REPORT OF THE 51st PLENARY SESSION OF THE COORDINATION GROUP FOR METEOROLOGICAL SATELLITES

EXTRACT
WORKING GROUP IV

DRAFT REPORT available for plenary as an information document (CGMS-51-WGIV-WP-04) If updates are needed, please send these to cgmssec@eumetsat.int

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PARALLEL WORKING GROUP SESSIONS

WGIV REPORT

Co-Chairs: *Kotaro Bessho, JMA / Vasily Asmus, ROSHYDROMET*
Rapporteurs: *Natalia Donoho, WMO / Simon Elliott, EUMETSAT*

1. Opening, objectives and expected outcomes / WGIV co-chairs and rapporteur status

2. Review of actions and recommendations from previous meetings and status update

3. User-provider dialogue on regional/global scales

3.1 User-provider dialogue on regional/global scales

CGMS-51-joint-JMA-KMA-WP-01 - Progress Report on the RAII WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training in 2022

The WMO Regional Association (RA) II WIGOS Project to develop support for National Meteorological and Hydrological Services (NMHSs) in Satellite Data, Products, and Training is a regional framework formed to assist NMHSs in RA II for better use of satellite-related information in collaboration with relevant satellite operators, users and WMO. The 4th Joint Meeting of RA II WIGOS Project and RA V TT-SU for RA II and RA V NMHSs was held in Tokyo, Japan, and also online on 18 November 2022. The meeting was hosted by the Japan Meteorological Agency (JMA). In the Joint Meeting, they had useful reports for regional community such as WMO's report for the global survey from ET-SSU, three training activity reports from the BOM, CMA, KMA, and the BMKG, two informative reports from other regions, RA I and RA III/IV. As a result, at the 4th Joint Meeting of RA II WIGOS Project and RA V TT-SU, we realized we need to communicate more between global and regional group.

KMA proposed the following recommendation.

CGMS-51 RECOMMENDATIONS – WGIV		
item	**Recommendation#**	**Description**
XXX	WGIV/XXXXX	AOMSUC-13 in 2023 will be held in Busan, Korea hosted by KMA together with VLab training, and a RA II/V joint coordination meeting. RA II/V Joint Coordination Group ask for CGMS's support and encouragement to attend.

3.2 Implementation and evolution of sustained and coordinated communication satellite broadcast systems

CGMS-51-CMA-WP-07- The report on CMACast services and upgrade

CMA provided the status of the CMACast system services and upgrade. In the framework of GEONETCast, CMACast distributes data to Asia-Pacific users who use the Integrated CMACast system to receive, process

data and make weather forecast in last 2022. In order to better offer more users services, CMACast system had updated in 2022. After upgrade, the coverage of CMACast includes the Asia-pacific region, the middle East region and most area of Africa. And most of users of CMACast had pointed to the new communication satellite and upgraded the new version receive software of CMACast. In addition, some parts of FY4B and FY3E products have been broadcasted by CMACast to users. CMACast will keep providing meteorological data dissemination service for the users.

CGMS-51-CMA-WP-08 - The update of FENGYUN satellite data and application services

CMA provided an overview of FENGYUN satellite data, the status and the future plan of the FENGYUN satellite data distribution and services. FY-3E and FY-4B data distribution information was updated. FENGYUN satellite data are open to NMSs and other international organizations and users for free charge via many ways. For real-time users, FENGYUN satellite data can be accessed via direct broadcasting station, CMA data broadcasting system (CMACast), GTS, WIS and public cloud. For non-real-time users, FENGYUN satellite data can be accessed from the FENGYUN satellite data center website, downloading toolkits and offline data services. For emergency users, FENGYUN satellite emergency support mechanism FY_ESM is useful to The National Meteorological Services (NMSs). The software platform of FENGYUN Earth will be provided to the international user for enhancing FENGYUN satellite data application this year.

CGMS-51-JMA-WP-07 - JMA report on usage of cloud services / data dissemination and distribution of Himawari-8/9 and their recent updates.

