine observations
- Space-based observing system components and the Coordination Group on Meteorological Satellites, as well as the Architecture for Climate Monitoring from Space
- GCOS, GFCS, GCW
- Some regional and sub-regional activities (RA-II, RA-IV, RA-V, RA-VI & EUMETNET)
- Impact studies, and the next NWP "impact" workshop

4.2.3 It next used the information gathered to develop material from which OSND principles can be extracted:

- Relevant OSND activities, including impact studies
- Overarching Principles in keeping with GCOS priorities
- GCOS Climate Monitoring Principles
- Weather radar network design activities
- Principles proposed by the Chair of ICT-IOS; and
- Review of existing regulatory material.

4.2.4 This material was then used as the basis for a set of observing system design principles and the workshop agreed on a roadmap for their development and for the preparation of guidance material on observing system network design. The OSND principles are included for information at [Annex II](#). Further information on the workshop can be found in the workshop report, at <http://www.wmo.int/pages/prog/www/OSY/Reports/OSDW1-Final-Report.pdf>.

4.2.5 The first full meeting of IPET-OSDE is to be held in Geneva from 31 March to 03 April 2014. The meeting agenda and other documents are available at <http://www.wmo.int/pages/prog/www/OSY/Meetings/IPET-OSDE1/DocPlan.html>.

4.2.6 Mr Stringer suggested that it will be important that the roadmap developed at the workshop is consistent with the timelines for the activities of other groups involved in WIGOS Framework Implementation. Mr Charpentier acknowledged this point and invited input and suggestions in this regard.

4.2.7 Dr Dibbern asked for clarification on where the responsibility lies for different components of the WIR. Mr Charpentier advised that this matter had been discussed at ICG-WIGOS-3 where it was concluded that it is not a straightforward matter. For example, it is anticipated that OSCAR will contain metadata, but that ownership of the metadata is not clear, nor is it clear who should specify design of the data base for metadata. These and other questions regarding responsibility or ownership will need to be addressed in the near future. Dr Dibbern noted that this matter would be discussed further at the upcoming ICT-IOS-8 session under an agenda item addressing WIGOS leadership. It was noted that the functional specifications for OSCAR v0.8 may also need discussion at ICT-IOS-8.

4.2.8 In further discussion on what metadata OSCAR will include and how it is to be done, Mr Charpentier noted that this had also been discussed at ICG-WIGOS-3. He noted that metadata will be required for observing system network design so inclusion of these metadata in OSCAR must be made mandatory. He noted that MeteoSwiss, which has agreed to host OSCAR, will also be a key contributor to determining what is to be included and how.

### **4.3 WIGOS Information Resource (WIR)**

4.3.1 Mr Charpentier informed the session of the status of development of the WIR, noting that the ICG-WIGOS-3 decided to change the name by removing the word 'Operational' from the title, to become simply the WIGOS Information Resource. He advised the session that the WIR is to provide a single point of access for WIGOS stakeholders to obtain information on the status and evolution of WIGOS. He noted that the WIR was formally launched a year ago, though it still has some missing components, and it is planned to be fully operational by 2015.

4.3.2 Mr Charpentier described the various components of the WIR and their status. The WIGOS Portal is essentially the website from which to access the information. It already exist ([www.wmo.int/wigos/wir](http://www.wmo.int/wigos/wir)) and there is a great deal of information available there, including links to the WIGOS PO web pages. There are also links to the component observing systems. Those parts requiring further development include information on standardization, data discovery access and retrieval (DAR), and information on the status of WIGOS implementation in the regions. There is as yet no link to OSCAR-Surface or SORT, because these components of the WIR have not yet been developed.

4.3.3 Mr Charpentier advised that SORT will provide easy access to all standards and best practices of relevance to WIGOS. It will comprise a database containing references to all relevant documents, and will be keyword searchable. For example, the CIMO Guide will be one of these documents, but it contains more than 1000 entries which need to be tagged with keywords before it will become searchable in this manner. Hence SORT has not yet been implemented. Its technical specification has been written, and a simple taxonomy proposed. Issues yet to be addressed include management of document content and metadata. Mr Charpentier advised that technical options for SORT are currently being investigated: for example, Typefi (<http://www.typefi.com>).

4.3.4 In regard to OSCAR, Mr Charpentier advised that this is based on the RRR database. It already exists and its full requirements have been documented. The space-based capabilities component has been developed, is on-line and is being used regularly, but the surface-based capabilities component is yet to be developed. Mr Charpentier noted that a significant effort will be required to complete this latter component.

4.3.5 Mr Charpentier advised that to be considered operational, OSCAR will need to contain at least the metadata of Volume A, and that it may ultimately contain all WIGOS metadata. OSCAR is now being developed in partnership with MeteoSwiss, which has agreed to host it. This has advantages over a WMO-hosted system in that MeteoSwiss can use its operational infrastructure for long-term maintenance. The content of a MoU between WMO and MeteoSwiss has been agreed. The MoU clarifies roles and responsibilities of each party: WMO is responsible for functional specification and content, while MeteoSwiss is responsible for hosting, running and maintaining OSCAR.

4.3.6 Ongoing OSCAR development will occur in two phases:

- Phase I is to be completed by Cg XVII. It includes migration of the requirements component to MeteoSwiss, 1<sup>st</sup> stage development of the surface-based capabilities component. (This will include, e.g., Volume A content plus JCOMM operations metadata, existing upper air metadata, and the critical review process (gap analysis))
- Phase 2 will follow during the two years after Cg-XVII. It will involve migration of OSCAR Space across to MeteoSwiss, completion of OSCAR surface, and integration of space-based and surface-based information into the critical review process.

## **5. UPDATE ON PROGRESS AGAINST TASKS AND FUTURE CONSIDERATIONS**

### **5.1 Regulatory Material**

5.1.1 Mr Russell Stringer, Chair of the Sub-Group on Regulatory Material (SG-RM), reported on progress achieved since formation of the sub-group at the first meeting of IPET-WIFI in June 2013 and reviewed next steps to be taken.

5.1.2 It was noted that:

- active input to TT-WRM (of EC's ICG-WIGOS) had assisted the development of the first full draft of the WIGOS regulatory material (TR Vol 1 Part 1 and the new Manual on WIGOS);
- some further planning of the transition from Manual on the GOS to Manual on WIGOS had taken place with TT-WRM; and
- some initial progress had been achieved on other activities.

5.1.3 More specifically, it was noted that:

- Communication was initiated with other OPAG-IOS expert teams and rapporteurs (IPET-OSDE, ET-SBO, ET-SAT, ET-SUP, ET-ABO, SG-RFC, R-SEIS and R-MAR) with an invitation to review parts of the Manual on the GOS relevant to them; Very helpful responses were received.
- A presentation was made to the ET-SBO meeting in July 2013 and they developed a work plan which includes several inputs to the review and development of regulatory material. The first step was a review of surface-based aspects of the current Manual on the GOS leading to a substantial response to the invitation (previous dot point);
- Ongoing collaboration between SG-RM and TT-WRM has been facilitated by having some members in common. This will continue to be helpful as the transition from Manual on the GOS to Manual on WIGOS proceeds;
- The 2013 update of the 2010 edition of the Manual on the GOS was recently published.

5.1.4 It was proposed that SG-RM now give priority to:

- Familiarising with the current draft WIGOS regulatory material which is intended for adoption by Congress-17 in May 2015;
- Developing the next edition of the Manual on the GOS (to accompany the WIGOS Regulatory Material) on a timeline to be ready for adoption by Congress-17.

