

Vision for WMO Integrated Global Observing System (WIGOS) in 2040

Current status



WMO OMM

World Meteorological Organization
Organisation météorologique mondiale

Lars Peter Riishojgaard
WMO Secretariat

Why a Vision for WIGOS in 2040?

- Will serve a reference for WMO Members and other observing system operators, providing context and expected boundary conditions relevant for observing system developments
- Informs the long-term planning of satellite agencies about expected evolution of user requirements
 - drives the 2040 timeline; current 2025 Vision too near-term
- Informs planning efforts of users of observations (e.g. NWP) regarding systems development and required computing and communication capabilities

A few key drivers

- External
 - Climate change; new requirements for information on all time scales
 - New application areas, renewed emphasis on existing application areas
 - Demographic changes (urbanization, mass migration, ...)
 - Increasing overall demand for meteorological information, all ultimately based on observations
- Internal
 - Evolving technical capabilities (sensing, telecommunication, computing)
 - Move toward integrated earth system modeling
 - Increasing recognition of economic value of meteorological information
 - Private sector interested in owning and operating observing systems

Timeline

- 17th World Meteorological Congress (2015) requested ICG-WIGOS to develop a “Vision for WIGOS in 2040” with the aim of submitting it for approval at the 18th Congress in 2019
- Expert team meetings and user consultation workshops held in 2015-16 leading to the development of draft “Visions” for space- and surface-based components, respectively
- Draft material presented and discussed in various contexts (WMO constituent bodies, CGMS-44, 45, GEO-XIV,...)
- A first version of an integrated document presented to ICG-WIGOS in January 2018
 - Submitted to CGMS-46 as WMO-WP-01

CGMS Involvement

- **CGMS-43** (Boulder, May 2015): In anticipation of discussions to take place at WMO Congress-17, WMO briefed Plenary on the rationale for the new “Vision”; this action was taken in response to report from ET-SAT in 2014;
- **CGMS-44** (Biot, June 2016): WMO (ET/SAT) briefed Plenary on initial development of “Vision for Space-based Components of WIGOS in 2040”;
- **CGMS-45** (Jeju, June 2017): WMO provided briefing on development of “Vision for Surface-based Components of WIGOS in 2040” and plans for an integrated Vision document; CGMS agencies invited to comment;
 - CGMS subsequently provided comments to WMO via CGMS Secretariat;
- **CGMS-46** (Bengaluru, June 2018): First draft of integrated “Vision for WIGOS in 2040” presented as WMO-WP-01
 - Incorporation (partial) of CGMS feedback;



Document Structure

- Chapter I; context, purpose, scope
 - Why a new vision, what are the main drivers of change; what does the concept of “integration” in WIGOS entail;
- Chapter II; Space-based WIGOS components
 - Trends in Requirements and Capabilities; text and tables introducing the four tiers of space-based systems contributing to WIGOS;
- Chapter III; Surface-based WIGOS components
 - Trends and issues (technology, requirements, private sector involvement, commoditization of sensors, processing, communication, ...); tables of available and emerging technologies.

Chapter II (Space-based WIGOS Components)

- **The Vision describes a four-tier constellation:**
 - 1. Backbone system with specified orbital configuration and measurement approaches**
 - Basis for Members' commitments, should respond to the vital data needs; similar to the current CGMS baseline with addition of newly mature capabilities
 - 2. Backbone system with open orbit configuration and flexibility to optimize the implementation**
 - Basis for open contributions of WMO Members, responding to target data goals
 - 3. Operational pathfinders, and technology and science demonstrators**
 - Responding to R&D needs
 - 4. Additional capabilities**
 - contributed by WMO Members and third parties including governmental, academic or commercial initiatives



WIGOS Vision, CGMS Baseline, the WIGOS gap analysis and the CGMS Risk Assessment

Vision for WIGOS (Chapter II, Tier I);
(Idealized) user view of CGMS Baseline

Gap analysis (WMO);
e.g. due to missing
Tier I components;
four-year cycle

CGMS Baseline (see WG-III Report);
system committed to by CGMS Members;
will be included in the *Manual on WIGOS*

Risk assessment
(CGMS), e.g. due to
on-orbit or launch
failures,
budgets;(Annually)

Space-based component of WIGOS;
system actually operating/will be operating



CGMS Role (near-term)

- Emerging understanding of relationship between WIGOS Vision and CGMS Baseline and respective roles of CGMS Risk Assessment and WMO Gap analysis may imply that some minor modification to description of the Tier I constellation;
 - Action on WMO, and subsequently on CGMS (WG-III);

Next steps

- WMO Executive Council to be briefed on status later this month;
- Final round of consultation to take place prior to translating the Vision document into all WMO languages and submitting it for review by all Members in preparation for Congress-18 discussions;
 - This will include all WMO technical commission and program areas, (GCOS and GCW), CEOS, other UN agencies (FAO, UNESCO, UNDP,...) and major contributing programs such as Copernicus;
- CGMS will also have an opportunity to comment, in particular regarding Chapter II, based on our current understanding of CGMS Baseline, Contingency Plan and Gap Analysis;