JMA presented an overview of Himawari-8/9 data dissemination and distribution in JMA and reported their recent updates.

Himawari-8/9 data distribution services include:

• HimawariCloud

• HimawariCast

• JMA Data Dissemination System (JDDS), a terrestrial service using HTTP, which facilitates users' transition from MTSAT to Himawari-8/9 data.

Additional Japanese institutions operate archival and redistribution services for Himawari-8/9 data in support of the research, development and education communities. The Japan Meteorological Business Support Center (JMBSC) provides Himawari data to private sector companies (37, as of March 2022).

Lastly, JMA reported that the switch over from Himawari-8 to Himawari-9 was successful.

3.3 Global or inter-regional data circulation and access, WIS

CGMS-51-ROSHYDROMET-WP-03 - Satellite data exchange in Roshydromet

Roshydromet presented an overview of their satellite data exchange. Roshydromet is sharing satellite data with international community in accordance with WMO Unified Data Policy.

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Data from Russian geostationary satellites of Electro-L series (Electro-L N3,76E, and Electro-L N2, 14,5W) is being distributed in HRIT/LRIT format every 3 hours. The 15-minute HRIT data is provided to local users via land channels. Electro-L N4 satellite was launched on February 05, 2023 and placed at 165,8 E position.

The data in HRIT/LRIT format will be available to users after the commissioning phase completion.

Data from Russian polar meteorological satellite Meteor-M N2-2 is provided to users worldwide in direct broadcast via HRPT downlink (1700 MHz). It currently includes MSU-MR scanning radiometer data. Next satellite of Meteor-M series, Meteor-M N2-3, is planned for launch on June, 27, 2023. After the commissioning phase, the data will be distributed to users via HRPT downlink. It will contain MSUMR scanning radiometer data together with microwave sounder MTVZA-GY data.

Data from infrared sounder IKFS-2 from Meteor-M N2-3 will be available on Roshydromet GSICS Processing and Research Centre website http://planet.rssi.ru/calval/portal-main-en?setlang=en_US

CGMS-51-WMO-WP-15 - WIS 2.0 introduction, pilot phase and transition.

In the coming years, WMO's WIS 2.0 will gradually replace the GTS. WMO gave an overview of the background for this migration, what it entails and how it is being carried out. The focus of the initiative is opening up data access to the widest community by reducing technical barriers and costs, and leveraging well understood and freely available technologies. The "WIS 2-0 in a box" solution was highlighted as a reference implementation of a WIS 2.0 node.

CGMS-51 RECOMMENDATIONS – WGIV		
item	**Recommendation#**	**Description**
XXX	WGIV/XXXXX	Given that GTS operational availability is not guaranteed beyond 2030, CGMS Members are recommended to develop plans for the adoption of the WMO Information System WIS 2.0 in support of international data exchange.

CGMS-51-EUMETSAT-WP-08 - EUMETSAT report on preparations for the migration from GTS to the WIS 2.0

In the coming years WMO will perform a phased introduction of its next generation information system (WIS 2.0). This brings with it a change of paradigm for both data providers and consumers; it also presents a number of opportunities for CGMS Members. EUMETSAT provided a brief summary of the WIS 2.0 architecture and describes how EUMETSAT is preparing for its migration to WIS 2.

CGMS-51-NOAA-WP-13 - NOAA Report on GEONETCast Americas (GNC-A)

GEONETcast (GNC) is a worldwide, near real time, network of satellite-based data dissemination systems designed to distribute weather products to diverse communities. NOAA presented an introduction to GNC-A, some news about their program, and an introduction to new GNC-A Program Manager.

3.4 Widening of data access, to new missions/providers as well as for other user communities

No specific topics were addressed under this item in the agenda.

3.5 Disaster support

CGMS-51-JMA-WP-08 - Status of JMA Himawari Request service

In January 2018, the Japan Meteorological Agency (JMA) launched a new international service "HimawariRequest", in collaboration with the Australian Bureau of Meteorology. The service allows NMHS users in Himawari8/9 coverage area to request Target Area observation covering a 1,000km x 1,000km area every 2.5 minutes.

