

**WORLD METEOROLOGICAL ORGANIZATION**

---

CBS/OPAG-IOS/ICT-IOS8 / Doc. 6.3  
(04.04.2014)

---

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

ITEM: 6.3

**IMPLEMENTATION-COORDINATION TEAM  
ON INTEGRATED OBSERVING SYSTEM  
(ICT-IOS)**  
*Eighth Session*

Original: ENGLISH

GENEVA, SWITZERLAND, 7 – 10 APRIL 2014

**REPORTS OF THE OPAG-IOS EXPERT TEAMS AND RAPPORTEURS**  
**REPORT OF THE EXPERT TEAM ON SURFACE-BASED OBSERVING SYSTEMS  
(ET-SBO)**

*(Submitted by Stuart Goldstraw (United Kingdom), Chair, ET-SBO)*

---

**SUMMARY AND PURPOSE OF DOCUMENT**

This document provides a report of the work of the Expert Team on Surface-Based Observing Systems (ET-SBO) since the seventh Session of the ICT-IOS, together with subsequent progress, and recommendations.

---

**ACTION PROPOSED**

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

- 
- Appendix A** Terms of Reference of the Expert Team on Surface-Based Observing Systems (ET-SBO)
  - Appendix B** Updated Work Plan with status of the Expert Team on Surface-Based Observing Systems (ET-SBO)
  - Appendix C** Proposal for the Development of the WIGOS Observations Quality Improvement System (W-OQIS).
  - Appendix D** Terms of Reference of the Task Team on Weather Radar Data Exchange.

## DISCUSSION

### 1. Introduction

1.1 The Expert Team on Surface Based Observations (ET-SBO) was established and its terms of reference (ToR) approved by CBS-XV in Jakarta (September, 2012). The ToR for ET-SBO, at Appendix A, were developed by Karl Monnik and Stuart Goldstraw at ICT-IOS-7 to reflect the merger of two existing Expert Teams on Automatic Weather Stations (ET-AWS) and Surface Based Remotely Sensed Observations (ET-SBRSO) and the need to address new issues, notably the WIGOS Framework Implementation Plan (WIP).

1.2 Expert Team membership of ET-SBO was finalised in consultation with the CBS Management Group, the WMO Secretariat and Members and the team was formally approved in April 2013.

1.3 An initial high level work plan for ET-SBO was developed by the Chair, approved by the OPAG-IOS Management Team and published on the WMO Website in May 2013. The first meeting of the newly formed Expert Team, ET-SBO-1, was held from the 9th to 12th of July 2013. As many members of the expert team were new to WMO activities, a significant proportion of the meeting was focussed on the introduction of the concept of WIGOS, the EGOS-IP and the development of the detailed activities associated with the work plan for the next 3 years.

### 2. Achievements

2.1 In relation to its Terms of Reference (Appendix A), the Expert Team on Surface-Based Observations (ET-SBO) has achieved the following:

1. *ToR a: Contribute to the implementation of WIGOS by undertaking those tasks assigned to it by the OPAG IOS Chair from the WIGOS Framework Implementation Plan:*

During ET-SBO-1 the review of WIGOS and GOS material was requested by the leads of Sub-Groups from IPET-WIFI. The ET reviewed material and provided written feedback. Most pleasing was the positive feedback obtained relating to the Core Metadata Profile being developed for WIGOS.

An outline proposal for a WIGOS Observations Quality Information System is being developed and following review and feedback from IPET-WIFI a revised proposal is being presented to ICT-IOS-8, see Appendix C. This proposal has not yet been updated to reflect the feedback received from IPET-WIFI.

2. *ToR b: Develop and update relevant elements of the Manual and the Guide to the GOS in the context of WIGOS, with initial priority on weather radar and AWSs:*

No significant progress has been made to date with the work plan items associated with this ToR. However it is proposed a WIGOS guidance material focussed sub-team meeting is arranged for later in 2014 to ensure progress is made.

3. *ToR c: Monitor and assess the status of planned and operational surface-based observing systems and ensure this is adequately described in Volume A and metadata database's of Members' observing system capabilities:*

The CBS ET-SBO Questionnaire on Member's Utilisation of Radar Winds was issued and results have been received and analysed. Version 1 of the report can be seen as an INF doc. Thanks must go to Dominique Ruffieux (Switzerland), Tom Szyzborski (USA) and the Secretariat for their industry in getting Ver1 ready for ICT-IOS-8. A review of the findings and conclusions will be added before a WIGOS technical report is created.

4. *ToR d: In collaboration with IPET-OSDE, assess the contribution of current and planned SBO systems to meeting user requirements for all Application Areas:*

No significant progress has been made with the work plan items associated with this ToR. However it is hoped discussions at IPET-OSDE will enable clear work plan items to be identified and acted upon by ET-SBO.

5. *ToR e: Facilitate the delivery of those EGOS-IP actions identified as priorities for OPAG-IOS:*

ET-SBO considered the best methodology to progress EGOS-IP actions at ET-SBO-1. A sub group of ET-SBO members agreed to review the range of relevant surface based actions and make recommendations to ET-SBO as to which could be progressed within the confines of ET-SBO resources. Unfortunately this task has not progressed as planned however, work has been commended on the development of a proposal to address action G10. [A discussion of this outline proposal at ICT-IOS will be requested].

In April 2013 the UK Met Office hosted a WMO Workshop on the Regional and Global Exchange of Weather Radar Data. This workshop was triggered by G48 in the EGOS-IP. The report of the workshop can be found on the CBS reports website at: <http://www.wmo.int/pages/prog/www/CBS-Reports/documents/>. The success of this workshop has been communicated more widely than the WMO community through the presentation of a paper at AMS Radar Conference and the planned presentation of a paper at ERAD. The main outcome of the workshop was the clear need to develop the data model and protocols for regional and global data exchange and a Task Team, as approved by OPAG-IOS Management, has been formed to address these issues.

6. *ToR f: Monitor the status of operational networks of SBO systems, promote best practice among WMO Members and provide advice on operational matters:*

Advice was provided by ET weather radar experts on the content of a concept paper that was presented by the Malaysian delegation at the 35th Meeting of ASEAN Sub-Committee on Meteorology and Geophysics (SCMG) held in Indonesia, 2-4 July 2013. The paper related to the Establishment of Effective ASEAN Weather Radar Composite Imageries for Near Real Time Operations.

