

**WORLD METEOROLOGICAL ORGANIZATION**

**COMMISSION FOR BASIC SYSTEMS**

**OPAG ON INTEGRATED OBSERVING SYSTEMS**

**INTER-PROGRAMME EXPERT TEAM ON THE  
OBSERVING SYSTEM DESIGN AND EVOLUTION  
(IPET-OSDE)**

**WORKSHOP FOR DRAFTING THE "VISION FOR  
WIGOS SURFACE-BASED OBSERVING COMPONENTS  
IN 2040"**

*(CBS Vision 2040 Surface)*

Offenbach, Germany, 23-25 August 2016

**FINAL REPORT**



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CBS Vision 2040 Surface, Final report



(Group photo, Thursday 25 August 2016)

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## **EXECUTIVE SUMMARY**

The CBS OPAG-IOS Inter Programme Expert Team on Observing System Design and Evolution (IPET-OSDE) workshop for drafting the "Vision for WIGOS Surface-Based Observing Components in 2040" (Vision 2040 Surface) took place at the Deutscher Wetterdienst (DWD) in Offenbach, Germany from 23 to 25 August 2016.

The workshop drafted a first version of the Vision 2040 Surface, agreed on immediate post meeting actions in preparation of the WIGOS Workshop for the Vision for WIGOS surface-based component Observing Systems in 2040, which is planned in Geneva, Switzerland, from 18 to 20 October 2016.

The workshop also proposed an updated workplan for developing the WIGOS Vision 2040, i.e. a document that includes the integration of the visions for the surface-based and space-based component observing systems. The workshop agreed that the role of the current Vision in the Rolling Review of Requirements (RRR) process was the same as the role of the future WIGOS Vision 2040.

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## GENERAL SUMMARY

### 1. ORGANIZATION OF THE SESSION

#### 1.1. Opening of the meeting

1.1.1. The CBS OPAG-IOS Inter Programme Expert Team on Observing System Design and Evolution (IPET-OSDE) workshop for drafting the "Vision for WIGOS Surface-Based Observing Components in 2040" (Vision 2040 Surface) opened at 10.00 hours on Tuesday 23 August 2016, at the Deutscher Wetterdienst (DWD) in Offenbach, Germany.

1.1.2. This workshop follows establishment of an *ad hoc* Sub-Group of the IPET-OSDE by the Second Session of the IPET-OSDE, Geneva, Switzerland, 11-14 April 2016. The Sub-Group is co-chaired by Dr John Eyre (United Kingdom), and Mr Frank Grooters (The Netherlands).

1.1.3. The workshop was chaired by the two co-chairs of the Sub-Group. Both welcomed the participants and wished for a successful meeting.

1.1.4. The list of participants is given in **Annex 1**.

1.1.5. Dr Jochen Dibbern (Germany) welcomed the participants on behalf of DWD. He recalled the importance of the meeting for the WMO and also for WMO Members to develop WIGOS national implementation plans. Dr Dibbern wished for a successful meeting.

1.1.6. Dr Wenjian Zhang (WMO Secretariat) welcomed the participants on behalf of the WMO Secretary General, Dr Petteri Taalas, and thanked DWD for hosting the workshop. He recalled that the meeting is tasked to draft the Vision 2040 Surface and will provide input to the WIGOS Vision 2040 Workshop in October 2016. The 16th Session of the Commission for Basic Systems (CBS) will then be invited to note the developed draft WIGOS Vision 2040 at the time. Dr Zhang stressed the following points regarding the development of the Vision 2040 Surface: (i) 17<sup>th</sup> Congress requested to address all WIGOS component observing systems, (ii) the document must be a visionary document, 25 years from now, and it is critical and challenging to develop it (it is difficult to guess what technologies will be used in 25 years but Members need guidance), and (iii) the key role of surface-based observing systems must be identified. Dr Zhang recalled that about 50 years ago the synoptic network was established and is still the backbone of the World Weather Watch (WWW) Global Observing System (GOS). He stressed that expansion from synoptic observations to all dimensions and scales is needed.

#### 1.2. Adoption of the agenda

1.2.1. The Provisional Agenda, as contained in the CBS-Surf-Vision/Doc. 1.2(1) was adopted by the workshop.

#### 1.3. Working arrangements

1.3.1. The work of the Workshop was conducted as a committee of the whole. However, sub-groups were established as required to consider specific issues. The session and documentation was in English only.

1.3.2. The Team agreed on its working hours and adopted a tentative time table for consideration of the various agenda items.

