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| **World Meteorological Organization**  **Commission for Instruments and Methods of Observation OPAG on Remote-Sensing Technologies**  **Inter-Programme Expert Team on Operational Weather Radars** Tokyo, Japan, 13-16 March 2017 | **CIMO/OPAG-RST/IPET-OWR-1/Doc. 5.2(4)** |
| Submitted by: The Secretariat  2.Mar.2017  **DRAFT 1** |

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# Existing and Newly-Developed WMO Regulations and Guidance

### SUMMARY

This document provides information on existing and newly-developed WMO regulatory and guidance materials on operational weather radars.

### DECISIONS/ACTIONS REQUIRED: see part 1

### ISSUES TO BE DISCUSSED: see part 2

### REFERENCES:

1. WIGOS Technical Regulations approved by Cg-17 - <http://www.wmo.int/pages/prog/www/wigos/WRM.html>

### ANNEXES:

1. Regulatory Materials Relating to Operational Weather Radars

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1. **DECISIONS/ACTIONS REQUIRED**

**The IPET-OWR is invited to decide on the following**:

1. Requirements for the review of existing regulatory and guidance material;
2. Requirements for the development of new regulatory and guidance material; and
3. The schedule and process for review and development of regulatory and guidance material for which it is responsible.

**2. Background**

One of the primary roles of the IPET is to develop and submit for approval and publication regulatory and guidance materials that inform the WMO Members of either their obligations (regulations) or best practice (guidance) as a contributor to the operation of the WMO Integrated Global Observing System (WIGOS) and the Global Observing System (GOS).

Generally, material contained in WMO manuals (e.g. the Manual on the GOS) are regulatory, meaning that Members are expected to comply with the requirements, particularly those indicated within “shall” clauses – manuals also contain “should” clauses which indicate that Members should endeavour to meet such requirements; whereas WMO guides are considered to be non-regulatory, offering Members guidance (advice) on how they might best implement their observing systems so as to meet the regulatory requirements. In addition to these materials, WMO also publishes technical and other reports (e.g. CIMO Instruments and Observing Methods (IOM) reports) that provide relevant information or best practice advice regarding observing system operation.

Naturally, the IPET will be concerned with the compilation and maintenance of regulatory materials (RM) relating to the operation of weather radar systems.

**3. Existing and Newly-Developed Regulatory Materials**

Annex I contains a non-exhaustive list of WMO regulatory and guidance materials relating to weather radars that are either published already, awaiting publication or under development and for which the IPET-OWR has responsibility to maintain or develop.

The IPET is invited to consider requirements for the review of existing regulatory and guidance materials.

The IPET is invited to consider requirements for the development of new regulatory or guidance materials, particularly taking into account:

1. the results of the recent WMO survey and other identified national and regional requirements – see agenda item 3 and Document 3.2; and
2. requirements for guidance on implementation of the WIGOS framework, e.g. provision and maintenance of OWR metadata.

**4. Process for Development and Integration of Regulatory and Guidance Material**

Under the CIMO Technical Commission, guidance materials are required to be reviewed by the CIMO Editorial Board and then approved for publication by the CIMO session or the president of CIMO. This includes the publication of IOM reports and also updates to WMO No. 8, of which the latter is also subject to approval by CIMO.

Under the developing WIGOS framework in the Pre-operational Phase established by Congress (Cg-17), WMO is working towards the full integration of the GOS and other Component Observing Systems into the WIGOS regulatory framework (See Reference 1). This means that GOS technical and guidance materials will need to be integrated under the WIGOS technical regulations by the next session of Congress in 2019. The IPET-OWR will be expected to contribute to this process with respect to the OWR regulatory and guidance materials.

Under the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (ICG-WIGOS), there has been established the Task Team on the WIGOS Editorial Board (TT-WEdB). This team has the role to *Coordinate activities for the updating of the WMO Technical Regulations (WMO-No. 49), the Volume I, Part I – WIGOS, and the Manual on WIGOS (WMO-No. 1160), in close collaboration with the WMO Secretariat (WIGOS-PO)*…

Taking into account the development of the WIGOS regulatory framework and also the need to maintain and develop guidance within WMO No. 8, it will be necessary for the IPET to coordinate with both the CIMO and WIGOS editorial boards for direction and advice on the process and schedule for development, integration and approval of regulatory and guidance materials.

The IPET is invited to consider the schedule and process for review and development of regulatory materials for which it is responsible.

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[Annex(es): Annex I](#_Annex_to_Draft) – Regulatory Materials Relating to Operational Weather Radars

## Annex I

### regulatory materials relating to operational weather radars

Following is an (non-exhaustive) list of WMO regulatory and guidance materials relating to weather radars that are either published already, awaiting publication or under development.

