REPORT OF THE 50TH PLENARY SESSION OF THE COORDINATION GROUP FOR METEOROLOGICAL SATELLITES

DRAFT REPORT available for plenary as an information document (CGMS-51-WGIII-WP-01)

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PARALLEL WORKING GROUP SESSIONS

WG III REPORT

1. Opening, objectives

Co-Chairs Ajay Mehta and Peng Zhang welcomed all participants to the WGIII session. They briefly presented the agenda and the objectives of the meeting related to the CGMS baseline and the CGMS risk assessment. The meeting participants were introducing themselves. The list of participants can be found in the Annex 1.

2. Status of and way forward for establishing core satellite data as per new WMO unified Data Policy

CGMS-50-WMO-WP-16: Status of and way forward for establishing core satellite data as per new WMO unified Data Policy

H. Pohjola presented the WMO Unified Policy for International Exchange of Earth System Data. He explained the major changes compared to old WMO Data Policy resolutions 40, 25 and 60. The important change is that with the new data policy WMO commits itself to broadening and enhancing the free and unrestricted international exchange of Earth system data. Thus, new data policy resolution emphasis on the Earth System and not only weather, hydrology and climate alone. New data policy has two categories: Core (data *shall* be exchanged) and Recommended (data *should* be exchanged).

WMO has started preparations for the bilateral discussion with space agencies to define Core and Recommended satellite datasets to be documented in WIGOS manual, which is referred to the data policy related to the data exchange. The invitation letters, together with WMO preliminary analysis of current space-based observation capabilities, were sent out requesting space agencies to contact WMO to facilitate bilateral discussion. After the bilateral discussions space agency commitments will be documented in WMO WIGOS Manual and presented for INFCOM, WMO Executive Council and again for WMO Congress 2023 for the final approval by WMO members. WMO has nominated Sue Barrell as a data policy coordinator.

In the discussion many space agencies confirmed that they have received the invitation letter to bilateral discussions from WMO.

3. Updates on significant observational missions (in response to/from a CGMS baseline/risk assessment point of view)

3.1 Operational missions

CGMS-50-WMO-WP-04: CMA Report on Next Precipitation Measurement and Early-morning Orbit Satellites (FY-3I and FY-3J)

M. Guan presented CMA´s plans for their first precipitation measurement mission (FY-3G and FY-3I) and the second early-morning orbit satellite (FY-3J). FY-3G is going to be launched in 2022. FY-3I and FY-3J are launched in 2026. Both FY-3G and FY-3I satellites have similar measurement capabilities, which are: Precipitation Measurement Radar (PRM), Microwave Radiation Imager (MWRI), Rainfall Measurement Optical Imager (RMOI), GNSS Radio Occultation Sounder (GNOS) and Neutral Atmospheric Density Detector. PRM is a dual-frequency, single-polarization one-dimensional phased array radar. The PRM frequencies are 13.35 GHz and 35.55 GHz with sensitivity 0.5 mm/h at 13.35 GHz, 0.2 mm/h at 35.55 GHz with swath ±20.3°. Horizontal resolution is 5.0 km, vertical resolution is 250 m. Overall the spectral channel settings of some instruments are further optimized, and the performance is upgraded from FY-3G and FY-3E. All these satellites further respond to the WIGOS Vision and CGMS Baseline, contributing to the operational continuity of the global space observing system.

In the discussion A. Mehta wanted to acknowledge CMA's significant contribution with these satellites to critical gaps in the risk assessment.

CGMS-50-ESA-WP-05: Status of the Current and Future ESA Earth Observation Missions and Programmes

Ivan Petiteville presented working paper on future ESA Earth observation missions and programmes. ESA has 15 satellites on orbit and around 40 in planning. Copernicus represents the major continuing initiative of European efforts in Earth Observation. The first Copernicus dedicated satellite ("Sentinel-1A") was launched in 2014, followed by Sentinel-2A in June 2015, Sentinel-3A and 1B in 2016, Sentinel-2B and Sentinel-5P satellites in 2017, Sentinel-3B in 2018 and Sentinel-6 Michael Freilich in 2020.

Sentinel operations continued nominally apart from the major Sentinel-1B anomaly that occurred late 2021 affecting the satellite power system. The satellite remains under control and regular orbit control manoeuvres are routinely performed. A long-term unavailability of data provision (several months) is assumed, but it is still too early to consider a permanent unavailability of Sentinel-1B. Sentinel missions are developed, launched and operated in partnership with the European Union and EUMETSAT. The Sentinel-4 and 5 instruments developed by ESA will fly respectively on the MTG-S and Metop-SG missions also developed by ESA in cooperation with EUMETSAT. Due to Sentinel 1B anomaly 1C launch will be postponed beyond 2022.