Target Area observation supports JMA's national/international services including the RSMC Tokyo - Typhoon Center and the Tokyo VAAC. In response to a recommendation made at the 2015 Joint RA II/RA V Workshop on WIGOS for Disaster Risk Reduction, JMA developed the service through the RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training. As of 12 April 2023, JMA had taken registrations from 22 NMHSs in RA II and RA V, and 19 have completed preparation for their requests.

There have been 202 international requests since the commencement of the service, among which 182 have been approved. Targets have included tropical cyclones in the South Pacific, extreme weather and bushfires in Australia, and volcanic activity in Indonesia.

JMA expects the HimawariRequest service to support disaster risk reduction activities in the Asia Oceania region based on the regional monitoring of extreme events such as tropical cyclones and volcanic eruptions using the Target Area observation.

As part of the RA II WIGOS Project, JMA is currently considering the creation of a web resource that displays the location of request-based rapid scan observations conducted by CMA, JMA and KMA in map form for at-a-glance viewing and ease of use.

3.6 Support to the Ocean user community

CGMS-51-NOAA-WP-14 - NOAA's CoastWatch/PolarWatch Support to the Ocean User Community

Ocean observations from space provide essential information for weather forecasting, ecological forecasting, climate forecasting, marine resource management, safety and navigation, research, blue economy, and other applications. Many ocean observations from satellites are now operational: mature, robust, validated, documented, and routinely available. Potential users remain, who are not aware of or perceive barriers to using satellite ocean remote sensing data in their operational applications. At NOAA CoastWatch, our data are "free and open" and we effectively do the research and development and build the relationships and user-confidence to get from satellite observations and data products to tools for decision making (such as Sargassum bulletins; by-catch avoidance tools; probability maps for harmful algae). And we collaborate internationally to use global satellite data to extend environmental monitoring and indicators to benefit the global community. Within NOAA, we lead and champion for the prioritization of innovative projects to support user needs. CGMS has a role to promote the optimal exploitation of satellite mission investments. CGMS should appreciate and acknowledge the importance

of the need for (and support the development of, where appropriate) consistently-processed, long term time series which link to NRT (similar to but different and separate from conventional Climate Data Records); consistently-processed multi-mission data (e.g., “super-collated”, fused, etc.); and multiple geophysical parameter satellite data combined with other observation types to produce relevant 4-dimensional ocean knowledge. CGMS has endorsed the Third International Operational Satellite Oceanography Symposium (OSOS-3) will be held in Busan, South Korea, 12-15 June 2023, with an optional training day on 16th June 2023. We suggest CGMS continue to support activities which aim to bridge gaps between data products and applications for decision making (e.g., OSOS-3, etc.) in the operational ocean, coastal, and freshwater communities.

NOAA asked CGMS WGIV to appreciate and acknowledge the importance of the need for (and support for the development of, where appropriate) the following: especially for the ocean user community:

- Consistently-processed, long term time series which link to NRT (similar to but different and separate from conventional Climate Data Records)
- Consistently-processed multi-mission data (e.g., “super-collated”, fused, etc.)
- Multiple geophysical parameter satellite data combined with other observation types to produce relevant 4-dimensional ocean knowledge in applications that enable decision-making.

3.7 Support for Arctic observations

CGMS-51-NOAA-WP-15 - NOAA's sea ice innovation plan and Arctic observation priorities

Changes in sea-ice cover come with increased hazards and notable societal impacts (e.g., on stability of Arctic communities, fisheries, national security, polar maritime transportation, coastal resilience).

NOAA/NESDIS sea ice innovation plan aims to advance the monitoring of the integrated Earth system to meet the challenges of climate and environmental change in the polar oceans, increase accessibility to analysis-ready information products.

The plan was co-developed through user engagement and using recommendations in NOAA strategic documents and other governmental organizations’ reports on the polar regions.

Five recurrent gaps were identified:

- Sea ice dynamics
- Sea ice long-term records
- Information product enhancements
- Product tailoring
- Novel sea ice information products.

