



## Concluding the CGMS coordinated position to the update of the WIGOS Vision 2040

CGMS-54 Plenary  
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Mr. Sean Burns, EUMETSAT, CGMS Secretariat,  
representing CGMS Secretariat in INFCOM MG

## Concluding the CGMS coordinated response to the update of the WIGOS Vision 2040

- CGMS-53 WGIII recommended to the CGMS-53 Plenary to develop a consolidated CGMS Position for the WIGOS Vision 2050;
- CGMS-54 WGIII recommended the finalised draft to CGMS-54 Plenary for endorsement;
- Development of the CGMS position proceeded in parallel to the drafting of the Vision.
- The position reflects the leadership positions of all CGMS members and provides reference and guidance for the development of the space-based part of the Vision 2050 while consolidating the support of the Space Agencies to the revised vision.

## Concluding the CGMS coordinated response to the update of the WIGOS Vision 2040

Date	Activity
27 March 2025	CGMS-53 WGIII -> Presentation of concept of position paper by CGMSSEC (CGMS-53-CGMS-WP-13)
17 April 2025	CGMS survey to space agencies (feedback expected in the course of May)
28-29 April 2025	WIGOS Vision meeting -> Presentation of position paper planning by CGMSSEC
3-5 June 2025	CGMS-53 plenary -> Discussion based on survey feedback (provided to participants)
June-August 2025	CGMSSEC to elaborate preliminary position paper for review by WGIII members
25-26 September	WIGOS Vision meeting (in EUMETSAT) -> CGMS preliminary position paper + initial review of space component of Vision
12 November 2025, 21 January 2026	CGMS WGIII inter-sessionals -> CGMS preliminary position paper review
3-4 March 2026	16 <sup>th</sup> WMO High-Level Consultative Meeting on Satellite Matters (CM-16) -> CGMSSEC will present preliminary position paper
13-19 April 2026	CGMS-54 WGIII -> Finalisation of CGMS position paper for recommendation to CGMS-54 Plenary
June 2026	CGMS-54 Plenary -> Final endorsement of CGMS position paper by CGMS and provision to WMO
July 2026	WMO Vision 2050 final submission to INFCOM-4
October 2026	INFCOM-4 -> endorsement of WIGOS Vision 2050 and recommendation to Congress
2027	2027 WMO Congress-20 -> approval WIGOS Vision 2050

## Concluding the CGMS coordinated response to the update of the WIGOS Vision 2040

CGMS WGIII agreed on a list of points to be elaborated in the position paper:

- Coverage of user requirements for Earth system monitoring;
- Focus on a backbone constellation, fully committed by CGMS members;
- Evolution of the Space-Based subcomponents;
- Consideration of emerging capabilities;
- Contributions of commercial capabilities;
- Impact of AI/ML;
- Ground segment aspects; ...

CGMS inputs were gathered via a survey and follow-up meetings

## CGMS and WIGOS Vision 2050



- Coverage of user requirements for Earth system monitoring

### Advanced Satellite Technologies

Microwave sensors, radio-occultation, scatterometers, and wind lidar improve atmospheric profiling and weather models.

### Nowcasting and Early Warning

High-resolution geostationary imaging enables rapid detection of severe weather and disaster preparedness globally.

### Integrated Earth-System Monitoring

Comprehensive observation of atmosphere, hydrosphere, cryosphere, biosphere, and human variables supports environmental understanding.

### Atmospheric Chemistry and Air Quality

Satellites track pollutants, aerosols, and greenhouse gases to support health and climate assessments.

### Polar and Space Weather Coverage

Enhanced data from polar regions and Lagrange point satellites improve climate and geomagnetic storm forecasting.

## CGMS and WIGOS Vision 2050



- Focus on a backbone constellation, fully committed by CGMS members, evolution of the tier concept – a tiered framework of subcomponents ;
  - Strengthened GEO/LEO backbone delivering essential, fit-for-purpose observations for global applications.
  - Clear priorities for high-value observations: sounding, profiling, RO, hydrology/extreme events, ocean winds, space weather.
  - Integrated, end-to-end observing systems enabling actionable national and regional Earth-system prediction.
  - Sustainability embedded as a core principle: debris mitigation, orbital stewardship, and responsible mission design.
  - Evolution of the Space-Based subcomponents, e.g. flexible LEO coverage, and convergence of operational, research, and commercial missions.