ET-SBO was represented at Workshop on Observations Monitoring organised jointly by ECMWF and the EUMETNET EUCOS Management Team. Attendees from RA-IV were also at the meeting, via Webex. The thrust of the meeting was to address the need to refine the observations monitoring guidance undertaken by members on behalf of WMO. This workshop triggered the development of the WIGOS OQIS highlighted under ToR a.

In light of the need for cost effective satellite based telecommunications infrastructure to support effective access ET-SBO representation at the Argos Joint Tariff Agreement meeting in Paris in late September 2013 was arranged.

7. ToR h: Assess the potential contribution of new and emerging SBO technologies in meeting the Vision for the GOS in 2025, in collaboration with CIMO:

The horizon scanning report produced by Daniel Michelson at the AMS Radar Conference highlighted the emergence of phased array Radars as a potential operational system of the future. Daniel's report, although not available online, was made available to ET-SBO Members.

8. ToR 8: Provide advice and support to the Chairperson of OPAG-IOS on the implementation of the WIGOS framework and its operational aspects:

Most items captured against ToR a.

### **3. Issues**

In addition to the issues covered by Recommendations in Section 4, the Expert Team on Surface-Based Observing Systems (ET-SBO) has identified the following issues for consideration by the ICT-IOS:

#### **3.1 WMO Integrated Global Observing System (WIGOS) and contribution to the WIGOS Framework Implementation Plan (WIP)**

The development of the 'Proposal for the development of the WIGOS observations quality improvement system (W-OQIS)' is currently being undertaken across a number of teams within the WIGOS & CBS structures. To date invaluable input has been provided from a number of sources. The ultimate home for the outcome of the proposal is WIGOS but until the drafting of the proposal is completed it is suggested that ET-SBO retains ownership. Advice is sort from ICT-IOS on this matter.

#### **3.2 Observational requirements for the Global Framework for Climate Services (GFCS) - No issues to report.**

#### **3.3 WMO Quality Management Framework (QMF) - No issues to report**

#### **3.4 Capacity Building - No issues to report.**

#### **3.5 Resourcing**

A number of work plan items have not progressed at the rate originally conceived at ET-SBO-1 in July 2013. This is predominately due to the 'day job' time constraints placed on ET members. Advice is sought from ICT-IOS on how to improve the engagement with Members to secure the time of nominated experts.

### 3.6 Launching further actions in response to the EGOS-IP

ToR e of ET-SBO relates to the delivery of EGOS-IP actions. It is envisaged that resources within the ET will only be available to launch one new activity within the ET to assist in the delivery of an ET action. Whilst we intend to build a prioritised list of actions to address, the Chair believes the next item to be addressed is action G10 related to optimising the temporal distribution of radiosonde observations. The action appears to be straightforward, but will require careful consultation across a wide range of user communities. Authority is therefore requested from ICT-IOS to trigger activities to address this EGOS-IP action. A short information paper is to be provided, but is not available at the time of writing this report.

## 4. Recommendations

The Expert Team on Surface-Based Observing Systems (ET-SBO) is not proposing any recommendations to CBS. It is recommending to ICT-IOS that:

1. Recommendation 1 – ET-SBO retains ownership of the development of the W-QOIS proposal.
2. Recommendation 2 – ET-SBO leads action to address EGOS-IP Action G10.

## 5. Proposal for the Terms of reference of the Expert Team / the Rapporteur

No changes are proposed by the Expert Team on Surface-Based Observing Systems (ET-SBO) to its Terms of Reference.

## 6. Work plan

The updated Work Plan with status for the Expert Team on Surface-Based Observing Systems (ET-SBO) for the period 2013-2016 is at Appendix B.

**APPENDIX A**

**TERMS OF REFERENCE OF THE EXPERT TEAM ON SURFACE-BASED  
OBSERVING SYSTEMS (ET-SBO)**

Last updated: 22/11/2013

(Approved by CBS-XV)

- (a) Contribute to the implementation of WIGOS by undertaking those tasks assigned to it by the OPAG IOS Chair from the WIGOS Framework Implementation Plan;
- (b) Develop and update relevant elements of the Manual and the Guide to the GOS in the context of WIGOS, with initial priority on weather radar and AWSs;
- (c) Monitor and assess the status of planned and operational surface-based observing systems and ensure this is adequately described in Volume A and metadata database's of Members' observing system capabilities;
- (d) In collaboration with IPET-OSDE, assess the contribution of current and planned SBO systems to meeting user requirements for all Application Areas;
- (e) Facilitate the delivery of those EGOS-IP actions identified as priorities for OPAG-IOS;
- (f) Monitor the status of operational networks of SBO systems, promote best practice among WMO Members and provide advice on operational matters;
- (g) Assess the potential contribution of new and emerging SBO technologies in meeting the Vision for the GOS in 2025, in collaboration with CIMO;
- (h) Provide advice and support to the Chairperson of OPAG-IOS on the implementation of the WIGOS framework and its operational aspects.

## APPENDIX B

**UPDATED WORK PLAN WITH STATUS FOR THE EXPERT TEAM ON SURFACE-BASED OBSERVING SYSTEMS (ET-SBO) FOR THE PERIOD 2012-2014**