1.3.3. The Secretariat introduced the documentation plan of the meeting, available

at <https://sites.google.com/a/wmo.int/cbs-surf-vision/>. The Chair thanked all those who have contributed to the documentation plan.

## **2. GUIDANCE FROM THE OPAG-IOS AND IPET-OSDE CHAIRPERSONS**

### **2.1. Guidance from the OPAG-IOS Chairperson and role of the workshop**

2.1.1. The Chairperson of the CBS Open Programme Area Group (OPAG) in Integrated Observing Systems (OPAG-IOS), Dr Jochen Dibbern (Germany), provided his guidance and explained about the role of the Workshop.

2.1.2. He stressed that it is important to identify who are the users of the Vision 2040 Surface document, and that the document will be used as guidance material helping WMO Members to evolve their observing systems. The document should focus on requirements for observational products and services (e.g. metadata, quality control) that will be delivered in 2040, more than on observing technologies. He explained that duplication with other existing materials such as the EGOS-IP and OSCAR should be avoided. Finally, Dr Dibbern proposed that the role of the private sector should also be addressed in the new WIGOS Vision 2040 although the main focus should be with the WMO Members and National Meteorological and Hydrological Services (NMHSs).

### **2.2. Guidance from the IPET-OSDE Chairperson**

2.2.1. The Chairperson of the IPET-OSDE, Dr John Eyre (United Kingdom) provided the IPET-OSDE perspective for drafting the Vision 2040 Surface.

2.2.2. He recalled that the Second Session of the CBS Inter-Programme Expert Team on the Observing System Design and Evolution (IPET-OSDE), Geneva, Switzerland, 11-14 April 2016, established a sub-group tasked to draft the Vision for WIGOS surface-based observing components in 2040" (Vision 2040 Surface). The co-leads of the Sub-Group, Dr John Eyre (UK) and Mr Frank Grooters (The Netherlands) have agreed on a workplan, which included (i) email consultation of the sub-group, (ii) a workshop for drafting an initial version of the Vision 2040 Surface, and (iii) further steps to submitting the initial draft through the wider WIGOS consultation, and the CBS sixteenth Session for its noting of work and progress and further guidance. It was noted that EC-69 (2017) was an important milestone to deliver work in progress, and it was proposed that a draft WIGOS Vision 2040 to integrate both Surface and Space Visions should be developed during 2017.

2.2.3. IPET-OSDE-2 agreed that all WIGOS component observing systems (GOS, GAW, GCW, WHOS), and co-sponsored observing systems (GCOS, GOOS<sup>1</sup>) should be engaged in contributing to the WIGOS Vision 2040, taking into account both surface-based and space-based observing components. IPET-OSDE-2 discussed and identified some elements that should in principle differ when developing the surface-based component of the Vision versus the space-based component.

2.2.4. IPET-OSDE-2 also noted that CIMO discussed an Instrument and Methods of Observation Programme (IMOP) Vision for 2040, and has developed a two-pager draft. The Team agreed that CIMO should be involved in the process of developing the new WIGOS Vision for 2040 for the surface-based component.

2.2.5. IPET-OSDE-2 further noted that the new WIGOS Vision 2040 will be appropriate material to be used to develop a business case for accessing externally sourced data, as this may be an issue in the future.

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<sup>1</sup> IOC-WMO-UNEP-ICSU Global Ocean Observing System

2.2.6. The workshop agreed that the final version of the WIGOS Vision 2040 should not be longer than about ten pages. This should impact the length of the Space Vision as well.

2.2.7. The workshop also noted that while the current Vision for the GOS in 2025 is good and well structured, it is lacking some elements beyond technologies (e.g. integration, QC, metadata, data policies and data exchange). Some elements are predictable, other elements are very difficult to predict. The workshop agreed to start drafting the new Vision 2040 Surface on the basis of the structure of the current 2025 GOS Vision. The new Vision 2040 Surface will have to include elements on user requirements that are being addressed, technology, who makes observations and what is the role of NMHSs and the private sector.

2.2.8. The workshop noted that observational user requirements for severe weather, heat waves, urban matters, and air pollution are going to increase, and that such requirements should be considered when developing the WIGOS Vision 2040.

### **3. THE ROLLING REVIEW OF REQUIREMENTS PROCESS AND THE CURRENT VISION**

#### **3.1. Background information on the development of the current Vision for Global Observing Systems in 2025**

3.1.1. The meeting received background information on the development of the current Vision for the Global Observing System in 2025 ("Vision 2025", see website<sup>2</sup>), which was completed in 2009 through Recommendation 1 (CBS-14).

