WMO SPACE PROGRAMME UPDATE

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WMO OMM
World Meteorological Organization
Organisation météorologique mondiale
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I. WMO Space Programme
World Meteorological Organization

- Founded as International Meteorological Organization (IMO) in 1873
- Became the World Meteorological Organization (WMO) in 1950
- UN specialized agency and UN authoritative voice for weather, climate, water and environmental services since 1951
- 187 Member States, 6 Territories
- WMO Convention
- Represented by Directors of National Meteorological and Hydrological Services (NMHSs)

See [https://public.wmo.int/en/about-us/who-we-are](https://public.wmo.int/en/about-us/who-we-are)
Highest Risks for the World Economy

Water crises
Biodiversity loss and ecosystem collapse
Cyberattacks
Man-made environmental disasters
Large-scale involuntary migration
Interstate conflict
Natural disasters
Extremes weather events
Failure of climate change mitigation and adaptation

World Economic Forum Global Risks Landscape 2019
WMO contributes to 12 of the 17 SDGs and is the co-custodian of SDG 13 on Climate Action

See https://public.wmo.int/en/our-mandate/what-we-do/wmo-contributing-sustainable-development-goals-sdgs
Origin of the World Weather Watch

- Wexler/Bugaev report, prepared in 1962, in response to a request by the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and by the UN General Assembly
- Contains the initial proposal for the World Weather Watch

See https://library.wmo.int/index.php?lvl=notice_display&id=10240#.XcRF4i2ZPOR
World Weather Watch Components

- Global Observing System (GOS)
- Global Telecommunication System (GTS)
- Global Data-Processing and Forecasting System (GDPFS)
Global Observing System (GOS) - 1961

- GOS is the Observing System Element of the WWW

TIROS-I – First weather satellite image (April 1960)

Space-based Global Observing System (GOS) in 1961
Global Observing System (GOS) in 2021
WMO Space Programme

- Established by Resolution 5 (Cg-XIV), 14\textsuperscript{th} World Meteorological Congress, in 2003
- Promote availability and utilization of satellite data and products for weather, climate, water and related applications.
- Coordinate environmental satellite matters and activities throughout all WMO Programmes.
- 16\textsuperscript{th} WMO Congress in 2011 confirmed four main components:

  - The space-based Observing System
  - Access to Satellite Data and Products
  - Awareness and Training
  - Space Weather Coordination

See [http://www.wmo.int/sat](http://www.wmo.int/sat)
WMO Space Programme Value Chain

Satellite Operators → Calibrated data sets → Quality-controlled products → Data collection, Dissemination & Access → Awareness & training → Users
II. WMO Integrated Global Observing System
Evolution of the Global Observing System
# WMO Application Areas

1) Global numerical weather prediction  
2) High-resolution numerical weather prediction  
3) Nowcasting and very short range forecasting  
4) Sub-seasonal to longer predictions  
5) Aeronautical meteorology  
6) Forecasting atmospheric composition  
7) Monitoring atmospheric composition  
8) Atmospheric composition for urban applications  
9) Ocean applications  
10) Agricultural meteorology  
11) Hydrology  
12) Climate monitoring (GCOS)  
13) Space weather  
14) Climate science

See [https://community.wmo.int/rolling-review-requirements-process](https://community.wmo.int/rolling-review-requirements-process)
Global Observing System Components

- Satellite observations; space agencies;
- Climate reference data; mix of entities (NMHS, other government, research);
- Ocean observations; National Ocean Services or research entities;
- Weather observations; typically National Met Services (NMHSs);
- Aircraft observations; commercial airlines with support from NMHSs;
Observing System Capability Analysis and Review Tool

Welcome to OSCAR

OSCAR is a resource developed by WMO in support of Earth Observation applications, studies and global coordination.

It contains quantitative user-defined requirements for observation of physical variables in application areas of WMO (i.e. related to weather, water and climate). OSCAR also provides detailed information on all earth observation satellites and instruments, and expert analyses of space-based capabilities.

The tool constitutes a building block of WIGOS and more specifically, the so-called Rolling Requirements Review process. OSCAR targets all users interested in the status and the planning of global observing systems as well as data users looking for instrument specifications at platform level. To continue, please select one of the following modules:

- Observation Requirements
- Satellite Capabilities
- Surface based Capabilities

Getting started with OSCAR/Space and OSCAR/Requirements

- Watch the 10 minute OSCAR screen-cast to get an overview of the application and learn how to use its functionalities
- Documents available for download:
  - OSCAR/Space and OSCAR/Requirements User manual (413 kbyte)
  - OSCAR/Requirements Focal Point manual (200 kbyte) for user requirements editors
  - OSCAR Flyer (1.4 Mbyte)
- Please provide feedback to the WMO Space Programme Office sat-help-desk@wmo.int

Getting started with OSCAR/Surface

- Read the OSCAR/Surface User manual
- The user support can be contacted via the OSCAR/Surface feedback form.

See http://oscar.wmo.int
III. Space-based Observing System Component
Coordination Group for Meteorological Satellites

See https://www.cgms-info.org
Committee on Earth Observation Satellites

See http://ceos.org
Vision for WIGOS in 2040

- Backbone system with specified orbital configuration and measurement approaches (Group 1).
- Backbone system with open orbit configuration and flexibility to optimize the implementation (Group 2).
- Operational pathfinders, and technology and science demonstrators (Group 3).
- Additional capabilities (Group 4).