| No. | Task  | Deliverable/Activity   | Due  | Responsible  | Status   | Comment  |
|-----|---|--|--|--|----------|--|
| 1.  | <p><b><u>Helping WIGOS Succeed</u></b></p> <p>Contribute to the implementation of WIGOS by undertaking those tasks assigned to it by the OPAG IOS Chair from the WIGOS Framework Implementation Plan [ToR a] Informally, as discussed at ET-SBO-1, this ToR has become:</p> | Address relevant items of WIGOS Implementation Activities assigned to ET-SBO, details to be forthcoming during work plan period, see individual task sheets for more detail.   | Ongoing but major delivery in October & November 2013 and March 2014 | <b>Co-ordination Lead:</b> Chair ET-SBO for overall delivery with lead and contributors for each task identified | On track | 100 days provisionally assigned to this work plan item.<br><i>SJG 27/09: some good progress made with this task, see specific comments below</i>   |
| 1.1 | Contribute to the implementation of WIGOS by undertaking those tasks assigned to it by the CBS/IOS IPET WIFI Chair from the WIGOS Framework Implementation Plan.  | <p><b>Regulatory Material</b></p> <p>Review the following sections of the Manual on the GOS: Part III (surface-based sub-system) except 2.5 and 2.7. See Annex III Breakout Group 1 information for more detail.</p> | October 2013   | <b>Task Lead and Contributors:</b> See the detailed attachment on pages 3 to 5 of Annex III.                     | Complete | Significant task requiring ~20 days of effort in total.<br><i>SJG 27/09: Link to WMO No.544 Section III sent to ET members. WebEx meeting being arranged for early October to review progress. SJG 19/12: Report submitted to TT-WRM before November meeting, suggest task complete.</i>                                       |
| 1.2 |   | <p><b>Metadata</b></p> <p>Use several specific surface-based observing systems to road-test the draft WIGOS metadata core profile. After road tests review the lessons learnt</p>                                    | November 2013  | <b>Task Lead and Contributors:</b> See the details in the report of Break out group 1 on page 2 for details.     | Complete | Significant task requiring ~20 days of effort in total.<br><i>SJG 27/09: WIS Sec report that meeting to firm up Beta version due week beginning 30/09. So expect profile document to be available soon thereafter. Email sent to ET to confirm this. SJG 19/12: Review of Profile complete and top level feedback given to</i> |

| No. | Task   | Deliverable/Activity  | Due                     | Responsible   | Status           | Comment   |
|-----|--|---|-------------------------|---|------------------|---|
|     |  |   |                         |   |                  | <i>TT-WMD, suggest task complete.</i>   |
| 1.3 |  | <p><b>Quality Management</b><br/>           Improve quality monitoring of WMO / CBS / GOS surface-based observations exchanged globally by:<br/>           Review the current centres and if necessary develop the proposed role and terms of reference for a single global 'WMO Lead Centre for Quality Monitoring of Land Surface Observations' evolving from the role currently performed by the six Regional centres.<br/>           Develop a specification for the analysis and reporting required from the centre.</p> | March 2014              | <b>Task Lead and Contributors:</b> Not yet identified.  | Delayed          | Significant task requiring ~20 days of effort in total.<br><i>SJG 27/09: No progress made with triggering this task during September. This will be addressed at the end of October.</i><br><i>SJG 19/12: Little progress made with this task, to be a priority in 2014.</i> |
| 2.  | <p><b>Improving Technical Documents</b><br/> <i>Develop and update relevant elements of the Manual and the Guide on the GOS in the context of WIGOS, with initial priority on weather radar and AWSs [ToR b]</i></p> | Review and update the technical content on Weather Radars, AWS and other high priority systems in SBOs area of responsibility currently held in Manual and Guide for the GOS, noting a new technical document structure may be implemented during the period.   | March 2014 & March 2016 | <b>Co-ordination Lead:</b> Islam Ameen  | Progress limited | 60 days provisionally allocated, 110 days recorded below.<br><i>SJG 19/12: I have not yet requested an update on this task. This will be a priority for 2014.</i>   |
| 2.1 |  | <p><b>Weather Radar Review</b><br/>           Update WMO No.544 to reflect the importance of Weather Radar operations in WIGOS. Details in break out group 4 report.</p>  | March 2014 & March 2016 | <b>Task Lead:</b> Daniel Michelson<br><b>Task Contributors:</b> Jean-Luc Cheze, Jeong-Hee Kim, Oguzhan Sireci | On Track         | 50 days of effort from ET members but others will be engaged  |



| No. | Task | Deliverable/Activity  | Due                     | Responsible  | Status             | Comment   |
|-----|------|---|-------------------------|--|--------------------|---|
| 2.2 |      | <b>Wind Profiler Review</b><br>Update WMO No.544 to reflect the importance of Wind Profiler operations in WIGOS. Details in break out group 4 report.   | March 2014 & March 2016 | <b>Task Lead:</b> Dominique Ruffieux<br><b>Task Contributors:</b> Yusuke Kajiwara, Tom Szyzborski                                      | On Track           | Effort required to be assessed after Wind Profiler Survey coment.   |
| 2.3 |      | <b>Upper air synoptic stations</b><br>Update WMO No.544 to reflect the current status of upper air synoptic reporting operations in WIGOS. Details in break out group 4 report.   | March 2014 & March 2016 | <b>Task Lead:</b> Henry Karanja<br><b>Task Contributors:</b> Edmundo Lucas, Li Wei   | On Track           | 30 days of effort from ET members but others will be engaged.   |
| 2.4 |      | <b>Surface synoptic stations</b><br>Update WMO No.544 to reflect the current status of surface land reporting operations in WIGOS. Details in break out group 4 report.   | March 2014 & March 2016 | <b>Task Lead:</b> Islam Ameen<br><b>Task Contributors:</b> Seong-Chan Park, Henry Karanja, Edmundo Lucas, Karl Monnik & Kazunori Irie. | On Track           | 30 days of effort from ET members   |
| 2.5 |      | <b>AWS Technical Manual</b><br>Create an AWS technical manual from all material generated by ET-AWS over the past 7 meetings and publish as a technical document under new WIGOS banner. (Karl to provide insight into this task) | ?                       | <b>Task Lead:</b> Karl Monnik<br><b>Task Contributors:</b> To be confirmed   | On track           | Details of resources required to be confirmed by Karl.  |
| 2.6 |      | <b>GRUAN Manual &amp; Guide</b><br>With the introduction of the GRUAN Manual and Guide consideration of how these are referenced in the GOS Manual and Guide are needed   | March 2014              | <b>Task Lead:</b> To be confirmed<br><b>Task Contributors:</b> To be confirmed   | Not yet integrated | <i>SJG 27/09: New task added to work plan. Not clear how much effort this will take but I am assuming is will be only a few paragraphs in WMO No.544.</i> |