#### **3.2. Role of the Vision in the RRR process**

3.2.1. The workshop reviewed the role of the Vision in the Rolling Review of Requirements (RRR) process. The Vision 2025 has played a useful role. It has been used widely within the WMO community and in discussions with partners, to provide a concise and easily intelligible statement of the types of developments in observing systems that would best serve the needs of WMO Members. The Vision 2025 has been used by the WMO Space Programme in its interactions, on behalf of WMO Members, with space agencies through CGMS and other forums. Although this has been very valuable, the role of the Vision 2025 for this specific purpose has now become more limited, because of the long lead times for developing satellite programmes. In this regard, 2025 is almost "tomorrow", and space agencies are looking for a longer term vision to motivate their future programmes and to guide their collective response to WMO needs.

3.2.2. The workshop discussed how surface-based and space-based observing systems complement each other, and what is the added value of the surface-based ones, including (i) variables that cannot be observed from space, (ii) validation of satellite data, (iii) collection of higher resolution data regionally and more timely data for time critical applications (e.g. weather radars), and (iv) continuity of data records for climate applications, etc.

### **4. THE WIGOS FRAMEWORK AND CURRENT PLANS**

#### **4.1. Role of the new Vision in relation to WIGOS activities**

4.1.1. The workshop was briefed on the role of the new WIGOS Vision 2040 in relation to the development of the WIGOS Pre-Operational Phase 2016-2019.

4.1.2. In particular, following guidance of CBS-Ext.(2014), it was agreed that a

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<sup>2</sup> <http://www.wmo.int/pages/prog/www/OSY/gos-vision.html>

vision for the observing system components of WIGOS in 2040 should be developed. The Seventeenth World Meteorological Congress (Cg-17, May/June 2015) acknowledged the request of the Sixty-Sixth Session of the Executive Council (EC-66, 2014) to CBS taking the lead in developing the "Vision for WIGOS in 2040" (WIGOS Vision 2040), which will include the vision for the WIGOS component observing systems in 2040 for its submission to Cg-18 in 2019. The Sixty-Eighth Session of the Executive Council (Geneva, June 2016) stressed the importance of an early development of the WIGOS Vision 2040 and requested CBS to lead this development, with involvement of the other technical commissions with the goal to have a draft WIGOS Vision 2040 submitted to the eighteenth World Meteorological Congress (Cg-18) in 2019 for endorsement.

4.1.3. The workshop agreed that the role of the Vision in the Rolling Review of Requirements (RRR) process was the same as the role of the WIGOS Vision 2040.

4.1.4. The workshop wondered whether WIGOS would have the same scope in 2040 as it has now (e.g. regarding the archiving of data). It agreed to develop the Vision 2040 Surface as a vision for the observing system capabilities on this timescale, without going into the details of how these would be delivered or implemented.

#### **4.2. Current workplan for developing the new Vision for WIGOS Component Observing Systems in 2040**

4.2.1. The workshop recalled that the ICT-IOS, ET-SAT and IPET-OSDE have been addressing the recommendations of Congress and the Executive Council and started to develop the drafts of the Space- (Vision 2040 Space) and Surface-based (Vision 2040 Surface) parts of the WIGOS Vision 2040.

4.2.2. The workshop noted that the draft Vision 2040 Space and the draft Vision 2040 Surface will be submitted to the Sixteenth Session of the CBS (Guangzhou, China, 23 to 29 November 2016) for noting work in progress and providing further guidance to the OPAG-IOS. EC-69 (2017) will also be an important milestone to report on work in progress, which might be a draft of the WIGOS Vision 2040, i.e. a document that includes the integration of the visions for the surface-based and space-based components. The plan is to have all WIGOS component observing systems (GOS, GAW, GCW, WHOS) and co-sponsored observing systems (GCOS, GOOS) engaged in preparing and reviewing the WIGOS Vision 2040.

4.2.3. The workshop recalled that the ninth Session of ICT-IOS (ICT-IOS-9), Geneva, Switzerland, 18-21 April 2016 considered the IPET-OSDE proposals and then proposed a roadmap for (i) taking forward the Vision 2040 Space and the Vision 2040 Surface to CBS-16; (ii) combining, and including the integrated version of these two components into a WIGOS Vision 2040, and (iii) the subsequent review and approval process. ICT-IOS-9 also agreed that the WIGOS Vision 2040 should be a short document (~10 pages).