5.1.5 IPET-WIFI then reviewed the near-term and longer term timeline that would need to be followed to be ready for Cg-17 and to achieve synchronisation with the future editions and updates of the WIGOS regulatory material. A draft timeline was prepared for confirmation by ICT-IOS ([Annex V](#)). Noting that the next meeting of ICT-IOS is soon after this meeting, there was concern that it would not be possible to present the proposed 2015 edition of the Manual on the GOS so soon. The ICT-IOS Chair (Jochen Dibbern) indicated that a complete concept plus substantially progressed text would be sufficient for that meeting.

5.1.6 The SG-RM took the opportunity in break-out sessions to make progress as follows:

- Re-familiarise with the current structure and content of the Manual on the GOS;
- Note the various inputs to take into account in developing the new edition:
  - the draft WIGOS technical regulations (two documents: Vol 1 Part 1 and the Manual);
  - the feedback on the Manual on the GOS obtained from other experts across CBS, and
  - the relevant discussions of IPET-WIFI-2;
- Each member of SG-RM took the lead role for selected parts of the WIGOS technical regulations and will review those parts in order to propose related updates to the Manual on the GOS. Such updates might be to delete duplicated material, to resolve contradictory material, or to add new material (although the overall approach is to reduce content of the Manual on the GOS as the new WIGOS material is developed);
- To demonstrate and commence the process, an editable version of the Manual on the GOS was used to:
  - reduce Part IV Space-based Subsystem to a single note referring to the new section of the WIGOS Manual;

- remove most of Part II Requirements, providing a note referring to the new section of the WIGOS Manual;
- flag the content of Part V Quality Control for further attention with a view to replace most or all of it with a similar note referring to the new WIGOS regulatory material; and
- flag the need to add a general statement in the Introduction to the Manual on the GOS that readers must also consult the WIGOS Manual which will eventually completely replace the Manual on the GOS;
- It was not easy to estimate the amount of work that would be necessary. SG-RM agreed to connect again in a Webex meeting after one week to compare experiences then again in two weeks time.

## 5.2 Metadata

### *Introduction*

5.2.1 The Sub-Group on observational metadata (SG-MD) was established at the first meeting of IPET-WIFI in June 2013. The Terms of Reference and membership are documented in [Annex III](#).

### *Progress*

5.2.2 GOS related metadata requirements have been provided to Task Team on WIGOS Metadata (TT-WMD) since IPET-WIFI-1. This has included specific feedback from some ETs. Also feedback from ICG-WIGOS-3 has been received.

5.2.3 Representing SG-MD, significant progress has been made in developing WIGOS Metadata semantic standard which is now in sub-version 19.

5.2.4 As the metadata standard has been undergoing considerable development over the past twelve months, the preparation of populated examples has not been done. Instead, application area specific comments have been considered and incorporated as necessary. However this task should be able to proceed over the next six months.

5.2.5 During discussion on the WIGOS Core Metadata Semantic standard, clarification was sought on the quality system used. The standard does not impose a standard, but rather allows users to identify their internal quality framework.

5.2.6 Quality control of metadata was raised during discussion. The existing Volume A contains many errors and a future WMD is likely to be fraught with the same issues. It was proposed that Technical Commissions have the responsibility to manage the quality of metadata records.

### *Issues*

5.2.7 Developing a common understanding of mandatory, optional and conditional fields for the purpose of reporting metadata requires wide consultation. On one hand there is an aspiration for significant improvement in the reporting and availability of observational metadata, while on the other hand there is the pragmatic expectation of what Member States will be able to submit. Part of the solution has been to develop a core group of metadata for different application areas. ICG-WIGOS-3 has provided guidance concerning core (mandatory) metadata fields.

5.2.8 The development of a common understanding of metadata fields which are generically applicable across WIGOS will require clear documentation and communication. Where possible, existing standards have been used. Some of the conceptual challenges include dealing with varied spatial scales, complexity in pre-processing for some measurands, highly specific requirements for some applications areas and a combination of dynamic and static metadata.

5.2.9 The boundary between observation (WIGOS) and discovery (WIS) metadata is not always clear. The involvement of Steve Foreman (representing WIS) has been beneficial in dealing with these issues. However it is likely that there will be some duplication between the specifications.

5.2.10 The complex standard for metadata has warranted a proposal by ICG-WIGOS-3 for the development of application area specific profiles and a staged approach to provide metadata. In order to ease the transition to new standard, the ability to report "unknown" for many fields has been proposed. This will allow compliance with the goal to eventually populate all mandatory fields with meaningful information.

5.2.11 The presentation on the WIGOS Information Resource, and specifically OSCAR highlighted the need for WIGOS metadata to allow network capability analysis to compare with network user requirements.

5.2.12 The responsibility for the technical implementation of the WMD Semantic standard was discussed. This should be raised at ICG-IOS for further guidance. It was recommended that ICG-ISS develop the metadata specification under guidance of TT-WMD. It was suggested that WIS would distribute the metadata.

### ***Recommendations to ICG-IOS***

5.2.13 Considering the requirement for member states to have access to a mechanism to submit and maintain WIGOS metadata, IPET-WIFI-2 recommends that ISS take responsibility for the technical implementation of the WIGOS Core Metadata Semantic standard in consultation with IPET-WIFI and TT-WMD.

### ***Proposed Future Work***

- 5.2.14 The session concurred with the priorities for future work proposed by the SG-MD
- Provide input to SG-RM on reasonable and clear guidance regarding Manual on the WIGOS.
  - Develop a staged approach for the submission and making available of metadata.
  - GOS application areas to submit populated examples of metadata for the current draft version of TT-WMD standard across all areas of OPAG IOS.
  - Contribute to the development of a technical implementation and recommended practices for specific arrangements for (meta)data entry to the WIR.
  - Liaise with capacity development and training activities of IPET-WIFI when the technical implementation has been completed.

### ***Additional Discussion***

5.2.15 The session sought clarification on a number of details of the work being performed by SG-MD and TT-WMD. Dr Dibbern noted the recent retirement of Ernest Rudel, and requested the WMO secretariat to make enquiries in regard to finding a replacement CCI representative for IPET-WIFI and its SG-MD. Mr Monnik noted that Bruce Bannermann (Australia) is likely to attend the next meeting of TT-WMD on behalf of CCI, but agreed that a replacement CCI representative for SG-MD would be useful. It was also noted that a representative of the WMO Space Programme (e.g. an expert from ET-SUP) is still to be identified for IPET-WIFI.

## **5.3 Quality Management**

5.3.1 Dr Schrab provided the session with an update on progress against assigned tasks and future considerations for the Sub-Group on Quality Management. SG-QM's terms of reference were briefly reviewed and it was noted that they will need to be compared and coordinated with the terms of reference for the newly formed ICG-WIGOS TT-WQM.

5.3.2 Dr Schrab advised of the progress achieved by SG-QM, noting that all activities are on track and will be revisited in light of the formation of TT-WQM. It is noteworthy that the SG-QM chair has been invited to the upcoming first session of ICG-WIGOS TT-WQM, to be held in Geneva on 23-24 April 2014, since SG-QM will need to work with the TT-WQM on determining how to allocate work in the QM area.

5.3.3 The session was briefed on a recent draft proposal from the ET-SBO entitled "WIGOS Observations Quality Improvement System", to be presented at the ICT-IO-8 meeting between 7 and 10 April 2014. The output of this discussion will be coordinated with the ET-SBO and WMO Secretariat. The session proposed to rename the draft as "WIGOS Monitoring and Fault Management System" to more precisely convey the scope of the proposed initiative. Each member of IPET-WIFI was asked to provide additional written feedback that could be used to improve the draft proposal.