Addressing these gaps will lead to innovation demonstrations and fit-for-purpose products enabling NOAA to deliver U.S. Government’s authoritative climate products and services of the highest quality.

3.8 Support for Hyperspectral infrared instruments

CGMS-51-EUMETSAT-WP-03 - Availability of MTG IRS products via EUMETSAT data access services

EUMETSAT's Meteosat Third Generation (MTG) mission will include both an imaging and a sounding satellite embarking different instrument suites. MTG-S, the sounder satellites, will fly with the InfraRed Sounder (IRS) on board. This instrument will provide substantial benefit to weather forecasting by tracking the three-dimensional structure of atmospheric water vapour and temperature operationally.

EUMETSAT operates a portfolio of data access services that will provide users with MTG-S IRS data products. This paper provides an overview of how users can access these products using these data access services.

Users were invited to take note and familiarise themselves with the data services that are most appropriate for their use of MTG-S IRS products.

CGMS-51-CMA-WP-09 - FY4 satellite series GIIRS L1 Data Introduction and access services

CMA provided an overview of the Geostationary Interferometric Infrared Sounder (GIIRS) data information of FY-4A and FY-4B, the status and access services. The daily schedule, observation region, L1 data volume and L1 file name of GIIRS were introduced.

GIIRS data are open to NMSs and other international organizations and users for free charge via many ways. For real-time users, the data can be accessed via public cloud. For non-real-time users, the data can be accessed from the FENGYUN satellite data center website, downloading toolkits and offline data services.

4. Coordination of Metadata (incl. standards within ocean communities)

The Working Group noted the ongoing efforts to initiate the activities of the Task Group on Metadata. A number CGMS Members have nominated members of the Task Group, but efforts are continuing to find a chairperson and to consolidate the terms of reference.

5. User readiness for new satellite systems

5.1 User readiness for new satellite systems

CGMS-51-VLab-WP-01 - VLab progress report and a new VLab strategy 2024-2027 for endorsement

The VLab Strategy (2024–2027) was updated by the VLab Management Group (VLMG) and adopted by the WMO Executive Council at its 76th session (27 February to 3 March 2023, Geneva). CGMS WGIV was invited to recommend the updated VLab Strategy, as provided in the Annex of the working paper, to CGMS Plenary for endorsement.

The VLab Management Group (VLMG) held quarterly online meetings. The Tenth meeting of VLMG was hosted by EUMETSAT at EUMETSAT HQ as a hybrid event on September 26-30, 2022.

Since CGMS-50, VLab members have offered a variety of training opportunities. The training topics address both current and new generation of satellites. Strong collaboration and coordination among VLab members build capacity regionally.

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The VLab Trust Fund continues to receive yearly contributions from NOAA/NWS, EUMETSAT, and KMA. Regular and increased contributions from CGMS agencies is required to expand VLab activities to meet WMO-CGMS Members' requirements and user needs and to improve the long-term sustainability of VLab activities.

CGMS WG-IV recommends to plenary to endorse the updated Strategy for the Virtual Laboratory for Education and Training in Satellite Meteorology (2024–2027).

CGMS-51 RECOMMENDATIONS – WGIV		
item	**Recommendation#**	**Description**
XXX	WGIV/XXXXX	CGMS WG-IV recommends to plenary to endorse the updated Strategy for the Virtual Laboratory for Education and Training in Satellite Meteorology (2024–2027).

CGMS members are invited to contact WMO to provide contributions to the WMO VLab Trust Fund to ensure the continuation of technical support to the VLab through the VLab Technical Support Officer as well as to the implementation of VLab projects.

CGMS members are invited to contact their supported VLab Centres of Excellence to discuss training needs and requirements.

CGMS-51-WMO-WP-16 - Best Practices for Achieving User Readiness for New Satellite Systems for recommendation to plenary.

The CGMS/WMO Best Practices for Achieving User Readiness for New Meteorological Systems was endorsed by CGMS-44 plenary, June 2016, and it is aimed to support and guide satellite operators and users in their respective preparation activities.