4.2.4. The workshop also noted that the WIGOS Workshop for the Vision 2040 Surface is planned in Geneva, Switzerland, from 18 to 20 October 2016. The outcome and recommendations of this workshop will be also be considered by CBS-16 as work in progress.

4.2.5. ICT-IOS-9 recommended that the ICG-WIGOS should now take ownership of the further development of the WIGOS Vision 2040, and take the lead, in the view to have it adopted by Cg-18. The OPAG IOS will contribute to the further development of the WIGOS Vision 2040 according to ICG-WIGOS guidance.

4.2.6. The workshop reviewed the current workplan for developing the new WIGOS Vision 2040 as proposed by the ICT-IOS-9. See item 7.4 and Annex 3.

## **5. DISCUSSION ON UPDATING THE VISION FOR WIGOS COMPONENT OBSERVING SYSTEMS**

### **5.1. Review of existing materials**

5.1.1. The workshop reviewed the materials made available before the workshop. Regarding document No. 6 (i.e. Space Vision 2040), the workshop requested Jay Lawrimore and John Eyre to check the observing capabilities requested by the GCOS IP and to make sure that they are considered in the Surface and Space Visions (**action; J. Layrimore (Surface & J. Eyre (Space); end Sept. 2016).**)

### **5.2. Proposed methodology and draft plan**

5.2.1. The workshop discussed and agreed on a methodology for drafting the Vision 2040 Surface.

### **5.3. Elements to take into account for updating the current Vision**

5.3.1. The workshop reviewed all the elements to be considered for updating the current GOS Vision 2025.

### **5.4. Cross-cutting issues**

5.4.1. The workshop reviewed and discussed prospective higher level and cross-cutting elements of the new Vision 2040 Surface to be considered (e.g. foreseen evolved roles of NMHSs and private sector with regard to surface observations, role of social media, big data, ...).

5.4.2. The workshop agreed that there was a need to review cross cutting issues from various materials, including the current GOS Vision 2025, the new draft Vision Space 2040, WIGOS materials, and to include them in the Vision 2040 Surface.

### **5.5. New surface-based observing systems elements to consider**

5.5.1. The workshop reviewed and discussed new surface-based observing systems elements to consider to be included in the new Vision 2040 Surface. Volunteers had provided input prior to the workshop in this regard.

### **5.6. Other elements to consider**

5.6.1. The workshop agreed that it was necessary to reach a clear view on the scope and detailed structure of the Vision 2040 Surface document that the workshop will be drafting, and for which the break-out groups (item 6) will draft the detailed text.

5.6.2. The workshop reviewed and discussed other elements to consider to be included in the new Vision 2040 Surface.

5.6.3. The workshop agreed to update and include into the Vision 2040 Surface some generic issues across all observing systems, as well as emerging and specific things to be issued, e.g. user requirements for severe weather, heat waves, urban matters, etc.

## **6. DRAFTING THE NEW SURFACE VISION**

### **6.1. Distribution of the work**

6.1.1. The workshop organized itself in drafting breakout groups. The workshop decided in plenary the set up the following break-out groups, and designated group

leaders as follows:

- **Group 1** (Jochen Dibbern, Lars Peter Riishojgaard, John Eyre): Revising the preamble, introduction, add new ideas. A paragraph on new types of observations was added. Points from the Vision 2040 Space were considered and added.
- **Group 2** (Frank Grooters, Luca Centurioni, Jay Lawrimore, Etienne Charpentier): Reviewing and updating Section 2 and its Table of observing systems components. A 3<sup>rd</sup> column was added on the evolution and trends of observing systems.
- **Group 3** (Stefan Klink, Jitze van der Meulen, Wenjian Zhang): Reviewing Section 3, System and application specific issues. Drafting in breakout groups

6.1.2. The break-out groups were invited to take into account the findings and guidance of the workshop per previous discussion, and were tasked to draft specific parts of the Vision 2040 Surface. The leads of the break-out groups provided their respective drafts and recommendations to the workshop co-chairs for further consideration during the following agenda items.

## **7. FUTURE WORKPLAN**

### **7.1.Required immediate post-meeting actions**

7.1.1. The workshop agreed on immediate post-meeting actions. Actions decided by this meeting, are recorded in **Annex 2**.

### **7.2.Planning for the forthcoming WIGOS workshop on the new Vision 2040 Surface**

7.2.1. The workshop discussed planning for the forthcoming WIGOS workshop on the new Vision 2040 Surface, and agreed on its participation and input to that workshop.

7.2.2. The workshop stressed that there is a need to make sure that the Application Areas and key stakeholders will be well represented at the workshop (**action; Secr.; asap**).