5.3.4 Work Plan Task 5 (Quality Management) activities and deliverables were updated based on discussion during the meeting (see [Annex IV](#)).

#### 5.4 Internal and External Collaboration

5.4.1 Dr Jose Arimatea appraised the session of the work achieved within IPET-WIFI under this WIGOS Key Activity Area. He noted a number of examples of very successful collaboration on the regional and national scales where their success had been strongly dependent on common interests being very clear. Hence he suggested that successful WIGOS collaboration was strongly inter-related with and dependent on effective WIGOS Communication and Outreach.

5.4.2 Dr Arimatea went on to suggest that the second activity under this Task in the Work Plan would require some modification, for best results. He suggested that the current Action, which is to compile a document listing GOS partner organizations', including a description of what each does and what each contributes to WIGOS, warrants a change of approach. Rather than compiling a complete list, Dr Arimatea suggests a more generic approach was needed, with the preparation of three lists, one each at national, regional and global scales, of the *types* of organizations with which successful collaboration currently takes place. These three lists could then be included in the strategy document (activity 1).

5.4.3 After some discussion, the session agreed to this modified approach and the two Work Plan activities under this Task were merged into one, with activity 2 embedded into activity 1 (see [Annex IV](#)). Dr Riishojgaard noted that, in the absence of more detailed guidance from ICG-WIGOS, and although the WIP refers to the establishment of MoUs between WMO and external organizations under this KAA, there may be merit in the IPET focusing on the regional and national scales. If a few interested countries, ideally in RA I and/or RA III, can be identified, this KAA could be progressed within IPET-WIFI by working with them. He also suggested that, given the substantial load on IPET-WIFI in other WIGOS KAAs, the pursuit of stronger global linkages might be better assigned to the WIGOS PO. He suggested that further guidance would be sought from ICG-WIGOS, but that in the meantime, the IPET focus should be on exploring national linkages, with an opportunity for this being the upcoming WIGOS/WIS regional workshop for RA III.

#### 5.5 Observing System Operation and Maintenance

5.5.1 Mr Ngamini informed the session of the progress achieved against this Task of the Work Plan. He stressed that he had focused until now on his ASECNA experience in Africa, suggesting that it would serve well as an example for other regions and sub-regions in cooperative observing system operations and maintenance.

5.5.2 Mr Ngamini described how ASECNA is a good example of clustering and pooling of resources for specific purposes, in this case the Safety of Air Navigation over 16 million km<sup>2</sup> in 17 African countries. All these countries have agreed to put together the financial and human

resources for the security of their airspace and the meteorological assistance to aviation. In the meteorological context, ASECNA can thus provide upper-air observations, maintenance of equipment, calibration and traceability of meteorological sensors.

5.5.3 During the African Monsoon Multidisciplinary Analysis (AMMA) project in West Africa from 2005 to 2010, ASECNA and the 'ASCENA non-member countries' involved in the project brought together their technicians in training sessions in ASECNA's lab, making implementation of the project throughout the region much easier. ASECNA's laboratories were used to train technicians of the non-ASECNA countries, while ASECNA's technicians did the installation and maintenance of equipment in the entire region. Even now, the calibration and traceability of meteorological barometer in many countries in the region are performed by technicians from ASECNA. The good relationship that exists between ASECNA and the RIC in Morocco has also aided this sub-regional success story.

5.5.4 New upper air stations were built for the project using ASECNA's standard. Throughout the region, consumables for surface and upper air observations were purchased by ASECNA, so observations were made regularly during the period, and by buying consumables for the entire region, the quantity was large and the price very competitive.

5.5.5 Mr Ngamini noted that under this WIGOS KAA, a new opportunity arises for these countries to cooperate: WIGOS can serve as a catalyst. Mr Ngamini suggested that the way forward for this IPET-WIFI activity is to choose in each country a person responsible for identifying potential cooperatives actions and current weaknesses of the observing networks. Getting these persons together in brainstorming meetings would help them to learn more about what each country can bring to the others. The outcomes of the meetings would lead to pooling of human, technical and financial resources to the harmonious development of the sub-region.

5.5.6 Dr Dibbern commended Mr Ngamini on his work, noting that the ASECNA experience is a good example that should be brought to the attention of ICG-WIGOS, and that a brainstorming session as suggested might be included as part of a planned regional WIGOS workshop. It was noted that the suggested focal point in each country should ideally be the WIGOS Focal Point, to avoid the need for too many focal points.

## 5.6 **Standardization of Observations**

5.6.1 Dr Volker Kurz appraised the session of the significant progress achieved against Task 6 of the Work Plan. He noted that the original actions identified in the Work Plan had essentially been completed, and given its completion at this stage, suggested that Task 6 might better be continued on an 'as required' basis, as part of the work of the Sub-Group on Regulatory Material.

5.6.2 Some discussion followed on this matter. A strong need for continuing close co-ordination on standardization between CIMO and WIGOS was expressed and that this should be and will be continued by the Head of the CIMO Editorial Board participating in these WIGOS activities. Ultimately, the session concluded that it would be better to keep the Tasks (1 and 6) separate in the Work Plan, but acknowledged that the work would primarily involve participation of Dr Kurz in the work of SG-RM. The respective Task of the Work Plan was updated accordingly (see Annex IV)

## 5.7 **Capacity Development and Outreach**

5.7.1 Dr Zhao Datong described the progress achieved within IPET-WIFI under the two KAAs of Capacity Development and Outreach. He noted that the two strategy documents developed by the WIGOS PO had each been reviewed from the perspective of the GOS, with comments and suggestion provided back to the WIGOS PO.

5.7.2 He noted that it is unclear what is required from IPET-WIFI beyond this preliminary action. Dr Dibbern agreed that this is one item for which more guidance on requirements is needed from

ICG-WIGOS. Dr Zhao noted that ICG-WIGOS-3 had stressed the need to move from drafting strategy to performing actions, but more guidance is needed on what is envisaged. He also acknowledged that ICG-WIGOS-3 had discussed a number of initiatives that would address these KAAs, such as:

- Provision of assistance to Members regarding WIGOS implementation;
- Development of WIGOS related guidelines and training materials and other relevant documentation;
- Mobilization of resources for WIGOS implementation;
- Provision of assistance to Members in using WIR Tools for the design and management of national WIGOS networks;
- Provision of assistance to Members in implementing WIGOS metadata.

5.7.3 After some discussion, the session agreed that IPET-WIFI should await further guidance from ICG-WIGOS on how it wishes IPET-WIFI to contribute to WIGOS under these KAAs.

## 5.8 RRR and WIR

5.8.1 The session agreed that these two items, and the contribution of IPET-WIFI to each of them, had been adequately discussed under Agenda Item 4.

## 6 REVIEW OF TERMS OF REFERENCE OF IPET-WIFI AND UPDATE OF THE WORKPLAN

6.1.1 The session proposed small changes to the Terms of Reference of IPET-WIFI to better reflect the guiding role of ICG-WIGOS, the priorities of IPET-WIFI given to GOS related components and the coordinating role in the WIR development. The changes are given in [Annex III](#).

6.1.2 The Terms of Reference of the IPET-WIFI Sub-Groups were reviewed and found to remain appropriate. The Work Plan was then carefully reviewed and revised to reflect the progress made against each Task, and, based on the experience gained to date, changes were suggested aimed at improving the ultimate outcomes of the IPET's work.