| No. | Task   | Deliverable/Activity   | Due                     | Responsible   | Status               | Comment  |
|-----|--|--|-------------------------|---|----------------------|--|
| 3.  | <p><b><u>Status of Implementation</u></b></p> <p>Monitor and assess the status of planned and operational surface-based observing systems and ensure this is adequately described in Volume A and metadata database(s) of Members' observing system capabilities [ToR c]</p> | Complete the outstanding actions associated with the Wind Profiler Questionnaire including results analysis. Review content of WMO No.9 Vol A including R/S catalogue and ensure it is fit for purpose and up to date, noting any future plans for changes in light of WIGOS and in particular the WIGOS Information Resourc | Ongoing / Annual review | <b>Co-ordination Lead</b> to be identified  |                      | 60 days provisionally allocated.<br><i>SJG 27/09: New task added to Work Plan in this section.</i>   |
| 3.1 |  | <b>WMO Radar Metadata Database</b><br>Maintenance and improvement of the WMO Radar Database, specifically the improved functionality identified at the WMO WxR Data Exchange Workshop, under recommendation 11.  | Ongoing + annual report | <b>Task Lead:</b> Oguzhan Sireci<br><b>Task Contributors:</b> To be identified                    | Delayed due to Chair | Suggest ~ 20 days devoted to this task as recommendation 11 contains a number of activities.<br><i>SJG 19/12: Not yet discussed best way of progressing this task with Oguzhan, must be a priority for 2014.</i>   |
| 3.2 |  | <b>Wind Profiling Radar Survey</b><br>Complete the outstanding actions associated with the Wind Profiler Questionnaire including results analysis. See Breakout report for details   | April 2014              | <b>Task Lead:</b> Dominique Ruffieux<br><b>Task Contributors:</b> Tom Szyzborski, Yusuke Kajiwara | On track             | Suggest 30 days is allocated to this task.<br><i>SJG 27/09: Excellent progress made by the team in finalizing the questionnaire. Now awaiting posting on WMO site by Dean.</i><br><i>SJG 19/12: Questionnaire published and plans for review agreed.</i><br><i>SJG March 2014: Profiler report produced.</i> |
| 3.3 |  | <b>Validation of 'Vol A' metadata</b><br>Details of task to become clear once proposals for migration of Vol A to new framework completed.   | 2015?                   | <b>Task Lead and Contributor:</b> Still to be identified.   | Not started          | Needs close liaison with IPET-OSDE.<br><i>SJG 19/12: In light of changes to Vol A with introduction of WIR content of this action not</i>  |

| No. | Task   | Deliverable/Activity  | Due     | Responsible   | Status      | Comment  |
|-----|--|---|---------|---|-------------|--|
|     |  |   |         |   |             | <i>yet clear. Need to clarify action in 2014.</i>  |
| 3.4 |  | Liaison with Weather Radar Exchange Pilot Projects<br>At the recent Wx Radar Data Exchange workshop a number of pilot projects on improving data exchange in the RAs were discussed. The progress of these and any support that can be given by ET-SBO needs to be established.                     | Ongoing | <b>Task Lead and Contributor:</b> To be confirmed.  | Not started | <i>SJG 27/09: New task added to work plan. Should be relatively light touch but regular contact with RA WxR exchange pilot projects would be the right thing to do.<br/>SJG 19/12: Not yet discussed with ET members how best to support this action.</i>                                      |
| 4.  | <b>Meeting User Requirements</b><br>In collaboration with IPET-OSDE, assess the contribution of current and planned SBO systems to meeting user requirements for all Application Areas [ToR d] | Provide reports to IPET-OSDE on the suitability of each observing system in meeting each Application areas requirement<br><br>Current task list includes:<br>Details to be obtained from IPET-OSDE (ET-EGOS-7) activity list and email correspondence between Chair ET-SBO and Etienne Charpentier. | Ongoing | Co-ordination Lead still to be identified<br>Task Leads to be identified once details of tasks become more clear.<br>Contributors to be identified once details of tasks become more clear. | On Track    | 30 days provisionally allocated, activity not discussed in detail at ET-SBO-1. Will be followed up in remainder of 2013.<br><i>SJG 19/12: 1<sup>st</sup> Workshop of Observing System Design. Provided feedback on proposed Design Principles. However further actions not yet considered.</i> |
| 5.  | <b>Delivering the EGOS-IP</b><br>Facilitate the delivery of those EGOS-IP actions identified as priorities for OPAG-IOS [ToR E]  | Undertake Radar Data Exchange Workshop and ensure follow up actions triggered.<br>Review EGOS-IP and proposed priority actions for consideration to ICT-IOS. Undertake agreed follow up actions   |         | Co-ordination Lead:<br><b>Li Wei</b>  | On track    | 150 days provisionally allocated.  |

| No. | Task   | Deliverable/Activity   | Due  | Responsible   | Status           | Comment  |
|-----|--|--|--|---|------------------|--|
| 5.1 |  | <b>Next steps with Weather Radar Data Exchange Action G48</b><br>WxR Data Exchange Task Team – details of ToR and workplan for TT to be found in final report in annex III pages 6 to 12.                              | March 2014 & March 2016 & beyond.              | <b>Task Lead:</b> Daniel Michelson<br><b>Task Contributors:</b> Jeong-Hee KIM , others to be confirmed by email | On track         | Approximately 50 days of effort to be devoted to this task.<br><i>SJG 27/09: Dean has formally requested the establishment of a TT to Chair ICT-IOS. SJG 19/12: TT being formed.</i>   |
| 5.2 |  | <b>Identify EGOS-IP Actions for ET-SBO</b><br>Analyse existing EGOS-IP actions using methodology defined by ET-SBO-1 Breakout Group 6 and recommend actions to be supported by ET-SBO to ET Members.                   | November 2013                                  | <b>Task Lead:</b> Li Wei<br><b>Task Contributors:</b> Jean-Luc Cheze & Tom Szyzborski                           | Progress delayed | Approximately 10 days in total should be assigned to this task.<br><i>SJG 27/09: Template to enable analysis of EGOS-IP actions produced and sent to Task Members. SJG 19/12: Progress delayed. Possibility of Radiosonde based action being considered.</i> |
| 5.3 |  | Further activity to follow, based on recommendations from above, could be tasks in this section or other sections depending upon the EGOS-IP actions identified.   | After December 2013                            | <b>Task Leads:</b> to be agreed<br><b>Task Contributors:</b> to be agreed                                       |                  | ~100 days of resource available for the delivery of further actions.   |
| 6.  | <b>Promoting Best Practice</b><br>Monitor the status of operational networks of SBO systems, promote best practice among WMO Members and provide advice on operational matters [ToR F] | Establish an improved source for technical advice documents “SBO Portal” as part of the WIGOS Information Resource. Populate Portal with national best practice documents. Respond to requests for advice from members | 2014 for Portal then ongoing for other actions | Co-ordination lead: <b>Henry Karanja</b> as Vice Chair SBO<br>All members will support this activity.           |                  | 100 days of effort provisionally allocated.<br><i>SJG 19/12: I have still not been able to devote any time to this task, this must be a priority for the next visit to Geneva in January.</i>  |