**New or Under Development**

| **Manual/Guide/Report** | **Section, Name** | **Category** | **Relevant To** | **Status/Comment** |
| --- | --- | --- | --- | --- |
| WIGOS Requirements, Design, Implementation and Operations of a Radar Network |  | Guidance | WIGOS | Paul Joe developed under contract with WMO  IPET-OWR-1, Doc. 5.2(5)  Likely to be published as a WIGOS Technical Report  Later integrated into the Guide to WIGOS |
| Dual polarization weather radar |  | Guidance | CIMO guidance | C. Horvat  ET-ORST, Task 3  IPET-OWR-1, Doc. 5.2(6) |
| Operation of weather radars in mountainous regions |  | Guidance | CIMO guidance | W. Kong  ET-ORST, Task 5  IPET-OWR-1, Doc. 5.2(7) |
| Evolution of weather radar technologies: New developments, resource requirements, spectrum allocation constraints |  | Guidance | CIMO guidance | P. Chong  ET-ORST, Task 7  IPET-OWR-1, Doc. 5.2(8) |
| Intercomparisons of weather radar algorithms and products (Radar Quality Control and Quantitive Precipitation Intercomparison |  | Guidance | CIMO guidance | D. Michelson, T. Kane  Derived from expected guidance from RQQI and ET-ORST, Task 9  IPET-OWR-1, Doc. 5.2(9) |
| Integration of observations from different rainfall observation systems |  | Guidance | WIGOS guidance | B. Urban  ET-ORST, Task 10  IPET-OWR-1, Doc. 5.2(10) |
| Operation of Weather Radar Systems (Japan) |  | Guidance | WIGOS guidance | N. Tsukamoto  ET-ORST, Task 15  IPET-OWR-1, Doc. 5.2(11) |
| Impact of Wind Turbines on Weather Radars |  | Guidance | CIMO guidance | C. Horvat  ET-ORST, Task 16  IPET-OWR-1, Doc. 5.2(12) |
| WMO No. 544, Manual on the GOS | Part III, Section 2.7, Weather Radar Stations | Regulations | GOS and WIGOS regulations | From CBS-16/[Doc 3.2(1)](http://meetings.wmo.int/CBS-16/English/2.%20PROVISIONAL%20REPORT%20(Approved%20documents)/CBS-16-d03-2(1)-MANUAL-AND-GUIDE-ON-GOS-approved_en.docx?Web=1)  Approved by CBS  Will be published subject to approval by EC (2017) |
| Weather radar capabilities for OSCAR |  | Guidance | WIGOS guidance | D. Michelson, M. Boscacci, L. Clementi, G. Haase, and A. Seed  Submitted March 2015  Provides a methodology for determining OSCAR weather radar network performance capabilities from observing system metadata |

**Published**

| **Manual/Guide/Report** | **Section, Name** | **Category** | **Relevant To** | **Status/Comment** |
| --- | --- | --- | --- | --- |
| WMO NO. 8, Guide to Instruments and Methods of Observations (2014) | [Part II, Chapter 7, Radar measurements](http://library.wmo.int/opac/doc_num.php?explnum_id=3185) | Guidance | WIGOS and GOS operational best practice. | <http://www.wmo.int/pages/prog/www/IMOP/CIMO-Guide.html>  2014 Edition of CIMO Guide has been approved for publication. |
| WMO No. 544, Manual on the GOS | Part III, Surface-Based Sub-System, Section 2.12.2, Special Stations, Weather Radar Stations | Regulations | GOS regulations | En: <http://library.wmo.int/pmb_ged/wmo_544-v1-2015_en.pdf>  Published in 2010 Edition (updated 2013))  Radar material to be superseded by updated material below subject to approval of EC (2017). |
| WMO No. 544, Manual on the GOS | Part III, Section 2.7, Weather Radar Stations | Regulations | GOS and WIGOS regulations | From CBS-16/[Doc 3.2(1)](http://meetings.wmo.int/CBS-16/English/2.%20PROVISIONAL%20REPORT%20(Approved%20documents)/CBS-16-d03-2(1)-MANUAL-AND-GUIDE-ON-GOS-approved_en.docx?Web=1)  Approved by CBS  Will be published subject to approval by EC (2017) |
| WMO No. 488, Guide to the GOS | Part III, Section 3.9.2.1, Types of Special Stations, Weather Radar Stations | Guidance | GOS guidance | En: <http://library.wmo.int/opac/index.php?lvl=notice_display&id=12516>  Published Edition 2010 (Updated 2013) |
| CIMO IOM-118 | [Evaluation of CIMO Weather Radars Survey and Web based Weather Radar Database](http://library.wmo.int/opac/index.php?lvl=notice_display&id=16879http://library.wmo.int/opac/index.php?lvl=notice_display&id=16879) | Technical Report | GOS OWR | O. Sireci (Turkey), 2015  Lead to the development of the WMO Radar Database (WRD) |
| CIMO IOM-88 | [Training Material on Weather Radar Systems](http://library.wmo.int/opac/index.php?lvl=notice_display&id=9269) | Technical Report | GOS OWR | E. Büyükbas, L. Yalçin, Z. Dag, S. Karatas (all Turkey), 2006 |
| CIMO IOM-79 | [Operational Aspects of Wind Profiler Radars](http://library.wmo.int/opac/index.php?lvl=notice_display&id=11279) | Technical Report | GOS OWR | J. Dibbern, D.Engelbarg, U.Goersdorf, V.Lehmann, H.Steinhagen (Germany); N.Latham, J.Nash, T.Oakley (UK); H.Richner (Switzerland), 2003 |
| CIMO IOM-69 | [Weather Radars used by Members](http://library.wmo.int/opac/index.php?lvl=notice_display&id=11271) | Technical Report | GOS OWR | T. Mammen (Germany), 1998 |
| CIMO IOM-52 | [Results of the Working Group on Weather Radars  Part I: Severe Weather Recognition Part II: Utilization of Doppler Radars for Monitoring Tropical Cyclones as one Element of the Global Monitoring System](http://library.wmo.int/opac/index.php?lvl=notice_display&id=11257) | Technical Report | GOS OWR | Part I: G.G. Shchukin (Russian Fed.), and Part II: Hisao Ohno (Japan), 1993 |
| CIMO IOM-37 | [Information on Weather Radars used by WMO Members](http://library.wmo.int/opac/index.php?lvl=notice_display&id=11244) | Technical Report | GOS OWR | M. Gilet (France), 1989 |
| CIMO IOM-8 | [Report on Meteorological Radars](http://library.wmo.int/opac/index.php?lvl=notice_display&id=15505) | Technical Report | GOS OWR | G.A. Clift, 1981 |

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