## 7 CONTRIBUTION TO ICT-IOS-8

7.1 The session discussed desired input to ICT-IOS-8, scheduled to be held in Geneva from 7 to 10 April 2014. Based on these discussions an input document was drafted for ICT-IOS, including a number of recommendations, namely:

- IPET-WIFI to take responsibility for provision of GOS input and advice to the team developing OSCAR (WMO/MeteoSwiss), in consultation with other CBS ETs.
- IPET-WIFI SG-QM to take the lead, with support of ET-SBO, in development of a WIGOS monitoring and fault management system, with initial focus on the land-based component of the GOS.
- Considering the requirement for member states to have access to a process to submit and maintain WIGOS metadata, IPET-WIFI-2 recommends that ISS take responsibility for the technical implementation of the WIGOS Core Metadata Semantic standard in consultation with IPET-WIFI and TT-WMD.
- The draft updated Manual on the GOS to be discussed during ICT-IOS and recommended to CBS-Ext (Paraguay, 2014) for its endorsement (See the Template of Draft Recommendation to CBS, at Appendix III).

The session proposed that the last of these recommendations might potentially be referred as a formal recommendation from ICT-IOS to CBS-Ext.

**8. ANY OTHER BUSINESS**

8.1 No other business had been identified for discussion.

**9. CLOSURE OF THE SESSION**

9.1 The session was closed on 21 March 2014 at 1300hrs.

## LIST OF PARTICIPANTS

<p><b>Chair</b></p> <p>Jochen DIBBERN</p>	<p>Deutscher Wetterdienst Frankfurter Str. 135 D-63067 OFFENBACH Germany Tel: +49 69 8062 2824 Fax: +49 69 8062 3836 Email: <a href="mailto:jochen.dibbern@dwd.de">jochen.dibbern@dwd.de</a></p>
<p><b>Co-Chair</b></p> <p>Russell STRINGER</p>	<p>Bureau of Meteorology G.P.O. Box 1289 MELBOURNE 3001 VIC Australia Tel: +61 3 9669 4225 Fax: +61 3 9669 4168 Email: <a href="mailto:r.stringer@bom.gov.au">r.stringer@bom.gov.au</a></p>
<p>Karl MONNIK</p> <p><i>(Chair of Sub-Group on MetaData)</i></p>	<p>Bureau of Meteorology G.P.O. Box 1289 MELBOURNE 3001 VIC Australia Tel: +(61 3) 9669 4205 Fax: +(61 3) 9669 4168 Email: <a href="mailto:k.monnik@bom.gov.au">k.monnik@bom.gov.au</a></p>
<p>Kevin SCHRAB</p> <p><i>(Chair of Sub-Group on Quality Management)</i></p> <p><i>(Webex)</i></p>	<p>NOAA - National Weather Service 1325 East-West Highway SILVER SPRING 20910-3292 MD United States of America Tel: +1 301 713 1792 Email: <a href="mailto:kevin.schrab@noaa.gov">kevin.schrab@noaa.gov</a></p>
<p>Jose ARIMATEA DE SOUSA BRITO</p> <p><i>(Webex)</i></p>	<p>Instituto Nacional de Meteorología (INMET) Eixo Monumental - Via S1 70680-900 BRASILIA D.F. Brazil Tel: +55 62 309 938 65 Fax: +55 61 210 246 20 Mobile: +55 62 9294 2354 Email: <a href="mailto:josearimateabrito@gmail.com">josearimateabrito@gmail.com</a></p>
<p>Mounir AZIZ</p> <p><i>(Webex)</i></p>	<p>National Meteorological Service of Morocco, Head of service of Metrology and basic Instrumentation Technical and Equipement Division B.P. 8106 en face de la prefecture Hay Hassani CASABLANCA Morocco Tel: +212 661 472 398 Email: <a href="mailto:aziz.mounir@engineer.com">aziz.mounir@engineer.com</a></p>

<p>Adam BARBER (Webex)</p>	<p>Met Office FitzRoy Road EXETER EX1 3PB Devon United Kingdom of Great Britain and Northern Ireland Tel: +44 139 288 5644 Fax: +44 139 288 5681 Mobile: +44 775 388 0322 Email: <a href="mailto:adam.barber@metoffice.gov.uk">adam.barber@metoffice.gov.uk</a></p>
<p>Mario Jorge GARCIA (Webex)</p>	<p>Servicio Meteorológico Nacional 25 de Mayo 658 1002 BUENOS AIRES Argentina Tel: +(54 11) 4514 1525 Fax: +(54 11) 5167 6711 Email: <a href="mailto:garcia@smn.gov.ar">garcia@smn.gov.ar</a></p>
<p>Volker KURZ (Webex)</p>	<p>Deutscher Wetterdienst Frankfurter Strasse 135 D-63067 OFFENBACH AM MAIN Germany Tel: +49 69 8062 2828 Fax: +49 69 8062 3827 Email: <a href="mailto:volker.kurz@dwd.de">volker.kurz@dwd.de</a></p>
<p>Ulrich LOOSER (Webex)</p>	<p>Federal Institute of Hydrology (BfG) Am Mainzer Tor 1 56068 Koblenz Germany Tel: +49 261 1306 5224 Fax: +49 261 1306 5722 Email: <a href="mailto:looser@bafg.de">looser@bafg.de</a>; <a href="mailto:grdc@bafg.de">grdc@bafg.de</a></p>
<p>Rainer MAERZ (Webex)</p>	<p>Deutscher Wetterdienst Frankfurter Strasse 135 63067 Offenbach am Main Germany Tel.: +49 69 8062 2155 Fax: +49 69 8062 3809 Email: <a href="mailto:rainer.maerz@dwd.de">rainer.maerz@dwd.de</a></p>
<p>Rabia MERROUCHI (Webex)</p>	<p>National Meteorological Service of Morocco, DSI/STTD B.P. 8106 en face de la prefecture Hay Hassani CASABLANCA Morocco Tel: +212 5 22 65 48 32 Fax: +212 5 22 91 32 55 Mobile: +212 661 473 172 Email: <a href="mailto:rabia.merrouchi@gmail.com">rabia.merrouchi@gmail.com</a>, <a href="mailto:merrouchi.rabia@marocmeteo.ma">merrouchi.rabia@marocmeteo.ma</a></p>