| No. | Task   | Deliverable/Activity  | Due              | Responsible  | Status                            | Comment  |
|-----|--|---|------------------|--|-----------------------------------|--|
| 6.1 |  | <b>Quality Management Review</b><br>Document all the currently operational quality monitoring centres for WMO / CBS / GOS surface-based observations exchanged globally together with their analysis methods and reports. Note very strong link to WIGOS QM activities. | March 2014       | <b>Task Lead: Henry Karanja</b><br><b>Task Contributors:</b><br>Edmundo Lucas, Islam Ameen | Requires a clear trigger in 2014. | Significant task requiring ~20 days of effort in total. See output from Breakout Group #5 for more details.<br><i>SJG 19/12: Changes to the Manual on the GDPFS will work to be undertaken on this task in 2014. Contact will be made in January to discuss best ways of progressing this task.</i>  |
| 6.2 |  | <b>Best Practice Portal</b><br>Create a observing networks operations best practice portal, described and linked from the WIGOS Information Resource (WIR) under Operations & Maintenance topic.  | November 2014    | <b>Task Lead:</b><br>Edmundo Lucas   | On Track                          | Suggested 10 days are associated with this task.   |
| 6.3 |  | <b>Quality Monitoring Portal</b><br>Specify structure, review current best practice and implement a QM portal within the WIR  | November 2014    | <b>Task Lead:</b> to be identified   | On Track                          | Suggested 10 days are associated with this task.   |
| 7.  | <b>Purposeful Horizon Scanning</b><br><br>Assess the potential contribution of new and emerging SBO technologies in meeting the Vision for the GOS in 2025, in collaboration with CIMO [ToR G] | Report on the suitability of new and emerging technologies for operational network implementation. Propose updates to the Vision for the GOS. Ensure close collaboration with relevant CIMO ETs & other working groups.   | 2014, 2015, 2016 | Co-ordination Lead: <b>Richard Ice</b> with all members of ET acting as contributors.      | On Track                          | 40 days provisionally allocated, needs to be reviewed in light of other changes but much of this effort is 'in kind' rather than core effort as members of ET may be traveling to technical conferences anyway<br><i>SJG 27/09: Contacted Richard to discuss the idea of using a visit report template to simplify the capture of intelligence from technical meetings. Further work will be required at the end of October.</i> |

| No. | Task   | Deliverable/Activity   | Due   | Responsible                          | Status       | Comment   |
|-----|--|--|---|--------------------------------------|--------------|---|
|     |  |  |   |                                      |              | <i>SJG 19/12: Daniel's visit report from AMS Meeting could act as a good template. Still to discuss this idea with Richard.</i>   |
| 7.1 |  | CIMO Teams identified where close co-ordination and review of their meeting reports is required:<br><i>CIMO OPAG-S&amp;I ET-A2 New In-situ Technologies;</i><br><i>CIMO OPAG-RSNT ET-B1 Operational Remote Sensing;</i><br><i>CIMO OPAG-RSNT ET-B2 New Technology and Test Beds;</i> | Sept 2013<br><br>End of 2013<br>Already met | <b>Task leads:</b> to be identified. | Task delayed | Report from each meeting is ~2 days of effort<br><i>SJG 19/12: We have not reviewed and discussed the output from recent CIMO meetings, to be addressed in 2014.</i>  |
| 7.2 |  | <i>In addition a review of papers submitted to major scientific and technical conferences, such as: AMS2014, EMS, ERAD, ISTP, others to be added.</i>  | Dates tbc                                   | <b>Task leads:</b> to be identified. | On track     | Report from each meeting is ~2 days of effort.<br><i>SJG 19/12: Daniels's report provides good style to follow.</i>   |
| 7.3 |  | Produce Annual Report for ET-SBO members. Annual report is a synthesis of likely future operational observing systems and their potential in meeting stated requirements.  | March 2014,<br>March 2015,<br>March 2016    | Task Lead: Richard Ice               | On track     | Annual report is ~2 days of effort per year.  |
| 8.  | <b>Reporting Progress to ICT-IOS</b><br>Provide advice and support to the Chairperson of OPAG-IOS on the implementation of the WIGOS framework and its operational aspects [ToR H] | Deliver progress reports and recommendations for changes to operating practices, technical documents and guidance to ICT-IOS during inter-sessional period.  | 2014 and 2016                               | <b>Task Lead: Chair ET-SBO</b>       | On track     | Chair 20 days in total ~20 days in total from all ET members<br><i>SJG 19/12: ICT-IOS-8 provisionally confirmed for week beginning 7<sup>th</sup> April and so documents will need to be ready in early March. Draft material to be circulated earlier.</i> |

| No. | Task | Deliverable/Activity   | Due                 | Responsible  | Status   | Comment                                     |
|-----|------|--|---------------------|--|----------|---|
| 8.1 |      | Generate report of work for ICT-<br>IOS-8. Requires input from all ET<br>Members.                    | April 2014<br>(tbc) | Chair ET-SBO with<br>review of report by all<br>members. | On track | Chair 5 days<br>ET members 0.5 days<br>each |
| 8.2 |      | Attend ICT-IOS-8, report progress<br>with work plan activities and<br>provide feedback to ET Members | May 2014<br>(tbc)   | Chair ET-SBO   | On track | Chair 5 days                                |
| 8.3 |      | Generate report of work for ICT-<br>IOS-9. Requires input from all ET<br>Members.                    | April 2016<br>(tbc) | Chair ET-SBO with<br>review of report by all<br>members. | On track | Chair 5 days<br>ET members 0.5 days<br>each |
| 8.4 |      | Attend ICT-IOS-8, report progress<br>with work plan activities and<br>provide feedback to ET Members | May 2016<br>(tbc)   | Chair ET-SBO   | On track | Chair 5 days                                |