The Best Practices provide a typical breakdown of user readiness activities and a timeline of deliverables from satellite operators to support user readiness. The Best Practices cover activities performed by both User Organizations and Satellite Operators.

The proposed revision of the document published in 2017 (WMO-No. 1187) reflects lessons learned from the satellite systems that have become operational over the last 5-10 years (such as Himawari-8/9, GOES-R, GEO-Kompsat-2, FY-4, FY-3 and JPSS), novel types of LEO missions, the increasing role of commercial satellite data providers, as well as evolutions in the user needs.

CGMS WG-IV recommends to plenary to endorse CGMS/WMO Best Practices for Achieving User Readiness for New Satellite Systems.

CGMS-51 RECOMMENDATIONS – WGIV		
item	**Recommendation#**	**Description**

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XXX	WGIV/XXXXX	CGMS WG-IV recommends to plenary to endorse CGMS/WMO Best Practices for Achieving User Readiness for New Satellite Systems.

5.2 Notification of changes (and alerts) in satellite data and/or products impacting users

No specific topics were addressed under this item in the agenda.

6. Cyber security towards end users

The activities of the Task Group on Cyber Security were suspended following the end of CGMS 50. As such, there was nothing reported under this agenda item.

7. Cloud Services interoperability

CGMS-51-NOAA-WP-16 - Summary and Highlights from CGMS WGIV Cloud Service Expert Group (2022-2023)

The CGMS Cloud Services Expert Group was established in July 2020 and is comprised of members from the National Oceanic and Atmospheric Administration (NOAA), European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), Korea Meteorological Administration (KMA), China Meteorological Administration (CMA), Japan Meteorological Agency (JMA), Indian Space Research Organisation (ISRO), and the World Meteorological Organization (WMO). The group hosts an annual CGMS Cloud Workshop and develops best practices and lessons learned based on the information exchange in the workshops. Over the past year (2022-2023), the group has focused on planning the 2023 annual Cloud workshop and finalizing the best practices document for CGMS publication.

The Group invited members from WGs I, II, and IV to their meetings and workshops to discuss Cloud best practices, lessons learned, and cloud interoperability.

8. Long term data preservation

At the time of the Working Group IV meeting, there was nothing specific to report.

Since the meeting, however, and in response to action WGIV/A50.02 ("*WGISS and WGIV to hold a joint meeting to discuss modalities and areas of common activities between WGISS and WGIV. This should include a report on the implementation of the adopted guidelines.*"), a joint meeting between WGIV and CEOS-WGISS was help on 07/06/2023. The meeting was well supported and identified possible areas for collaboration both in terms of data management and in the use of cloud computing.

9. Aspects on the implementation of the global contingency plan from Plenary (as proposed by WGIII)

CGMS-51-WGIII-WP-02 - Status and outcome of the 5th CGMS risk assessment

The objective of the Risk Assessment Workshop is to:

- Update the CGMS Baseline based on member inputs;
- Prepare a consolidated Risk Assessment against the CGMS Baseline;
- Identify contingency actions to be taken, or actions to identify in the HLPP;
- Identify ways to integrate satellite data into the CGMS Baseline and characterise CGMS' contribution.

The Working Group III held a workshop from 21-23 February 2023, hosted by EUMETSAT.

WGIV reviewed the draft update of the CGMS Risk Assessment.

10. Review of WGIV list of actions (incl. review/updates of existing and proposed new action items & recommendations)

WGIV discussed the actions and recommendations from previous CGMS plenary sessions (CGMS-50 and earlier). The status of the open actions on and recommendations for WGIV were reviewed and updated as needed. The final status is provided in a table attached to this report.

11. WGIV Coordination Items

11.1 Status of CGMS future direction 2022+ project

CGMS-51-CGMS-WP-09WGIV- Status of CGMS future direction 2022+ project

CGMS Secretariat gave an overview of the activities undertaken on the CGMS future direction 2022+ project since CGMS-50 plenary for consideration and feedback by the CGMS-51 working groups (WGs I-IV and the SWCG). The 2nd high-level meeting on 29 March 2023 endorsed the proposed way forward, noting the need for the identification of concrete implementation measures in the next year (up to CGMS-52) and a stronger link as concerns the potential interfaces.

