Fourth DBCP Capacity Building Workshop for the North Pacific Ocean and Its Marginal Seas (NPOMS-4) 
(Busan, Republic of Korea, 2-4 November 2015)

The WMO Integrated Global Observing System (WIGOS) pre-operational phase (2016-2019)

(Etienne Charpentier, WMO Observing Systems Division)
What is WIGOS?

- An over-arching **framework**
  - For the **coordination and evolution** of WMO observing systems
  - For contributions of WMO to co-sponsored observing systems
- An evolution from the WWW (weather) centric GOS to a **multi-disciplinary framework** supporting Weather, Water & Climate
- A WMO priority & a key contribution to the climate services (**GFCS**)
- A WMO contribution to **GEOSS** (with WMO Information System – WIS)
- Doing more & better with what we have now
  ⇒ For more efficient and effective service delivery
- **WIGOS is not:**
  Replacing or taking over existing observing systems, which will continue to be owned and operated by a diverse array of organizations and programmes, national as well as international
The WIGOS Framework

- The WIGOS framework is essentially about:
  - **Documenting and implementing** standard and recommended practices and procedures for making & sharing observations
  - **Coordination & collaboration** for efficiency and effectiveness
  - **Integration and interoperability**
  - **Timely delivering observations** that meet user needs in a way they can use them
  - **Empowering** NMHSs and providing them with the necessary guidance
WIGOS Observing Systems

- Global Observing System (WWW/GOS)
- Observing component of Global Atmospheric Watch (GAW)
- WMO Hydrological Observing System (WHOS)
- Observing component of Global Cryosphere Watch (GCW)

Co-sponsored Observing Systems

- WMO-IOC-UNEP-ICSU Global Climate Observing System (GCOS)
- IOC-WMO-UNEP-ICSU Global Ocean Observing System (GOOS)
- FAO-WMO-UNESCO-UNEP-ICSU Global Terrestrial Observing System (GTOS)
What do we mean by “integration”? 

- Composite systems
- ‘Network of networks’
- Integration through:
  - Supporting diverse user needs
  - Systems designed for efficiency & effectiveness
  - NWP data assimilation
  - Partnership & collaboration
  - End-to-end service model
  - Data policy, access and exchange
  - Coordinated network operation & maintenance
  - Practices and procedures
- NOT one-size-fits-all
To oversee, guide and coordinate WIGOS

To facilitate and support the operation of WIGOS

To plan, implement and evolve WIGOS component systems

Management of WIGOS Implementation / operation

Collaboration with co-sponsors and partners

Data discovery, delivery & archival

Observing system operation & maintenance

Communications and outreach

Operational Information Resource

Standardization, interoperability & compatibility

Design, planning and optimised evolution

Quality Management

Capacity Development

WIGOS Key Activity Areas
The WIR web portal -
[www.wmo.int/wigos/wir](http://www.wmo.int/wigos/wir)

**WIGOS Operational Information Resource (WIR)**

**Note:** The WIR is currently under construction, and tools and some of the information meant to be delivered here may not be available at this point. These are added gradually, and the plan is to have WIR completed by Cg-17 (2015).

The WMO Integrated Global Observing System (WIGOS) is an integrated, comprehensive, and coordinated system which comprises the present WMO global observing systems, in particular the in situ and space-based components of the Global Observing System (GOS), the Global Atmosphere Watch (GAW), the Global Cryosphere Watch (GCW), and the WMO Hydrological Observing System (WHYCOS). WIGOS also provides a framework for the contributions of WMO to the co-sponsored observing systems.

The WIGOS Operational Information Resource (WIR) is a network platform and tool designed to provide WIGOS stakeholders with all relevant information on the operational status and evolution of WIGOS and its component observing systems, the operational requirements of WIGOS, including standard and recommended practices and procedures used in the WIGOS framework, and their capabilities to meet observational user requirements of all WMO Application Areas.