**APPENDIX C – NOT YET UPDATED WITH FEEDBACK FROM IPET-WIFI****Proposal for Development of the WIGOS Observations Quality Improvement System (W-OQIS)**

| <b>Version</b> | <b>Description</b>                              | <b>Author/Reviewer</b> | <b>Date</b> |
|----------------|---|------------------------|-------------|
| A              | Initial thoughts by Stuart Goldstraw, Ch-ET-SBO | Stuart Goldstraw       | 24 Jan 2014 |
| D1             | Update by Dean Lockett, Secretariat             | Dean Lockett           | 25 Feb 2014 |

**Background**

A wide range of NWP centres undertake global or regional observational monitoring tasks. This is broadly defined within the GDPFS Manual (see Annex I for references), with specific practices at various centres being documented locally. To better understand and improve international observational monitoring practices, tasks within the IPET-WIFI/SG-QM and ET-SBO work plans have been established to review and revise as necessary, the actual observational monitoring activities being undertaken by a range of national and international monitoring centres.

Additionally and related to these tasks, under the WIGOS Implementation Plan, there are 2 global actions relating to quality management:

|                    |  |   |
|--------------------|--|---|
| <b>5.1.1<br/>G</b> | Develop WIGOS Quality Management guidance, mechanism, practices and procedures             | 1) WIGOS QM to be incorporated into WIGOS Regulatory material<br>2) Appropriate bodies have responsibilities identified in their ToRs |
| <b>5.1.2<br/>G</b> | Examination of current quality management practices being used by WMO observing programmes | Report on QM practices used with identification of areas for improvement  |

Quality Management practices clearly is much wider in scope than just international quality monitoring activities, however improvement, enhancement and extension of these practices would contribute greatly to improved data quality of observing systems.

The main gap in the current monitoring processes appears to be the link between the outcomes of the observations monitoring undertaken by the NWP Monitoring Centres, the coordinating activities of the Lead Centers and engagement of the appropriate staff in each Met Service to solve the problems, or at least gain a better understanding of the root cause. There are some examples of good practice but equally a number of observational data quality problems identified many months or even years ago have not been addressed. The proposal herein is targeted at improving this situation.

The main driver for this work is the improvement in the quality of the observational data provided for use by Application Areas, as defined in the WMO Rolling Review of Requirements process. While this activity will be focussed on the utilisation of data by NWP centres, due to their O-B feedback, it is believe all application areas will benefit from the improved performance of the observational networks.



The currently defined systems for monitoring both observational data quantity and quality (Manual on GDPFS and Manual on Codes) predominantly rely on the concept of communications via the GTS and do not take advantage of more modern communications methods and associated tools such as the Internet and E-mail.

While the role of monitoring of message traffic on the GTS is still vital and lies in the domain of the the WIS centers, it does not make sense that such centers should be tasked with quantity and quality monitoring functions associated with message content.

The role of global NWP centers, while firmly established in relation to provision of a leading role in observations quality monitoring, can likely be extended to the provision of a role in a streamlined and enhanced quantity monitoring system.

### **Related Activities and Collaboration and Cooperation with other WMO Teams**

Ultimately, this activity, particularly as it relates to the WIGOS IP, would be a contribution to the work of EC/ICG-WIGOS and its task team on WIGOS QM (TT-WQM). However, given its connection to the WWW and the GOS, CBS IPET-WIFI, through it's sub-group on QM (SG-QM – for Members and ToR, see Annex III of [IPET-WIFI-1, Final Report](#)) should probably be the lead WMO body, with a strong contribution to be made from ET-SBO.

The task is defined within Task 5 (Deliverable/Activity 5) of the IPET-WIFI Work Plan – Annex IV of IPET-WIFI-1 – see below.

|    |   |  |          |                                   |         |    |   |
|----|---|--|----------|-----------------------------------|---------|----|---|
| 5. | Provide advice to ICG-WIGOS via CBS on GOS Quality Management practices and procedures. | 1. Request TCs to nominate QM focal points for WIGOS sub-systems.  | Aug 2013 | <b>Secretariat</b>                | ICT-IOS | 0% | <sup>e</sup> include consideration of the possibility of combining the roles of global quality and quantity monitoring.<br><sup>f</sup> to improve the feedback mechanisms and process so as to |
|    |   | 2. Review the status of WMO and Regional quality monitoring systems with a view to identifying areas for improvement and efficiency <sup>e</sup> : a) Review existing regulatory material related to QM for GOS sub-systems. b) Prepare recommendations on new or improved QM procedures in relation to GOS sub-systems. | Oct 2013 | <b>Schrab</b><br>Members of SG-QM |         | 0% |   |
|    |   | 3. a) Review the outcomes of the ECMWF Workshop on NWP data monitoring requirements  | Jun 2014 | <b>Schrab</b><br>Members of SG-QM | 0%      |    |   |
|    |   |  | Sep 2013 |                                   | SG-RM   | 0% |   |

CBS OPAG-IOS IPET-WIFI-1, Annex IV, p 3

| No <sup>5</sup> | Task | Deliverable/Activity   | Due                              | Responsible  | Impacted ETs         | Status          | Comment   |
|-----------------|------|--|----------------------------------|--|----------------------|-----------------|---|
|                 |      | (Jul 2013) b) Assist in the process of integrating the procedures into the Manual or Guide on WIGOS.<br>4. Develop and document the concept of extending the Global Quality Monitoring System to a "Fault Management System" <sup>d</sup> .<br>5. Contribute to the drafting work of TT-WRM <sup>g</sup> in collaboration with SG-RM and provide GOS-related feedback through SG-RM on TT-WRM documentation <sup>h</sup> . | Jun 2014<br>Aug 2014<br>Oct 2013 | <b>Schrab</b><br>Members of SG-QM<br><br><b>Schrab</b><br>Members of SG-QM | ICT-IOS<br><br>SG-RM | 0%<br>0%<br>20% | better ensure the identification and rectification of missing data, station outages and specific quality issues.<br><br><sup>g</sup> Take the lead in drafting QM material on GOS for Tech Regs (incl Common Elements of Surface-Based Obs Systems) and WIGOS Manual.<br><br><sup>h</sup> Task 5 leader will participate in TT-WRM teleconferences. |