The basis for discussion were the agreed seven strategic themes:

- Socio-economic benefits – *proposed to be led by WGIII*
- Research to operations – *proposed to be led by WGIV*
- Future observing (hybrid) space infrastructure – *proposed to be led by WGI (Simon Elliott)*
- Future information technologies – *proposed to be led by WGI, WGIV (Cloud), WGII (AI/ML)*
- Relationship with the private sector – *proposed to be led by WGIII*
- Climate and Earth system monitoring – *proposed to be led by WGII*
- Space situational awareness – *proposed to be led by WGI and SWCG*
- + A topic for all: supporting developing countries

WGIV was invited to take note of the status of CGMS future direction 2022+ project.

Following CGMS-51, the concrete outcomes of the CGMS future direction 2022+ project need to be finalised, and further work to be implemented via concrete actions through the working groups.

12. CGMS High Level Priority Plan (incl. Review, Status of implementation, Proposed Updates)

CGMS-51-CGMS-WP-08WGIV – Revised HLPP 2023-2027 - for plenary endorsement

This working paper provided the status of implementation of CGMS High Level Priority Plan (2022-2026). It also listed proposals for changes to the HLPP targets. WGI reviewed and provided inputs to the current status of the HLPP.

CGMS-51-CGMS-WP-07WGIV - Status of implementation of CGMS High Level Priority Plan (2022-2026)

The Working Group noted the status of those parts of the CGMS High Level Priority Plan (2022-2026) relating to its activities and confirmed their validity.

13 Future WGIV sessions (incl. dates for future plenary and intersessional meetings, proposals for new agenda items)

CGMS-51-WGIV-WP-03- Decision on dates on WGIV activities in 2023-2024 (CGMS-51 to CGMS-52)

The paper guided the discussion on planning the dates and formats of the WGIV activities between CGMS-51 and up to and including CGMS-52.

CGMS-51 WGIV agreed on the following WGIV intersessional meetings up to CGMS-52:

WGIV	Proposed CGMSG-50 to CGMS-51 WGI intersessional dates
WGIV Intersessional meeting #1	12/10/2023, 12 UTC
WGIV Intersessional meeting #2	25/01/2024, 12 UTC
WGIV Intersessional meeting #3	04/04/2024, 12 UTC

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CGMS-51 WGV discussed and confirmed the following proposed dates of CGMS-52 plenary session:

WGIV	Proposed CGMSG-51 to CGMS-52 WGIV intersessional dates
CGMS-52 working group meetings	22-28 April 2024 Alternatives: 6-10 May 2024 (20-26 May 2024 - very close to plenary)
CGMS-52 plenary session In-person Host: NOAA	Week of 3-7 June 2024, USA

The confirmed schedule will be added to the online CGMS website meeting calendar.

CGMS-51-WGIV-WP-10 - Status of co-chairs/rapporteurs of the CGMS working groups, CGMS International Science Working Groups, VLab, and other groups

This paper provided an overview of the co-chairs and rapporteurs in the CGMS Working Groups, rapporteurs in the CGMS international science working groups, and other CGMS related activities (VLab, JWGClimate, other task groups and teams).

The working paper provides the status of representatives and an indication of any positions that need to be filled in the near to medium-term future. CGMS members were invited to nominate candidates for co-chair and rapporteur positions (or upcoming positions) as necessary and to inform cgmssec@eumetsat.int accordingly.

14 AOB

No AOB items were presented.

15 Meeting Conclusions

The WGIV Co-Chair and Co-Rapporteurs thanked the WGIV meeting participants for their valuable contributions to a successful meeting.

The outcomes and conclusions of the meeting were reviewed against the expected outcomes presented in the beginning of the meeting. The expected outcomes were achieved, with some additional inputs on Terms of Reference and recording up-to-date membership to be provided by the Task Groups ahead of CGMS-52.

/*** Reference to Actions and recommendations table to be included here after plenary ***/

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