The WIR provides information on the following WIGOS topics:

1. WIGOS concept: rationale and benefits
2. Management, and coordination mechanism
3. Design, planning and optimized evolution of WIGOS component observing systems
4. Observing System Operation and Maintenance, and Quality Management
5. Standardization, System Interoperability and Data Compatibility
6. Data Discovery, Delivery and Archival
7. Capacity Development, Communication and Outreach
8. WIGOS component observing systems

**WIGOS Tools:**
- SORT: "Standardization of Observations" Reference Tool
- OSCAR: Observing System Capability Analysis and Review tool
  - OSCAR/Requirements: Observational User Requirements
  - OSCAR/Space: Space-based capabilities
  - OSCAR/surface: Surface-based capabilities

The functional requirements of the WIR are available [here](#).

The diagram below summarises the key WIGOS Framework Activity Areas ([click on each activity below for more information](#)).
Decisions of the seventeenth World Meteorological Congress (Cg-17, Geneva, 25 May – 12 June 2015):

2. WIGOS a key priority as part of WMO Strategic Planning for the next financial period 2016 to 2019
3. Approved Recommendation 18 (CBS-Ext. (2014)) on the support of Members to the Implementation plan of the marine meteorological and oceanographic observing system in support of NWP (incl. barometer drifters & tropical moored buoy array)
Cg-17 decisions:

4. Adopted Resolution on pre-operational phase of WIGOS for 2016 to 2019 with aim that Members will benefit from a fully operational WIGOS from 2020 onward

5. Future WIGOS priorities:
   - Develop WIGOS guidance
   - Further develop WIGOS Information Resource (WIR) and OSCAR
   - Develop & implement a WIGOS Data Quality Monitoring System
   - Develop concept and establishment of WIGOS Regional Centres (WRCs)
   - Undertake national implementation of WIGOS

- ICG-WIGOS re-established by the Executive Council (EC-67, June 2015)
- ICG-WIGOS is tasked to develop a complete Plan for the WIGOS Pre-Operational Phase (PWPP) for approval by EC-68 in June 2016
WIGOS Pre-Operational Phase
Priority 1/5

1. Develop WIGOS guidance material
   - Develop new WIGOS Guide
   - Complementing WIGOS Manual, e.g. on
     - Observing Network Design
     - WIGOS Identifiers
     - Collecting & submitting WIGOS metadata and using OSCAR
1. Develop WIGOS guidance material - Observing Practices & Procedures

- **Standards** and **recommendations** for instruments and methods of observation
- All aspects of observations and observing systems:
  - establishment & installation
  - management & operation
  - maintenance, inspection & supervision
  - delivery & sharing of observations
  - data and metadata management (pre-processing & processing, QC, monitoring, remedial actions, ...)
- Data Quality: 'fit-for-purpose' ideal
- **Documenting known quality is key**
2. Further develop the WIGOS Information Resource (WIR) and the Observing Systems Capability Analysis and Review tool (OSCAR – oscar.wmo.int)
   - **OSCAR/Requirements**: Technology free observational user requirements recorded quantitatively
   - **OSCAR/Space**: capabilities of all satellite sensors, whether historical, operational or planned
   - **OSCAR/Surface**: surface-based capabilities; developed by MeteoSwiss for WMO
2. WIGOS Information Resource (WIR) & OSCAR (oscar.wmo.int)

- OSCAR/Surface – oscar.wmo.int/surface
  - Meant to become the official repository of WIGOS Metadata as of early 2016
    - One-stop-shop for surface- and space-based observing instruments & platforms metadata
    - Allows user to understanding observational data
    - Allows to identify potential synergies
    - A tool for developing countries willing to use OSCAR as their primary WIGOS metadata database
  - An evolution/modernization of WMO No. 9, Volume A, Observing Stations and WMO Catalogue of Radiosondes
  - Includes marine observing systems metadata from JCOMMOPS
2. WIGOS Information Resource (WIR) & OSCAR (oscar.wmo.int)

- OSCAR/Surface – oscar.wmo.int/surface
  - A database for recording surface-based observing systems capabilities for the purpose of the WMO Rolling Review of Requirements
    - Objective gap analysis / critical review
    - A tool for planning evolution of the observing system
    - Monitoring evolution of capabilities, compare with plans, look at progress

- Planned evolution of OSCAR
  - Add new types of stations in OSCAE/Surface (e.g. aircrafts, wind profilers)
  - Add gap analysis module
  - Enhancements of OSCAR/Space
Note: This is a beta version, all data will be erased before going to production!