Jean Blaise NGAMINI (Webex)	Direction de l'Exploitation Technique de l'ASECNA 32-38 Av. Jean Jaures BP 3144 DAKAR Senegal Tel: +221 33 869 5709 Mobile : +221 77 542 3935 Fax: +221 33 820 7495 Email: <a href="mailto:ngaminijea@asecna.org">ngaminijea@asecna.org</a> / <a href="mailto:jbngamini@yahoo.com">jbngamini@yahoo.com</a>
ZHAO Datong (Webex)	China Meteorological Administration 46 Zhongguancun Nandajie BEIJING 100081 China Tel: +86 10 5899 5027 Fax: +86 10 6217 4797 Email: <a href="mailto:zhaodt@cma.gov.cn">zhaodt@cma.gov.cn</a>
<b>WMO SECRETARIAT</b> 7 bis, avenue de la Paix Case postale 2300 CH 1211 Geneva 2 Switzerland	<b>CBS/OPAG-IOS/IPET-WIFI-2 Website</b>  <a href="http://www.wmo.int/pages/prog/www/OSY/Meetings/IPET-WIFI-1_Geneva2013/DocPlan.html">http://www.wmo.int/pages/prog/www/OSY/Meetings/IPET-WIFI-1_Geneva2013/DocPlan.html</a>
<b>Observing and Information Systems Department (OBS)</b>	
Roger ATKINSON <i>Scientific Officer, Instruments and Methods of Observation Unit</i> <i>WMO Observing Systems Division</i>	Tel.: +41 22 730 8011 Fax: +41 22 730 8021 E-mail: <a href="mailto:ratkinson@wmo.int">ratkinson@wmo.int</a>
Dean LOCKETT <i>Scientific Officer, Airborne and Remote Sensing Observations</i> <i>WMO Observing Systems Division</i>	Tel.: +41 22 730 8323 Fax: +41 22 730 8021 E-mail: <a href="mailto:dlockett@wmo.int">dlockett@wmo.int</a>
Igor ZAHUMENSKY <i>Scientific Officer, WIGOS Project Office, WIGOS Branch</i>	Tel.: +41 22 730 8277 Fax: +41 22 730 8021 E-mail: <a href="mailto:izahumensky@wmo.int">izahumensky@wmo.int</a>
Luis Filipe NUNES <i>Scientific Officer, WIGOS Project Office WIGOS Branch</i>	Tel.: +41 22 730 8138 Fax: +41 22 730 8021 E-mail: <a href="mailto:lnunes@wmo.int">lnunes@wmo.int</a>
Lars-Peter Riishojgaard <i>Project Leader, WIGOS Project Office WIGOS Branch</i>	Tel.: +41 22 730 8193 Fax: +41 22 730 8021 E-mail: <a href="mailto:lriishojgaard@wmo.int">lriishojgaard@wmo.int</a>
Miroslav ONDRAS <i>Chief, Observing Systems Division, WIGOS Branch</i>	Tel.: +41 22 730 8409 Fax: +41 22 730 8021 E-mail: <a href="mailto:mondras@wmo.int">mondras@wmo.int</a>

Anna MIKALSEN  
*Scientific Officer*  
*GCOS Office*

Tel.: +41 22 730 8272  
Fax: +41 22 730 8021  
E-mail: [amikalsen@wmo.int](mailto:amikalsen@wmo.int)

**OBSERVING SYSTEM NETWORK DESIGN PRINCIPLES (draft)****1. SERVING MANY APPLICATION AREAS**

Observing networks should be designed to meet the observational needs of many application areas within WMO and WMO co-sponsored programmes.

**2. MEETING USER REQUIREMENTS**

Observing networks should be designed to address stated user requirements, in terms of geophysical variables to be observed and the space-time resolution, accuracy, timeliness and measurement stability needed.

**3. MEETING NATIONAL, REGIONAL AND GLOBAL REQUIREMENTS**

Observing networks designed to meet national needs should also take into account the needs of the WMO community for applications for which requirements are regional or global.

**4. MAKING OBSERVATIONAL DATA AVAILABLE**

Observational data from national observing networks should be made available to other WMO Members, at space-time resolutions and with a timeliness needed to meet the needs of regional and global applications.

**5. PROVIDING INFORMATION SO THAT THE OBSERVATIONS CAN BE UNDERSTOOD**

Observing networks should be designed and operated in such a way that the details and history of instruments, their environments and operating conditions, their data processing procedures and other factors pertinent to the interpretation of the observational data (i.e. metadata) are documented and treated with the same care as the data themselves.

**6. DESIGNING COST-EFFECTIVE NETWORKS**

Observing networks should be designed to make the most cost-effective use of available resources.

**7. DESIGNING APPROPRIATELY SPACED NETWORKS**

Where high-level user requirements imply a need for spatial and temporal homogeneity of observations, network design should also take account of other important user requirements, such as the representativeness and usefulness of the observations.

**8. DESIGNING RELIABLE, STABLE AND SUSTAINABLE NETWORKS**

Observing networks should be designed to be reliable, stable and sustainable.

**9. DESIGNING THROUGH A TIERED APPROACH**

Observing network design should use a tiered structure, through which information from reference observations of high quality can be transferred to and used to improve the quality and utility of other observations.

**10. ACHIEVING HOMOGENEITY AND CONSISTENCY IN OBSERVATIONAL DATA**

Observing networks should be designed to deliver observational data of the level of homogeneity and consistency by intended applications.

**11. ACHIEVING SUSTAINABLE NETWORKS**

Improvements in sustained availability of observations should be promoted through the design and funding of networks that are sustainable in the long term including, where appropriate, through the transition of research systems to operational status.

**12. MANAGING CHANGE**

The design of new observing networks and changes to existing networks should ensure adequate consistency and quality of observations across the transition from the old system to the new.

**ANNEX III**

**PROPOSED CHANGES TO THE TERMS OF REFERENCE OF THE EXPERT TEAM ON WIGOS  
FRAMEWORK IMPLEMENTATION MATTERS (IPET-WIFI)**

Last updated: 21/03/2014

(To Be Submitted for Approval by CBS-XVI)

- (a) Address integration aspects of WIGOS as defined in the WIGOS Framework Implementation Plan, **based on advice from ICG-WIGOS**;
- (b) Provide technical advice, guidance, practices and procedures for WIGOS Framework Implementation, in collaboration with CIMO; with priorities to be given to **the GOS-related component of:**
  - (i) WIGOS Regulatory Material (such as WIGOS Manual, GOS Manual and Guide), in collaboration with the relevant WMO Programmes and TCs;
  - (ii) Standards for basic WIGOS metadata (e.g., those agreed for international exchange and for WIGOS Operational DB), including the access to WIGOS metadata;
  - (iii) WIGOS Quality Management, including monitoring;
  - (iv) WIGOS Information Resource **in collaboration with other OPAG-IOS Expert Teams**;
  - (v) WIGOS standards and best practices;
  - (vi) Capacity development, education and outreach strategy;
- (c) The IPET WIFI is envisaged to encompass three sub-groups (SGs), each to be activated as/when required:
  - (i) Sub-group on Regulatory Material;
  - (ii) Sub-group on Metadata;
  - (iii) Sub-group on QM.

## **TERMS OF REFERENCE AND MEMBERSHIP OF THE IPET-WIFI SUB-GROUPS**

### **1. SUB-GROUP ON REGULATORY MATERIAL (SG-RM)**

#### **Terms of Reference:**

Contribute to the development and maintenance of WIGOS regulatory material, both GOS-related material and provisions common to all component systems, as follows:

1. Coordinate with ICG-WIGOS TT WRM regarding requirements for GOS-related provisions and provisions common to all component systems for the WIGOS Regulatory Material
2. Make proposals to ICG-WIGOS TT-WRM for GOS-related provisions and provisions common to all component systems for the WIGOS Regulatory Material
3. Review Manual and Guides on GOS and make proposals to IPET-WIFI for updates
4. Collaborate with TT-WRM on the transition and eventual phasing out of the GOS Manual
5. Collaborate with TT-WRM on development of the WIGOS Guide
6. In close cooperation with ICG-WIGOS TT-WRM, contribute to the creation of mechanisms for the future ongoing review and update of the Regulatory Material

In tackling the above activities, compile input from:

- technical experts across all areas of OPAG IOS;
- the other task areas of IPET-WIFI.

#### **Provisional Membership:**

Russell Stringer, Australia (Chair)  
Adam Barber, UK  
Volker Kurz, Germany  
JaeGwang Won (Republic of Korea)  
Rabia Merrouchi (Morocco)

#### **NOTES:**

1. Will require active collaboration of other OPAG-IOS ETs and Rapporteurs.
2. Representation in the work of those TCs not directly represented on IPET-WIFI will be via ICG-WIGOS TT-WRM

## **2. SUB-GROUP ON METADATA<sup>1</sup> (SG-MD)**

### **Terms of Reference:**

1. Coordinate with ICG-WIGOS TT-WMD on requirements for a WIGOS Core Metadata Standard
2. Contribute to the TT-WMD development of specifications for WIGOS metadata by provision of input on GOS sub-systems
3. Develop proposals, in collaboration with TT-WMD, for GOS-related practices and procedures for implementation of WIGOS metadata standards and for maintenance of WIGOS Metadata
4. Through IPET-WIFI contribute to WIGOS capacity development initiatives in regard to gathering, storing and exchanging GOS-related metadata, consistent with overall WIGOS metadata practices.