This task is also related to the work of CBS ICT-DPFS, whose current work plan has the following activity. (Final report of the ICT-DPFS Ext Meeting, Jan 2013: [http://www.wmo.int/pages/prog/www/CBS-Reports/documents/ICT-DPFS-Ext\\_report-Jan2013.pdf](http://www.wmo.int/pages/prog/www/CBS-Reports/documents/ICT-DPFS-Ext_report-Jan2013.pdf) )

|    |           |  |   |                                    |   |                      |              |
|----|-----------|--|---|------------------------------------|---|----------------------|--------------|
| P2 | WIGOS/WIS | Update observation monitoring procedures | up-to-date observation monitoring procedures included in appropriate manual | Updated procedures endorsed by CBS | Review current observation monitoring procedures. update as required. agree on which manual to put these in: consider near-real-time requirements; joint with WIGOS, IOS, ISS; quality and quantity; plan for implementation; implement | Joint TT (DPFS, IOS) | D Richardson |
|----|-----------|--|---|------------------------------------|---|----------------------|--------------|

## Proposal

### Aims

1. To revise the current provisions and requirements for both quantity and quality monitoring within the WWW and to analyse the gaps and areas where improvement can be made.
2. To review the structure, roles and processes of international observations quantity and quality monitoring and to make recommendations for improvement.

3. To establish an improved mechanism to link the current observational monitoring undertaken by NWP centres with the NMHSs providing the observational data by implementing an Observations Quality Improvement System in the context of WIGOS.

### **Scope**

1. The review will be limited to the land surface-based observing systems of the GOS.
2. Quantity monitoring will be extended from system-based message statistics to the level of individual meteorological parameters.
3. Revision and update of monitoring requirements including:
  - o Frequency of monitoring and monitoring reports.
  - o Distribution of reports.
  - o Procedures and responsibilities for follow-up action.

### **Deliverables**

- a) Revised and updated plan and procedures for quality and quantity monitoring of land, surface-based observing systems of the GOS.
- b) Revised international structure and framework for international observations monitoring.

The solution would be expected to consist of the following elements:

- a) The continuous near-real-time (e.g. daily) and non-real-time (e.g. monthly or other periods as necessary) monitoring and reporting of observational data quantity and quality by NWP centres.
- b) A central website where observational monitoring reports from the monitoring centres will be made available to WMO Members.
- c) A structure of NMHS, Regional and/or global focal points and system experts and mechanisms for relay of reports and information to and between them.
- d) A database for recording:
  - a. monitoring results
  - b. observing systems issues (by site, date/time and parameter)
  - c. fault rectification/resolution
- e) A set of forums for:
  - a. sharing of information on issues and priorities associated with fault detection and resolution;
  - b. recording and making available common problems and their solutions.
- f) A performance reporting mechanism that will demonstrate the benefit of improving the quality of the observing network.