Welcome to OSCAR

Latest news
2015-05-26
OSCAR/Surface launched at WMO Congress Cc-17
Today, we are happy to present to the Members of WMO the beta version of OSCAR/Surface. OSCAR/Surface complements the already existing OSCARSpace.
3. Develop & implement a WIGOS Data Quality Monitoring System

- Integrated approach but initial focus on GOS surface observing components based on pilots on
  - GOS Quality Monitoring (e.g. ECMWF, NCEP)
  - GOS Incident Management (e.g. RA-I)

- Strong role of
  - NWP monitoring centres
  - CBS Lead Centres
  - WIGOS Regional Centres

- JCOMMOPS to play a role for marine data
**WIGOS Pre-Operational Phase Priority (3/5)**

WIGOS monitoring - station details

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Export as
4. Develop concept and establishment of WIGOS Regional Centres (WRCs)

- Provide support & assistance to Members & Regions for their national & regional WIGOS implementation
- Provide link with Secretariat, regional offices, Regional Instrument Centres (RICs), Regional Training Centres (RTCs) regarding all WIGOS related activities in the Region
- Monitoring implementation of EGOS-IP
- Regional performance monitoring of WIGOS networks (data availability, timeliness, quality) and feedback
- Facilitate WIGOS data and metadata collection to WIS and OSCAR
5. Undertake national implementation of WIGOS

- Nominate National Focal Points
- Consideration of EGOS-IP actions
- Consideration of Observing Network Design principles
- Coordination with co-sponsors (other agencies than NMHSs)
What does WIGOS mean at the National level?

• **Demonstrating national leadership** in observations:
  - Best practices
  - Plan & design
  - Sustainability, maintenance & operation
  - Integration and interoperability
• **Compliance with** WMO TR (WMO-No. 49) - standard and recommended practices and procedures, and WIGOS Manual
• **Culture change & change management**;
  – Supported by collaboration at Regional/Sub-regional level
• WIGOS benefits will **only** be delivered through commitment at a national level
National leadership through WIGOS

- **WIGOS and WIS** provide means & opportunities:
  - To enhance national observing networks for benefit of all users
  - To enhance sharing and accessibility of observations
  - To reinforce central role of NMHS through partnerships & a network of networks
  - To strengthen national mandate and authority

- **Strong national** coordination & cooperation will assist in building **strong regional** coordination & cooperation
JCOMM Capacity development in WIGOS

• JCOMM Capacity Building Strategy has included WIGOS implementation needs
• Capacity Building & Partnerships / PANGEA
  • Developed countries providing training on data use as well as ocean instruments deployed in the region
  • Developing countries contributing to the implementation of the ocean observing system on their region (e.g. ship time)
  • DBCP-WIO, NPOMS & PI series of workshop are excellent examples
• WMO-IOC Regional Marine Instrument Centres (RMICs) playing a key role in Capacity Development
  • Training workshops (4th workshop for Asia Pacific was organized in Weihai, China, 21-23 Oct. 2014)
  • Liaison groups in the regions
• Cost-effective calibration service
• Leading intercomparison activities
Summary and conclusion

• The implementation of the global WIGOS framework (2012-2015) has made substantial progress
• The Pre-Operational Phase will focus on
  ✓ Developing guidance material
  ✓ Deployment and enhancement of OSCAR (WIGOS metadata)
  ✓ Development of a WIGOS Data Quality Monitoring System
  ✓ Regional and national activities:
    − Establishment of Regional WIGOS Centers
    − Regional/Sub-Regional Workshops and training events to support OSCAR/Surface and Regional priorities for WIGOS
    − Support for national WIGOS implementation efforts, in particular regarding national partnerships, data guidance, and network design and operation and maintenance
• JCOMM & DBCP fully engaged in WIGOS implementation