### **Provisional Membership:**

Karl Monnik, Australia (Chair)  
Rainer März, Germany  
Aziz Mounir, Morocco, (subject to formal PR agreement)  
Ernest Rudel, Austria (now retired, needs replacement)  
Ulrich Looser, Germany  
ET-SUP representative (TBA)

### **NOTE:**

1. Will require active collaboration of other OPAG-IOS ETs and Rapporteurs.
2. Representation in the work of those TCs not directly represented on IPET-WIFI will be via ICG-WIGOS TT-WMD

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<sup>1</sup> WIGOS Metadata is interpretation metadata, as distinct from discovery metadata, which is dealt with under WIS.

### **3. SUB-GROUP ON QUALITY MANAGEMENT (SG-QM)**

#### **Terms of Reference:**

1. Review current QM practices used within the GOS
2. Review material from the WMO Quality Management Framework
3. Coordinate with ICG-WIGOS TT WQM the content of a WIGOS-QMS Implementation Plan
4. Compile GOS-related QM practices, including a proposal for a Fault Management System, to be included in the WIGOS Regulatory Material
5. Submit contributions to the IPET-WIFI for coordination

#### **Provisional Membership:**

Kevin Schrab, USA (Chair)  
Branislav Chvila, Slovakia  
Federica Rossi, Italy  
Mario Garcia, Argentina  
Francis Mosetlho, South Africa

#### **NOTE:**

1. Will require active collaboration of other OPAG-IOS ETs and Rapporteurs.
2. Representation in the work of those TCs not directly represented on IPET-WIFI will be via ICG-WIGOS TT-WQM

**UPDATED WORK PLAN WITH STATUS FOR IPET-WIFI FOR THE PERIOD 2014-2016**

Updated 20 March 2014

No. 2	Task	Deliverable/Activity	Due	Responsible	Impacted ETs	Statu s	Comment
1.	Contribute to the development and maintenance of WIGOS regulatory material, both GOS-related material and provisions common to all component systems.	<p>1) input to TT-WRM, to assist and review the inclusion of material from GOS Manual and TRs into the WIGOS Manual and TRs (particularly for sections 2, 3 and 7)</p> <p>2) proposals for updated or new regulatory material to the TRs, WIGOS Manual and/or GOS Manual (as appropriate)</p> <p>3.1) clear plans (with TT-WRM) for the transition and eventual phasing out of the GOS Manual</p> <p>3.2) lay foundation for completion of transition, after CBS-XVI (2016), from GOS Manual to WIGOS Manual</p> <p>4) Collaboration with TT-WRM on development of the WIGOS Guide</p>	<p>1) Oct 2013</p> <p>2) 2016 (for next edition of WIGOS Manual), &amp; ongoing.</p> <p>3.1) Nov 2014</p> <p>3.2) 2016</p> <p>4) Jun 2013 and ongoing</p>	Stringer SG-RM Members	TT-WRM  ICT-IOS	90%          15%          30%          10%          5%	<p>Interactions and feedback provided for TT-WRM on first drafts. Further input possible on next drafts.</p> <p>Some WIGOS and GOS updates obtained from across CBS. Need further work on GOS Manual.</p> <p>Done some planning, more needed on timeline for GOS Manual.</p> <p>Coordination established, initial changes drafted. Need more work on GOS Manual through a few stages.</p> <p>Initial concepts only.</p>

<sup>2</sup> Corresponds with WIGOS Activity Area Number.

No. 2	Task	Deliverable/Activity	Due	Responsible	Impacted ETs	Statu s	Comment
2.	Contribute to the development of guidance, mechanisms and procedures for engagement, coordination and collaboration with partner organizations.	1. Contribute GOS-related input to, and review, ICG-WIGOS-developed document on strategy for WIGOS engagement with partner organizations <sup>a</sup> .	Dec 2014	<b>Arimatea</b> , All IPET members	ICT-IOS	5%	<sup>a</sup> Partners will need to ensure compliance, to some extent, with WMO Technical Regulations in relation to data provision, quality, etc.
3.	Network Planning / RRR	Close cooperation between IPET-WIFI and IPET-OSDE, feedback to IPET-OSDE as required.	Ongoing	<b>Dibbern</b> Stringer	IPET- OSDE	20%	Stringer and Dibbern are both contributing to IPET-OSDE activities.
4.	Develop guidance on: 1) mechanisms and procedures for improved integration of GOS observational data and products,  2) process of sharing, between GOS and other component observing systems, operational experiences, sharing of expertise and guidance for resourcing joint activities	1) As a Regional WIGOS implementation project, identify groupings within RA I which could share experience and procedures in the areas of operation and maintenance <sup>1</sup>  2) Contribution to guidance documentation on best practice for operations and maintenance  3) Document listing issues that need to be addressed <sup>2</sup> by regional cooperation, suggesting solutions (e.g., distributed Regional WIGOS Centre), and providing examples of best practice.	1) May 2014  2) Mar 2015  3) Dec 2014	<b>Ngamini</b> All IPET Members  <b>Ngamini</b> All IPET Members  <b>Ngamini</b> All IPET Members	ICT-IOS ET- WISC- OM  ICT-IOS	0%  0%  0%	<sup>1</sup> Proposed Method: Arrange for a session on this topic to be conducted as part of a WIGOS RA I workshop that is planned under ICG-WIGOS.  <sup>2</sup> procurement, instrument maintenance, spectrum management, etc

No. 2	Task	Deliverable/Activity	Due	Responsible	Impacted ETs	Statu s	Comment
5.	Provide advice to ICG-WIGOS via CBS on GOS Quality Management practices and procedures: 1) Finalise SG-QM Work Plan	[Work Plan]	Mar 2014	<b>Secretariat Schrab</b>	TT-WQM	80%	SG-QM to review and reach agreement on work plan. Ch-TT-WQM to review and agree on work plan. Summarised plan to be updated in IPET-WIFI work plan (Final Report IPET-WIFI-2)
	2) Establish a group of GOS observing sub-system focal points that can provide expertise and knowledge on QMon practices and regulations to SG-QM.	2a) Finalise list of sub-systems to be reviewed by SG-QM; 2b) Finalise list of GOS OS-S focal points. 2c) Create a FP email list for collaboration. [Group of OS-S FPs established.]	Aug 2014	<b>Secretariat Schrab</b>		50% a) 100% b) 20% c) 0%	Participation of Chair SG-QM required in WIGOS Quality Workshop (Apr 2014)  Likely list of 6 GOS OSS for review of QM: (a) Surface synoptic stations (Land and Sea stations); (b) Upper-air synoptic stations (Land and Sea stations); (c) Aircraft meteorological stations; (d) Aeronautical meteorological stations; (l) Weather radar stations; and (n) Wind profiler stations.
	3) Review the status of WMO and Regional quality monitoring	3a) In consultation with TT-WQM determine the scope and requirements for the review to be undertaken by OS-S FPs. 3b) Review existing regulatory material related to QMon for GOS sub-systems.	2016 (CBS)	<b>Schrab SG-QM</b>	<b>ET-ABO ET-SBO</b>	0%	Can the scope for this task be expanded to quality management rather than just QMon?  This task is a contribution to a parent task of TT-WQM