### **7.3.CBS perspective on the development of the new Vision 2040 Surface, and preparations for CBS-16 in this regard**

7.3.1. The workshop discussed the CBS perspective on the development of the new Vision 2040 Surface, and preparations for CBS-16 in this regard.

### **7.4.Workplan for development of the combined Vision 2040**

7.4.1. The workshop reviewed the draft workplan for the development of the combined WIGOS Vision 2040 to integrate the Vision 2040 Space and the Vision 2040 Surface. The workshop proposed some adjustments to this plan. The new proposed workplan is provided in **Annex 3**.

## **8. ANY OTHER BUSINESS**

8.1. The Workshop considered any other business to discuss under this agenda item.

**9. CLOSURE OF THE SESSION**

9.1. The co-Chairs thanked the participants and the Secretariat for contributing to the successful outcome of the workshop. The workshop agreed that this has been a very productive meeting.

9.2. The meeting closed at 15:00 on Thursday 25 August 2016.

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**LIST OF PARTICIPANTS**

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**ACTION SHEET RESULTING FROM THE WORKSHOP  
(IMMEDIATE POST MEETING ACTIONS)**

No.	Ref <sup>1</sup>	Action	By	Deadline
1	5.1.1.	The workshop reviewed the materials made available before the workshop. Regarding document No. 6 (i.e. Space Vision 2040), the workshop requested Jay Lawrimore and John Eyre to check the observing capabilities requested by the GCOS IP and to make sure that they are considered in the Surface and Space Visions	J. Lawrimore (Surface) & J. Eyre (Space)	end Sept. 2016
2	7.2.2.	The workshop stressed that there is a need to make sure that the Application Areas and key stakeholders will be well represented at the workshop	Secr.	Asap
3		Draft vision to be made available to the WIGOS Workshop (18-20 Oct. 2016) by 3 October 2016	Secr.	3 Oct. 2016
4		Frank Grooters to review the ABO part in section 2, and consider moving some elements to the R&D, Technology. Development and Pathfinder category; research aircrafts to also be addressed in the R&D part	F. Grooters	15 Sept 2016 Done
5		Under remote sensing upper air profiling in table 2, Evolution and trends to be updated to reflect what new technologies will be used (e.g. Lidars, T&U, wind profilers, radiometers)	J. Dibbern	15 Sept. 2016
6		Review variables in column 2 of table 2 and make them compliant with the list of variables in OSCAR/Requirements	J. Eyre	15 Sept. 2016
7		CHy and other TCs representatives to be invited to review their relevant Sections of the draft Vision prior to the Workshop	Secr.	3 Oct. 2016
8		To review table 2 for generic issues to be moved to section 1	J. Eyre & F. Grooters	15 Sept. 2016
9		Michele Citterio to review the draft Surface Vision and complete the Cryospheric Observation section in Table 2	M. Citterio	15 Sept. 2016
10		Coordination Group on Space Weather to be invited to check the Space Weather section in table 2, update, and	Secr.	15 Sept. 2016

<sup>1</sup> Ref: reference to paragraph number of the workshop where relevant.

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No.	Ref <sup>1</sup>	Action	By	Deadline
		complete column 3; the section may also be shortened/summarized		
11		Placeholders should be put in Section 3 for all Application Areas. Some input to be provided as examples for a few Applications Areas (SSLP, ...)	Secr.	15 Sept. 2016
12		Address duplication between Table 2 and Section 3 (trends and evolution to be kept in Table 2).	J. Eyre & other workshop participants	15 Sept. 2016
13		Lightning detection systems section in section 3 to be reviewed (possibly out of date) and updated by appropriate experts, and complementarity with satellite systems addressed. J. Eyre to invite expert to review the section	J. Eyre	15 Sept. 2016
14		Consider addition to section 1 to reflect the growing ease of making and sharing observations	J. Eyre	15 Sept. 2016 (Done)
15		Add footnote in Table 2 to explain the logic of the table structure (by layer, station type, etc.)	Secr.	15 Sept. 2016
16		Secretariat to invite GAW to add ozonesonde information in table 3 under 3rd column of Atmospheric composition upper-air observations section	Secr.	15 Sept. 2016