## CGMS and WIGOS Vision 2050



### ➤ Consideration of emerging capabilities;

TECHNOLOGY	PRIMARY CAPABILITY	OPERATIONAL BENEFIT
Spaceborne LiDAR	Wind, cloud, aerosol profiling	Improved global wind fields; enhanced aerosol data
Hyperspectral Microwave & IR	Fine vertical atmospheric profiling	Higher resolution thermodynamic state information
GEO Passive Microwave	Continuous all-weather monitoring	Improved real-time precipitation & convection tracking
Smallsat Microwave Constellations	Frequent regional revisit	Enhanced hydrology & surface parameter monitoring
Doppler Cloud/Precipitation Radars	Vertical motion & hydrometeor structure	Better storm dynamics understanding
Quantum Sensing	Novel measurement techniques	Future potential transformative capabilities
Signals of Opportunity (SoOp)	Use of communication/navigation signals	New frequency access; GNSS-R & beyond

## CGMS and WIGOS Vision 2050



- Contributions of commercial capabilities;
  - Recognise and integrate commercial providers through open standards, assured quality, and reliable latency.
  - Enable public-private hybrid models to ensure continuity of key observations while leveraging commercial innovation.
  - Partner with commercial and citizen-science platforms for calibration and validation.
  - Prepare for more complex, diverse data streams with varying processing and latency requirements.
  - Coordinate CGMS commercial data procurement to ensure interoperability, non-redundancy, cross-calibration, and value-for-money.

## CGMS and WIGOS Vision 2050



WORLD  
METEOROLOGICAL  
ORGANIZATION

- Impact of AI/ML;
  - AI enables adaptive, intelligence -driven requirements setting.
  - Improves observing system simulation & optimisation for design trade -offs.
  - Supports real-time data compression, patching, triage & quality control.
  - Amplifies existing sensors via synthetic observations & performance enhancement.
  - Improves integration with NWP and supports feedback loops for constellation evolution.
  - Enables onboard decision -making, dynamic tasking & autonomous constellation operations.
  - AI models may influence future observation requirements, focusing on information content & redundancy reduction.

## CGMS and WIGOS Vision 2050



- Ground segment aspects; ...
  - Emphasise timeliness & accessibility as core system performance metrics.
  - Latency requirements must be product-driven and aligned with sensor-to-user workflows.
  - Ground segment & data transport investments are as critical as space-segment upgrades.
  - Digital Twins, IoT & smart sensors will drive unified, cloud-based data access.
  - CGMS will promote open sharing of tools, algorithms & harmonised processing for consistency.
  - Coordinate ground architecture planning & procurement to maximise value, reduce costs & enhance interoperability.

## CGMS and WIGOS Vision 2050



- The WIGOS Vision 2050 needs to:
  - a) articulate the need for a funded, quality-controlled, and sustained Earth observing system for its Members.
  - b) ensure continuity and resilience of the global observing backbone.
  - c) recognise the complementary roles of R&D missions and private sector contributions, while safeguarding operational reliability and data integrity.
  - d) offer enabling and flexible guidance to support CGMS Member implementation to anchor a stable operational system while embracing innovation and evolving partnerships.

## CGMS and WIGOS Vision 2050



- The update of the WIGOS Vision 2050 is significant and important to enable CGMS agencies:
  - a) To secure commitment, funding and continuity of the operational Earth observing missions; and
  - b) To be in a better position to respond to the user community needs, and ultimately to implement further observations for the benefit of early warnings, saving of people's lives and infrastructure, risk reduction and the like.

## To be considered by CGMS:

- CGMS is invited to endorse the CGMS coordinated position to the update of the WIGOS Vision 2040

Thank you for your attention!