No. 2	Task	Deliverable/Activity	Due	Responsible	Impacted ETs	Status	Comment
	<p>systems with a view to identifying areas for improvement and efficiency</p> <p>4) For the land surface-based observing system, develop and document the concept of extending global quality monitoring to include a "Global Fault Management System"</p>	<p>3c) Review existing regional QMon systems and their procedure in place, for example ECMWF, EUCOS, etc. 3d) Prepare recommendations on new or improved QMon procedures in relation to GOS sub-systems.</p> <p>[Document that can be used as input to the deliverable of TT-WQM]</p> <p>4a) Review the outcomes of the ECMWF Workshops on NWP data monitoring requirements 4b) Revise, update and finalise the draft proposal developed by ET-SBO to define the scope and deliverable of this activity. 4c) Liaise with ET-SBO and ICT-GDPF regarding revision of the Manual on the GDPFS re requirements for monitoring of the GOS by NWP. 4d) Develop an updated plan and procedures for quality and quantity monitoring of land, surface-based observing systems of the GOS. 4e) Update appropriate manuals and guides based on the outcomes of this activity. 4f) Assist IPET-WIFI in reporting to CBS</p> <p>[1. Revised international structure and framework for international observations monitoring 2. Updated regulatory material on Qmon of land surface-based system of the GOS]</p>	<p>2016 (CBS)</p> <p>a) Aug 2014 b) Aug 2014 c) Feb 2015 d) Dec 2015 e) Feb 2015 f) Jun 2016</p> <p>2016 (CBS)</p>	<p><b>Schrab</b> <b>SG-QM</b> <b>ET-SBO</b></p> <p><b>SG-QM</b></p>	<p><b>TT-WQM</b> <b>ET-SBO</b> <b>ICT-GDPF</b> <b>ICT-ISS</b></p> <p><b>ET-SBO</b> <b>ET-ABO</b></p>	<p>5%</p>	<p>and related to Activity 5.1.2 of the WIP.</p> <p>Include consideration of the possibility of combining the roles of global quality and quantity monitoring.</p> <p>To improve the feedback mechanisms and process so as to better ensure the identification and rectification of missing data, station outages and specific quality issues.</p> <p>Include consideration of the possibility of combining the roles of global quality and quantity monitoring.</p> <p>2nd workshop to be held in 3rd quarter 2014 – Ch-ET-SBO will attend.</p> <p>Take the lead in drafting QM material on GOS for Tech Regs (incl Common Elements of Surface Based Obs Systems) and WIGOS Manual.</p>

No. 2	Task	Deliverable/Activity	Due	Responsible	Impacted ETs	Statu s	Comment
	<p>5) In consultation and collaboration with TT-WQM, develop and revise QM and QMon regulatory material and guidelines for inclusion in WIGOS and GOS regulatory materials.</p> <p>6) Contribute to the drafting work of TT-WRM in collaboration with SG-RM and provide GOS-related feedback through SG-RM on TT-WRM documentation.</p>	<p>5a) Liaise with ET-SBO and ICT-GDPF re appropriate location for regulatory material relating to monitoring of the GOS by NWP.</p> <p>6a) Provide feedback to TT-WRM on current draft version of the Manual on WIGOS with respect to quality monitoring aspects.</p>	Mar 2014	SG-QM	<p>IPET-GDPF</p> <p>TT-WRM</p>	50%	<p>Task leader will participate in TT-WRM teleconferences.</p> <p>This task is a contribution to WIP Activity 5.1.1</p>
6.	<p>1) describe the standard practices and recommended practices for collecting observations, applicable to instruments and methods of observation with a focus on the GOS</p> <p>2) provide guidance to</p>	<p>1.1) existing standard practices and recommended practices, described in a manner suitable for inclusion in WIGOS regulatory material (TRs or Manual on WIGOS)</p> <p>1.2) proposed new standard practices and recommended practices, described in a manner suitable for inclusion in WIGOS regulatory material (TRs or Manual on WIGOS)</p> <p>2.1) identify and if necessary further develop guidance on how to implement those existing standard and</p>	<p>Nov 2013</p> <p>Dec 2014</p> <p>Nov 2013</p>	Kurz IPET-WIFI Members	<p>CIMO ETs (CIMO Guide Ed Board, Standardi zation) TT-WRM SG-RM</p>	<p>100%</p> <p>ongoi ng</p> <p>100%</p>	An annual Activity

No. 2	Task	Deliverable/Activity	Due	Responsible	Impacted ETs	Statu s	Comment
	Members on how to implement those standard and recommended practices	<p>recommended practices, described in a manner suitable for inclusion in a relevant Guide (WIGOS, GOS, CIMO or other guidance material).</p> <p>2.2) guidance on how to implement the proposed new standard and recommended practices, described in a manner suitable for inclusion in a relevant Guide (WIGOS, GOS, CIMO or other guidance material).</p> <p>2.3 maintain a watching brief on existing guidance material with a view to identifying candidates which have become ready to be elevated to the WIGOS regulatory material as observing systems mature.</p>	<p>Dec 2014</p> <p>Dec 2014</p>			<p>Ongoing</p> <p>Ongoing</p>	<p>An annual Activity</p> <p>An annual Activity</p>
7.	Provide technical advice and guidance on the GOS-related content requirements of the WIR with emphasis on SORT.	<p>1 Review overall GOS-related content of the WIR and provide feedback as required.</p> <p>2 Provide input to SORT, with emphasis on GOS-related WIGOS regulatory and guidance material.</p> <p>3. Coordinate guidance on WIR content with other OPAG-IOS ETs</p>	<p>Dec 2014</p> <p>Dec 2014</p> <p>Dec 2014</p>	<b>Dibbern</b> Members of IPET-WIFI	ICT-IOS and relevant ETs	<p>Ongoing</p> <p>10%</p> <p>Ongoing</p>	
8.	1) Compile and provide input to the development of WIGOS (interpretation) metadata, focusing on the GOS component.	<p>1.1 GOS input provided to ICG-WIGOS TT-WMD</p> <p>1.2 Review and provide feedback on the Core Metadata list developed by TT-</p>	<p>1.1 Jun 2013</p> <p>1.2 Nov 2013</p>	<b>Monnik</b> Members of SG-WMD	TT-WMD	<p>DONE</p> <p>80%</p>	

No. 2	Task	Deliverable/Activity	Due	Responsible	Impacted ETs	Status	Comment
	2) Compile and provide input to the development of approaches for gathering, storing and exchanging WIGOS metadata, focusing on the GOS component. This should lead to a number of standard practices and recommended practices for Members to follow.	<p>WMD, prepare populated examples (e.g. for surface station, radar, etc.)</p> <p>1.3 Seek feedback on 1.2 from the technical experts across all areas of OPAG IOS.</p> <p>2.1 drawing on input from the technical experts across all areas of OPAG IOS, present proposals or options to TT-WMD for approaches for gathering, storing and exchanging WIGOS metadata, focusing on the GOS component.</p> <p>2.2 suggest options for standard and recommended practices, and for specific arrangements for (meta)data entry to the WIR.</p> <p>2.3 Consider options for a staged approach for the submission and making available of metadata.</p>	<p>1.3 Sep 2014</p> <p>2.1 Jun 2014</p> <p>2.2 Nov 2014</p> <p>2.3 Mar 2015</p>			<p>50%</p> <p>0%</p>	<p>With a view to inclusion in the 2016 version of the Manual on WIGOS</p>
9.	<p>1) Contribute to the development of a WIGOS capacity development strategy.</p> <p>2) Contribute to WIGOS capacity development, as required.</p>	<p>1) Review and provide feedback to ICG-WIGOS on draft WIGOS Capacity Development Strategy.</p> <p>2) Assist in the organization and conduct of WMO seminars/workshops on the benefits of regional</p>	<p>Oct 2013</p> <p>2014-2015</p>	<p><b>Zhao</b> IPET-WIFI Members</p>	<p>ICT-IOS</p>	<p>100%</p> <p>0%</p>	