***Tasks and Activities***

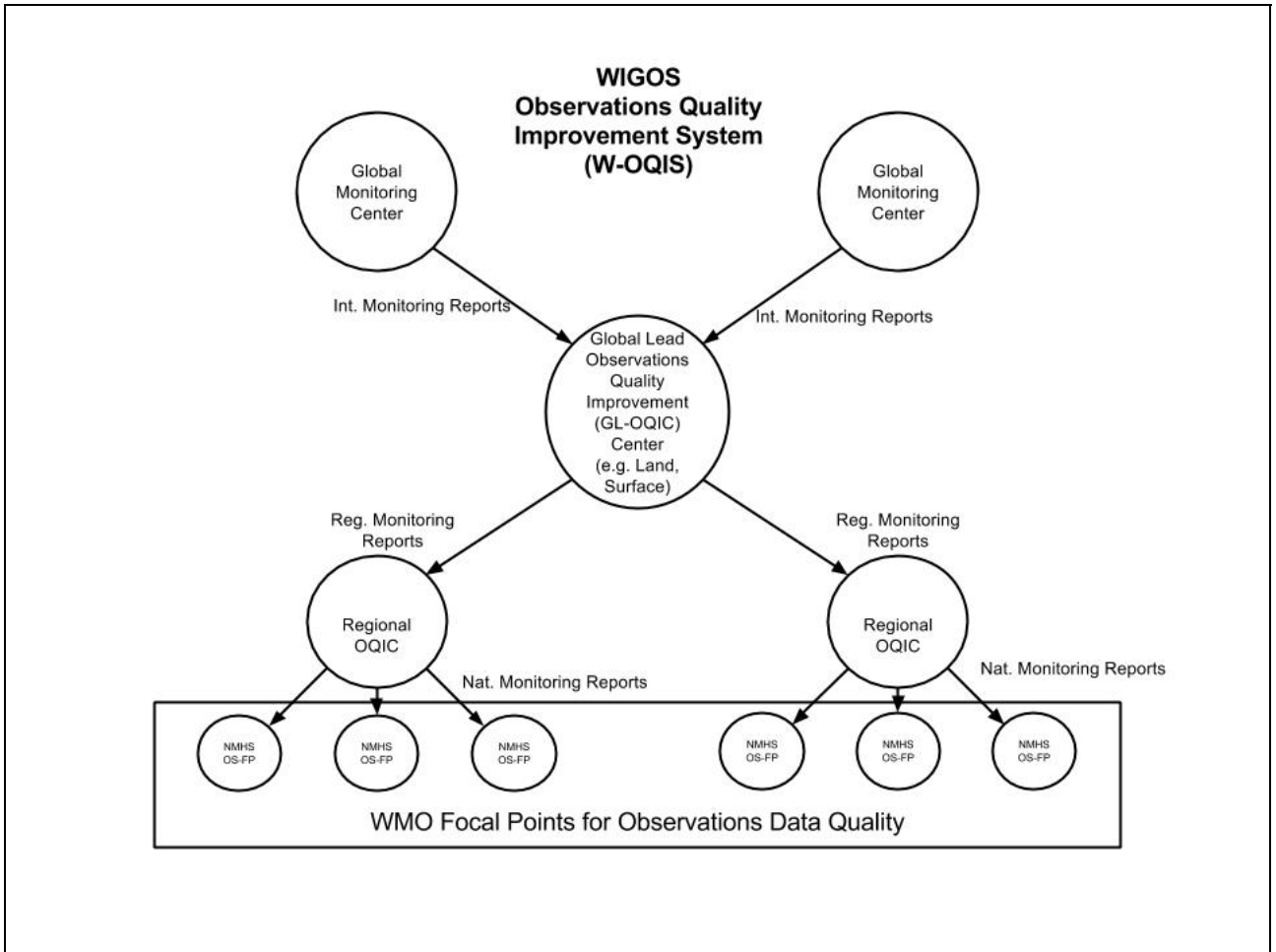
***In lead up to ICT-IOS-8***

1. SG-QM and ET-SBO to review and revise the proposal.
2. ET-SBO QM Sub-group to be designated to assist SG-QM.
  - a. Suggest a virtual CBS team of 2 members of SG-QM and 2 members of ET-SBO is formed.
  - b. IPET
3. SG-QM to review the current monitoring procedures and practices and make broad recommendations for improvement.
4. Finalise the proposal for presentation to ICT-IOS-8 to include a list of worked examples.

***Post ICT-IOS-8***

TBD

**Initial Ideas & Considerations**



**Functions**

WMO

- Establish W-OQIS centers
- Establish and maintain W-OQIS Focal Point email lists (e.g. Google Groups email lists)
- Establish and maintain W-OQIS Focal Point Forums (e.g. Google Groups forums)

WMO Technical Commissions

- Define procedures for W-OQIS centers.
- Define specification or requirements for the OQIS-DB.

Global Monitoring Center (GMC)

- Compare received data with NWP
- Produce real-time (e.g. daily) monitoring reports in standard format

- Send reports to GL-OQIC
  - This could be facilitated by direct transaction with the GL-OQIC database.

#### Global Lead Observations Quality Improvement Center (GL-OQIC)

- Receive and store GMC monitoring reports.
- Maintain the Observations Quality Improvement System database (OQIS-DB).
- Disseminate regional (and national) monitoring reports to R-OQICs and NMHS OS-FPs.
- Provide access to regional (and national) monitoring reports on demand (e.g. internet transaction with OQIS-DB).
- Report to WMO TCs on monitoring and improvement results.

#### Regional Observations Quality Improvement Center (R-OQIC)

- Follow up on unresolved issues:
  - Uncorrected faults
  - Silent stations
- Maintain a regional help center for observations (e.g. respond to questions and issues raised on W-OQIS FP forums)
- Report to Regional Association on observations quality.

#### NMHS Observing System Focal Points

- Receive and take initial action upon reception of monitoring reports.
- Maintain the OQIC-DB to record when faults have been rectified.

#### ***Issues***

Initial focus would be on 1 or 2 land surface-based systems and parameters (e.g. as per the requirements of the Manual on the GDPFS. Additional meteorological parameters, observing systems and networks could be added to the W-OQIS once the initial components are successfully implemented.

It is envisaged the GL-OQIC would be predominantly virtual with a number of WMO members contributing staff time and resources to its maintenance.

Communications and dissemination of reports would likely be via email and the Internet.

The OQIS-DB would be the key tool for the W-OQIS and would facilitate:

- Recording of monitoring results
- Production and dissemination of monitoring reports
- Recording of fault rectification

The administration and activities of GL-OQIC and the OQIS-DB might be supported via a trust fund that additionally might be used to support other activities, e.g. the recovery of some errant or non-functioning observing systems.

In addition to the W-OQIC-FP forums, the WIGOS Information Resource would be utilised to provide information and possible solutions to common quality issues so as to promote best practice.

If necessary, access to the various forums, online information and database content would be restricted accordingly.

***Risks***

TBD.

## References and Information

### Data Quality Monitoring of the World Weather Watch via the Global Data Processing and Forecasting System

1. Online information on the process is at:  
<http://www.wmo.int/pages/prog/www/DPS/Monitoring-home/mon-index.htm>
2. *Plan for Monitoring the Operation of the World Weather Watch* is provided in the Manual on the GDPFS, Part II, Attachment II-7.
3. Requirements for monitoring are defined in the Manual on the GDPFS, Part II, Attachment II-9, *Procedures and Formats for the Exchange of Monitoring Results* at [http://www.wmo.int/pages/prog/www/DPFS/Manual/documents/485\\_Vol\\_I\\_en.pdf](http://www.wmo.int/pages/prog/www/DPFS/Manual/documents/485_Vol_I_en.pdf)

### Data Quantity Monitoring of the World Weather Watch

1. Introductory information on the WEB is at:  
<http://www.wmo.int/pages/prog/www/ois/monitor/introduction.html>
2. Guide on Integrated WWW Monitoring (IWM):  
[ftp://ftp.wmo.int/GTS\\_monitoring/IWM/From\\_WMO/Guide-Implementation-IWM.pdf](ftp://ftp.wmo.int/GTS_monitoring/IWM/From_WMO/Guide-Implementation-IWM.pdf)



## **APPENDIX D**

### **TERMS OF REFERENCE FOR THE WMO CBS TASK TEAM ON WEATHER RADAR DATA EXCHANGE**

**Approved October 2013**

- (a) Gather requirements for information (data, metadata, products, timeliness and frequency) from weather radars to be exchanged globally on a regular basis along with requirements on recommended transmission methods;
- (b) Develop and document a data model based on the requirements;
- (c) Identify and recommend appropriate data formats for operational and scientific exchange;
- (d) Express the data model using approved data format(s), taking into account the considerable progress achieved by EUMETNET OPERA in harmonizing operationally exchanged real-time weather radar data with the OPERA Data Information Model (ODIM);
- (e) Coordinate with IPET-MDRD and IPET-DRMM to ensure that the data model and data representations are consistent and compatible with WMO standards and practices;
- (f) Make recommendations on requirements for documentation and training materials to support WMO Members in the application and use of the data model and data representations to be used for the global exchange of weather radar information to support data users;
- (g) Using ODIM\_BUFR as a basis, develop, review and coordinate approval of required BUFR sequences for global exchange of radar data;
- (h) Elaborate compliance between ODIM\_H5 and netCDF CF Conventions, especially regarding GIS compatibility.