**PROPOSED ACTION PLAN FOR DEVELOPING THE WIGOS VISION 2040**

<b>Date</b>	<b>Milestone</b>	<b>Body responsible</b>	<b>Action followed up by</b>
April 2016	IPET-OSDE-2 to set up the sub-group on the surface Vision (Frank Grooters, Daniel Michelsen, John Eyre, Jay Lawrimore, Jochen Dibbern, Jitze van der Meulen, JCOMM, Michele Citterio, Russell Stringer, Stephan Klink). Offenbach as an option for the venue.	IPET-OSDE	J. Eyre
May 2016	to identify JCOMM representative	Secretariat	Secretariat
May 2016	to initiate email discussion in preparation of the September workshop	IPET-OSDE Chair	J. Eyre
May 2016	to identify venue and propose date for the September workshop	Secretariat	Secretariat
June-Aug. 2016	Email exchange to agree on outline of the Vision, and documentation plan for the September workshop	IPET-OSDE sub-group	J. Eyre, F. Grooters
Aug. 2016	An ad hoc IPET-OSDE drafting workshop for the Surface-based observing systems part of the WIGOS Vision	IPET-OSDE sub-group	J. Eyre, F. Grooters
End Sept. 2016	CIMO Technical Conference 2016 (TECO-2016, Madrid, Spain, 27-30 September 2016) to note the ongoing process for the development of the Surface Vision 2040, and propose guidance from its perspective, including required changes to the GOS Vision 2025 to be considered for the new Vision.	CIMO TECO 2016	Jitze vd Meulen to actively request the issue to be raised, and present Vision 2025 and plan to develop Vision 2040 as part of the final statement of the conference; 3 Sept. 2016
October 2016	The draft from the IPET-OSDE sub-group is considered by the larger WIGOS community (workshop), with participation from all WIGOS component observing systems, and co-sponsored observing systems stakeholders. John Eyre will present the outcome of the IPET-OSDE Workshop to the WIGOS Workshop	IPET-OSDE Chair	J. Eyre
October 2016	Jitze vd Meulen, Secretariat and Bertrand Calpini to discuss and make sure that the CIMO perspective will be taken into account	CIMO	J. vd Meulen
End November 2016	The 16th Session of the CBS (CBS-16, Guangzhou, China, 23-29 November 2016) notes work in progress, and may suggest some changes and guidance from its perspective. The draft Surface- and Space- Vision documents will be presented to CBS-16 as information documents, noting the the two	CBS-16	Secretariat

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<b>Date</b>	<b>Milestone</b>	<b>Body responsible</b>	<b>Action followed up by</b>
	documents will be merged at a later stage		
Dec. 2016	to prepare the work for merging the two Visions	Secretariat	Secretariat
Febr. 2017	A workshop (or drafting meeting) may then be needed to finalize the integration the two Visions	Secretariat	Secretariat
Mar. 2017	to review draft and propose changes and further guidance. ICG-WIGOS will be expected to approve the plan for finalizing the two Visions.	ICG-WIGOS-6	S. Barrell, B. Calpini, Secretariat (LPR)
May 2017	to note availability of first draft and provides further guidance (work in progress). This will be followed by consultation of the stakeholders	EC-69	Secretariat
Jan. 2018	to make a final review of the draft and approves its submission to EC-70, while inviting the CBS through IPET-OSDE and ICT-IOS to make some adjustments.	ICG-WIGOS-7	S. Barrell, B. Calpini, Secretariat (LPR)
April 2018	to further review the draft according to EC-69 and ICG-WIGOS-7 guidance.	IPET-OSDE-3 and ICT-IOS-10	IPET-OSDE & ICT-IOS Chairs
May 2018	agrees that the available draft is good enough for submission to Cg-18.	EC-70	Secretariat
Mid-2018	CIMO Session to review the draft.	CIMO-17	B. Calpini, Secretariat
Early-2018	ICG-WIGOS to consider latest changes, and consider version to be submitted to Congress	ICG-WIGOS	S. Barrell, B. Calpini, Secretariat (LPR)
End 2018	If there is a CBS-Ext(2018) Session, the CBS to review and recommend the draft to be submitted to EC-70 and Cg-18.	CBS Ext.(2018)	Secretariat
May 2019	Congress approves the WIGOS Vision for 2040.	Cg-18	Secretariat

**DRAFT WIGOS VISION 2040 SURFACE**

The draft document prepared by the workshop will be finalized by the IPET-OSDE sub-group and made available as preparatory document to the WIGOS Workshop for the Vision for WIGOS surface-based component Observing Systems in 2040, which is planned in Geneva, Switzerland, from 18 to 20 October 2016. See list of WIGOS meetings below for accessing all preparatory documents in due course:

<http://www.wmo.int/pages/prog/www/WIGOS-WIS/meetings.html>

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**ACRONYMS**

AA	Application Area
ABO	Aircraft-based Observations
AMDAR	Aircraft Meteorological Data Relay
AntON	Antarctic Observing Network
AOPC	GCOS Atmospheric Observation Panel for Climate
asap	As soon as possible
ASAP	Automated Shipboard Aerological Programme
AWS	Automatic Weather Station
CAeM	Commission for Aeronautical Meteorology
CAGM	Commission for Agricultural Meteorology
CAS	Commission for Atmospheric Sciences
CBS	Commission for Basic Systems
CCI	Commission for Climatology
CD	Capacity Development
CEOS	Committee on Earth Observation Satellites
Cg	Congress
CGMS	Coordination Group for Meteorological Satellites
CHy	Commission for Hydrology
CIMO	Commission for Instruments and Methods of Observation
CM	Climate Monitoring
CMA	China Meteorological Administration
CryoNet	Core network of GCW surface measurement sites/stations
DAOS	Data Assimilation and Observing Systems working group
DPFS	Data Processing and Forecasting System
DRR	Disaster Risk Reduction
E-AMDAR	EIG EUMETNET AMDAR programme
E-ASAP	EIG EUMETNET Automated Shipboard Aerological Programme
EC	Executive Council
ECMWF	European Centre for Medium-Range Weather Forecast
EC-PORS	Executive Council Panel of Experts on Polar Observations, Research and Services
ECV	Essential Climate Variable
EGOS-IP	Implementation Plan for the Evolution of Global Observing Systems
E-GVAP	EIG EUMETNET GNSS water vapour programme
EIG	Economical Interest Group
E-PROFILE	EIG EUMETNET Radar Wind Profilers and Backscatter Lidars programme
E-SURFMAR	EIG EUMETNET Surface Marine observation programme
ET-ABO	OPAG-IOS Expert Team on Aircraft-based Observing Systems
ET-AO	CIMO Expert Team on Aircraft-based Observations
ET-EGOS	Former OPAG-IOS Expert Team on the Evolution of Global Observing Systems
ET-ODRRGOS	Former OPAG-IOS Expert Team on Observational Data Requirements and Redesign of the Global Observing System
ET-OPSL	CBS/CCI Expert Team on Operational Predictions from Sub-Seasonal to Longer-Time Scales
ET-SAT	OPAG-IOS Expert-Team on Satellite Systems
ET-SBO	OPAG-IOS Expert Team on Surface-Based Observing Systems
EUMETNET	EIG Grouping of European Meteorological Services
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
E-WINPROF	EIG EUMETNET Operational Networking of Wind Profilers in Europe
FAO	Food and Agriculture Organization of the United Nations
FSO	Forecast Sensitivity to Observation
GAW	Global Atmosphere Watch
GAWSIS	GAW Station Information System
GCOS	WMO-IOC-UNEP-ICSU Global Climate Observing System
GCOS-IP	GCOS Implementation Plan
GCW	Global Cryosphere Watch

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GCW-IP	GCW Implementation Plan
GEO	Group on Earth Observations
GEO	Operational geostationary satellites
GFCS	Global Framework for Climate Services
GHGs	Greenhouse gases
GLAS	GEWEX Global Land/Atmosphere System Study
GNSS	Global Navigation Satellite System
GNSSRO	GNSS for Radio Occultation
GNWP	Global NWP
GOOS	IOC-WMO-UNEP-ICSU Global Ocean Observing System
GOS	Global Observing System
GPCs	Global Producing Centres of Long-Range Forecasts
GPS	Global Positioning System
GPSRO	GPS Radio Occultation
GRUAN	GCOS Reference Upper Air Network
GSG	GCW Steering Group
GSICS	Global Space-Based Inter-Calibration System
GSN	GCOS Surface Network
GSNMC	GSN Monitoring Centre
GTN-P	Global Terrestrial Network for Permafrost
GTS	Global Telecommunications System
HR	Horizontal Resolution
HRNWP	High Resolution NWP
IBCS	Intergovernmental Board on Climate Services
ICAO	International Civil Aviation Organization
ICG-WIGOS	Inter-Commission Coordination Group on WIGOS
ICSU	International Council for Science
ICT-IOS	CBS Implementation Coordination Team on Integrated Observing Systems
ICT-SW	WMO Inter-Programme Coordination Team on Space Weather
ID	Identification Number
IGOS	Integrated Global Observing Strategy
IMOP	Instrument and Methods of Observation Programme
IOC	Intergovernmental Oceanographic Commission (UNESCO)
IPET	Inter-Programme Expert Team
IPET-OSDE	OPAG-IOS IPET on the Observing System Design and Evolution
IPET-SUP	OPAG-IOS IPET on Satellite Utilization and Products
IPET-WIFI	OPAG-IOS IPET on WIGOS Framework Implementation Matters
IPT-SWISS	Inter-Programme Team on Space Weather Information, Systems and Services
IPWG	International Precipitation Working Group
ITU	International Telecommunication Union
IWWG	International Winds Working Group
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
JMA	Japan Meteorological Agency
KA	Key Activity Area
KNMI	Royal Netherlands Meteorological Institute
LAM	Limited Area Model
LEO	Operational low-Earth orbit satellites
MHEWS	Multi-Hazard Early Warning Systems
MoU	Memorandum of Understanding
NASA	National Aeronautics and Space Administration
NCEP	NOAA National Centers for Environmental Prediction
NFP	National Focal Point
NMHSs	National Meteorological and Hydrological Services
NOAA	US National Oceanic and Atmospheric Administration
NVSRF	Nowcasting and Very Short Range Forecasting
NWP	Numerical Weather Prediction
OC	Observing Cycle