No. 2	Task	Deliverable/Activity	Due	Responsible	Impacted ETs	Statu s	Comment
		cooperation (such as for design, implementation and management of observing systems).					
10	1. Contribute to the development of a WIGOS Communications and Outreach Strategy (WCOS) and plan 2. Contribute to WIGOS communication and outreach activities	1. Provide feedback to ICT- IOS on the WIGOS Communications and Outreach Strategy (WCOS) and plan 2. Enhance understanding of WIGOS and its benefits at appropriate WMO meetings.	Jun 2013  Ongoing	<b>Zhao</b>  All IPET-WIFI Members		100%  ongoi ng	

**NOTES:**

1. More work required on Impacted ETs column. Indicate the way in which the impact occurs (e.g. Consult, Inform, Advise, Consider Input from).  
Action for Task Leaders.

**TIMELINE FOR UPDATING THE MANUAL ON THE GOS FOR APPROVAL BY CG-XVII**

WIGOS technical regulations: longer term timeline for new editions and updates of TR Vol. I Part I, Manual on WIGOS, in sync with Manual on the GOS  
[as at March 2014]

			<u>M-GOS:</u>	<u>TR-M-WIGOS:</u>	<u>TR-M-WIGOS:</u>
<b>2013</b>	May		EC-65	2013 update to 2010 edition approved	structure decided for the first (2015) edition
	Nov	CAS			
<b>2014</b>	Dec				
	Jan				
	Feb				
	Mar	CAGM			SYNC finalise proposed draft 2015 edition
	Apr			ICT-IOS endorse draft 2015 edition	review by Presidents of TCs, EC-PORS (3 months)
	May		EC-66 reduced scope	No updates, progress report on new 2015 edition for Cg-17 decision.	progress report (no decision required)
	Jun	CAeM		translation of proposed 2015 edition; post on web site for general review	
	Jul	CCI		finalise agenda paper for CBS-Ext(14)	revise draft in response to feedback
	Aug	CIMO		ICG-WIGOS review, check synchronisation of M-GOS and TR-M-WIGOS	
	Sep	CBS	CBS-Ext(14)	CBS endorse draft 2015 edition	translation of proposed 2015 edition
<b>2015</b>	Oct			revise draft if needed by CBS; translation of revised draft	consult with Members (3 months)
	Nov				
	Dec				
	Jan				SYNC revise draft; then ICG-WIGOS final endorsement; translation of revised draft
	Feb			finalise agenda paper for Cg-17	finalise agenda paper for Cg-17
	Mar				
	Apr				
	May		Cg-17	decision to adopt the proposed 2015 edition	decision to adopt the WIGOS tech regs, first (2015) edition
	Jun		EC-67		establish arrangements for future updates and 2019 edition
	Jul				
Aug			finalise proposed draft 2016 update to 2015 edition (available in synchronisation with proposed update to TR-M-WIGOS). ICT-IOS endorsement (out of session)	SYNC finalise proposed draft 2016 update to 2015 edition; ICG-WIGOS endorsement (out of session).	
Sep				review draft 2016 update (Pres TCs, 3 months)	

**M-GOS** = Manual on the Global Observing System (WMO-No. 544), Volume I

**TR-WIGOS** = WIGOS technical regulations contained in Vol.I Part I  
**M-WIGOS** = (prospective) Manual on the WMO Integrated Global Observing System  
**TR-M-WIGOS** = abbreviation

**SYNC** = synchronisation is important at this step

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	Sep			review draft 2016 update (Pres TCs, 3 months)
	Oct			
	Nov			
	Dec		President CBS fast track endorsement	<b>SYNC</b> revised draft 2016 update, then ICG-WIGOS endorsement
<b>2016</b>	Jan		translation of proposed 2016 update	<b>SYNC</b> translation of proposed 2016 update
	Feb		finalise agenda paper for EC-68 (to Members 3 months before EC)	finalise agenda paper for EC-68 (to Members 3 months before EC)
	Mar			
	Apr			
	May	EC-68	decision to adopt 2016 update to 2015 edition	decision to adopt 2016 update to 2015 edition
	Jun		finalise proposed draft 2017 update to 2015 edition (available in synchronisation with proposed update to TR-M-WIGOS). ICT-IOS endorsement (out of session). translation of proposed 2017 update.	<b>SYNC</b> finalise proposed draft 2017 update to the 2015 edition; ICG-WIGOS endorsement (out of session)
	Jul		finalise agenda paper for CBS-16	review draft 2017 update (Pres TCs, 3 months)
	Aug			<b>SYNC</b>
	Sep	<b>CBS</b> CBS-16	CBS endorse draft 2017 update	
	Oct		revise draft if needed by CBS; translation of revised draft	revised draft 2017 update, then ICG-WIGOS endorsement
	Nov			translation of proposed 2017 update
	Dec			
<b>2017</b>	Jan			ICG-WIGOS initiate/oversee preparation of 2019 edition.
	Feb		finalise agenda paper for EC-69 (to Members 3 months before EC)	<b>SYNC</b> finalise agenda paper for EC-69 (to Members 3 months before EC)
	Mar			
	Apr			
	May	EC-69	decision to adopt 2017 update to 2015 edition	decision to adopt 2017 update to 2015 edition
	Jun			
	Jul			
	Aug		finalise proposed draft 2018 update to 2015 edition (available in synchronisation with proposed update to TR-M-WIGOS). ICT-IOS endorsement (out of session)	<b>SYNC</b> finalise proposed draft 2018 update to 2015 edition; ICG-WIGOS endorsement (out of session).

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Year	Month	Event / Meeting	Activity / Decision	Notes / Milestones
2018	Sep			review draft 2018 update (Pres TCs, 3 months)
	Oct			
	Nov			
	Dec		President CBS fast track endorsement	SYNC revised draft 2018 update, then ICG-WIGOS endorsement
	Jan		translation of proposed 2018 update	translation of proposed 2018 update
	Feb		finalise agenda paper for EC-70 (to Members 3 months before EC)	SYNC finalise agenda paper for EC-70 (to Members 3 months before EC)
	Mar			
	Apr			
	May	EC-70	decision to adopt 2018 update to 2015 edition, information about proposed cessation for decision at Cg-18	decision to adopt 2018 update to 2015 edition
	Jun			SYNC
	Jul		finalise agenda paper for CBS-Ext(18)	
	Aug			finalise proposed draft 2019 edition review by Presidents of TCs, EC-PORS (3 months)
Sep	CBS	CBS-Ext(18)	CBS endorse the proposed cessation of M-GOS to Cg-18	
Oct				
Nov				revised draft 2019 edition in response to feedback
Dec				review and endorsement by ICG-WIGOS
2019	Jan			translation of draft 2019 edition
	Feb		finalise agenda paper for Cg-18 (to Members 3 months before Cg)	SYNC finalise agenda paper for Cg-18 (to Members 3 months before Cg)
	Mar			
	Apr			
	May	Cg-18	M-GOS cessation for decision	
	Jun	EC-71		decision to adopt 2019 edition of the WIGOS tech regs establish arrangements for future updates and 2023 edition