See [https://www.cgms-info.org/Agendas/WP/CGMS-47-WMO-WP-02](https://www.cgms-info.org/Agendas/WP/CGMS-47-WMO-WP-02)
IV. WMO Reform and Earth System Approach
18th World Meteorological Congress

See https://library.wmo.int/index.php?lvl=bulletin_display&id=3977
WMO Reform

WMO for the 21st Century

1873

2050

2-7 December 2019

AOMSUC-10
New WMO Structure

See https://public.wmo.int/en/governance-reform
### WMO Strategic Plan 2020-2023

**VISION 2030**

By 2030, we see a world where all nations, especially the most vulnerable, are more resilient to the socioeconomic consequences of extreme weather, climate, water and other environmental events; and underpin their sustainable development through the best possible services, whether over land, at sea or in the air *(and in space)*.

**OVERARCHING PRIORITIES**

- Preparedness for, and reducing losses from hydrometeorological extremes
- Climate-smart decision-making to build resilience and adaptation to climate risk
- Socioeconomic value of weather, climate, hydrological and related environmental services

**CORE VALUES**

- Accountability for Results and Transparency
- Collaboration and Partnership
- Inclusiveness and Diversity

**LONG-TERM GOALS**

1. **Services**
   - Better serve societal needs

2. **Infrastructures**
   - Enhance Earth system observations and predictions

3. **Science & Innovations**
   - Advance targeted research

4. **Member Services**
   - Close the capacity gap

5. **Smart Organization**
   - Strategic realignment of structure and programmes

**STRATEGIC OBJECTIVES**

**FOCUSED ON 2020-23**

1. **Services**
   - Strengthen national multi-hazard early warning/alert systems
   - Broaden provision of policy- and decision-supporting climate, water and weather services

2. **Infrastructures**
   - Optimize observation data acquisition
   - Improve access to, exchange and management of Earth system observation data and products
   - Enable access and use of numerical analysis and prediction products

3. **Science & Innovations**
   - Advance scientific knowledge of the Earth system
   - Enhance science-for-service value chain to improve predictive capabilities
   - Advance policy-relevant science

4. **Member Services**
   - Enable developing countries to provide and utilize essential weather, climate, hydrological and related environmental services
   - Develop and sustain core competencies and expertise
   - Scale up partnerships

5. **Smart Organization**
   - Optimize WMO constituent body structure
   - Streamline WMO programmes
   - Advance equal, effective and inclusive participation

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2-7 December 2019  
AOMSUC-10
V. Conclusions
On its current trajectory, Asia and the Pacific will not achieve any of the 17 SDGs by 2030.

CO₂ reached an all-time high in Earth's atmosphere in 2019

At current trends, we are looking at global heating of between 3.4 and 3.9 degrees Celsius by the end of the century

The last five years have been the hottest ever recorded

Ice caps are melting, permafrost is thawing

Ocean levels are rising and oceans are being poisoned

IPCC reports confirm that we are knowingly destroying the very support systems keeping us alive

That means important decisions must be made now!

COP25 is our opportunity
Securing our Future

- WWW has been a success story for international cooperation and for the sharing of space benefits.
- With the evolution of GOS to WIGOS we have moved from WWW towards an observing system supporting the WMO Earth System Approach.
- We – the space-based observing system community – need to ensure that these valuable assets are fully utilized to help achieve the goals set out in global development agendas.
- To help secure humankind’s future.
Thank you

http://www.wmo.int/sat
Backup Slides
Purpose of WMO

(WMO Convention, Article 2(a))

a) To facilitate worldwide cooperation in the establishment of networks of stations for the making of meteorological observations as well as hydrological and other geophysical observations related to meteorology, and to promote the establishment and maintenance of centres charged with the provision of meteorological and related services;

b) To promote the establishment and maintenance of systems for the rapid exchange of meteorological and related information;

c) To promote standardization of meteorological and related observations and to ensure the uniform publication of observations and statistics;

d) ... (apply to aviation, shipping, agriculture, collaborate on research, hydrology ...)

Purpose of WMO
WMO Integrated Global Observing System

Operational from 1 January 2020

World Weather Watch

Global Atmosphere Watch (GAW), Global Cryosphere Watch (GCW), Hydro Observing System, Global Climate Observing System (GCOS)

WMO Information System (WIS)
Rolling Review of (Observing) Requirements

For each WMO Application Area

OSCAR/Requirements

User requirements for observations

Gap Analyses
(Statements of Guidance)

Implementation Plan

Long-term Vision for global observing systems

Programmes of Members and Agencies

Observing capabilities

OSCAR/Space

OSCAR/Surface

WIGOS Vision 2040

See https://community.wmo.int/rolling-review-requirements-process
The RRR is supported by three key databases of OSCAR, the Observing Systems Capabilities and Review tool:

- **OSCAR/Requirements**, in which “technology free” requirements are provided for each application area, expressed in units of geophysical variables (260 in total currently);
- **OSCAR/Space**, listing the capabilities of all satellite sensors, whether historical, operational or planned;
- **OSCAR/Surface**, list surface-based capabilities; developed by MeteoSwiss for WMO, operational since May 2016;

See [http://oscar.wmo.int](http://oscar.wmo.int)
WIGOS Components
(by discipline)

- Global Observing System (WWW/GOS)
- Observing component of Global Atmospheric Watch (GAW)
- WMO Hydrological Observations (including WHYCOS)
- Observing component of Global Cryosphere Watch (GCW)
# Global Developments

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<th>1960s</th>
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<td>WMO</td>
<td>UNEP</td>
<td>First World Climate Conference</td>
<td>IPCC</td>
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- **CO₂ levels passed 400 ppm**

2-7 December 2019

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