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OCG	JCOMM Observations Coordination Group
OND	Observing Network Design
OPA	JCOMM Observations Programme Area
OPACE	Open Panel of CCI Experts
OPAG	Open Programme Area Group
OPAG-DPFS	CBS OPAG on DPFS
OPAG-IOS	CBS OPAG on Integrated Observing Systems
OPERA	EIG EUMETNET Operational Programme for the Exchange of Weather Radar Information
OSCAR	Observing System Capability Analysis and Review tool
OSCAR/Requirements	Observational user requirements component of OSCAR
OSCAR/Space	Space-based observing systems capabilities component of OSCAR
OSCAR/Surface	Surface-based observing systems capabilities component of OSCAR
OSDW	IPET-OSDE Observing System Design Workshop
OSE	Observing System Experiment
OSND	Observing system network design
OSSE	Observing System Simulation Experiment
PoC	Point of Contact
QM	Quality Management
R&D	Research and Development
RA	Regional Association
RBCN	Regional Basic Climatological Network
RBN	Regional Basic Observing Network
RBSN	Regional Basic Synoptic Network
R-MAR	OPAG-IOS Rapporteur on Marine Observing Systems
RRR	Rolling Review of Requirements
R-SEIS	OPAG-IOS Co-Rapporteur on Scientific Evaluation of Impact Studies undertaken by NWP centres
RTH	Regional Telecommunication Hub
R-WIP	Regional WIGOS Implementation Plan
SAG	Scientific Advisory Groups
SAON	Sustained Arctic Observing Network
SG-OD	IPET-WIFI Sub-Group on OSCAR Development
SG-RFC	OPAG-IOS Steering Group on Radio-Frequency Coordination
SIAF	Seasonal to Inter-Annual Forecasting
SLWC	Super Cooled Liquid Water Content
SOC	Science Organizing Committee
SoG	Statement of Guidance
SSLP	Sub-Seasonal to Longer Predictions
TAMDAR	Tropospheric Airborne Meteorological Data Reporting
TAO	Tropical Atmosphere Ocean
TBD	To be defined
TC	Technical Commission
TDCF	Table Driven Code Form
TECO	Technical Conference
TOPC	GCOS Terrestrial Observation Panel for Climate
ToR	Terms of Reference
TPOS	Tropical Pacific Observing System project
TRITON	Triangle Trans-Ocean Buoy Network
TT-SOGON	CCI Task Team on the Statement of Guidance on Observational Needs
U	Uncertainty
UK	United Kingdom of Great Britain and Northern Ireland
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UR	User Requirement
USA	United States of America
VCP	Voluntary Cooperation Programme
VoIA	WMO No. 9, Weather Reporting, Volume A, Observing Stations and WMO

VR	Catalogue of Radio-sondes
WAM	Vertical Resolution
WCRP	West African monsoon
WDQMS	WMO-IOC-ICSU World Climate Research Programme
WG-GRUAN	WIGOS Data Quality Monitoring System
WHOS	Working Group on GRUAN
WIGOS	WMO Hydrological Observing System
WIP	WMO Integrated Global Observing System
WIR	WIGOS Framework Implementation Plan
WIS	WIGOS Information Resource
WMO	WMO Information System
WPP	World Meteorological Organization
WRF	WIGOS Pre-operational Phase
WWW	Weather Research and Forecasting
	World Weather Watch

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