The Earth Explorer missions currently in orbit (SMOS, CryoSat, Swarm, Aeolus) are all performing extremely well, and the related data exploitation is based on continuous data of excellent quality. The three missions all feature strong elements of international collaboration and a growing synergy between them. The SMOS satellite was launched in 2009. The CryoSat-2 satellite was launched in 2010 and the Swarm satellites in 2013. Aeolus is the last Earth Explorer satellite put into orbit in 2018 and its Doppler Wind Lidar technique used for measuring wind profiles from space has already been fully demonstrated.

The positive impact of Aeolus on the weather forecast has been also seen by multiple Numerical Weather Prediction centres world-wide, in particular by ECMWF. Aeolus follow-on programme is under planning and the programme proposal will be provided until end of 2022.

The Proba-V small satellite was launched on in 2013. Its coarse resolution imager has, together with Sentinel-3, continued the data acquisition of the Vegetation payload on-board SPOT-4 and 5. However, Proba-V Vegetation instrument has ended its operations on 31 October 2021 as planned. The Proba-V Cubesat Companion (PV-CC) development within the GSTP programme now envisages a launch with Vega-C at end of 2022 or early 2023.

For the ESA future missions and their progress I. Petiteville reported the forthcoming Explorer missions, EarthCARE, Biomass, FLEX, and FORUM. The FORUM mission was selected for implementation as Earth Explorer 9 (EE-9) in 2019. The Phase B2/C/D/E1 space segment contract for FORUM has been finalised and signed at the beginning in 2022. The Phase A studies - two parallel system studies - supporting science studies and campaigns for Harmony have progressed nominally.

In 2020, ESA issued a Call for Ideas for Earth Explorer 11 (EE-11). The science requirement consolidation (SciReC) studies have been kicked-off for the four Phase 0 mission candidates CAIRT, Nitrosat, SEASTAR, and WIVERN. The tender evaluation of the System Studies for all four mission candidates have been conducted and those activities are expected to kick-off by mid-May 2022. Also, activities related to Arctic Weather Satellite (AWS), TRUTHS, SCOUTs and ALTIUS are ongoing. Each of these missions are planned contribute routine, operational monitoring data to improve our understanding of the Earth system and climate change.

Looking to the future, the six Copernicus Expansion missions are currently in phase B2/C/D/E1, addressing EU policy and gaps in Copernicus user needs, and each expanding the current capabilities of the Copernicus space component: CHIME, CIMR, CO2M, CRISTAL, LSTM, and ROSE-L. The Sentinel development activities, including Copernicus Expansion missions and Next Generation missions, continued in line with Segment 4 of the Copernicus Space Component (CSC) Programme, the FutureEO Programme and the CSC Long Term Scenario. Sentinel development activities, including Copernicus Expansion missions and Next Generation missions, continued in line with Segment 4 of the Copernicus Space Component (CSC) Programme, the FutureEO Programme and the CSC Long Term Scenario.

CGMS is also informed of the status of the Earth Watch Programme element, Global Monitoring of Essential Climate Variables (also known as the ‘ESA Climate Change Initiative’ or CCI). The CCI has continued to progress very well since its inception in 2008. In 2016, a second phase of the programme, CCI+, was approved by ESA member states which is allowing to study and monitor 23 essential climate variables (ECV) derived from satellite data, fulfilling GCOS objectives. Out of these 23 ECVs, 16 have been handed over to the Copernicus Climate Change Service (C3S) lead by ECMWF, for operational use.

As a general observation, the COVID-19 pandemic has affected several activities related to the procurement of satellites and instruments at different degrees. Thanks to appropriate measures, the impacts on development projects have been mitigated has much as possible, while overall, the operations of ESA satellites currently in orbit and services to users have been kept nominal.

H. Pohjola asked about the funding status of the Copernicus expansion missions I. Petiteville responded that the funding was agreed with EC to continue with six expansion missions. However, final funding agreement to be completed needs 750 MEUR more. Thus, discussions with non-EU countries are ongoing to full fill the budget. He is confident that the budget will be completed, but the original schedule of the missions might be challenging. He confirmed that currently CIRM is aimed for launch 2028.

M. Rattenborg was asking about the support by missions for HLPP and robust system for low frequency MW SST observations. I. Petiteville responded that it is primary mission of CIRM supporting the Arctic policy of EC together with CHYRSTAL and C2M. He also reminded that launch dates are of course evolving in time.

CGMS-50-JAXA-WP-02: Update on the Status of Future Precipitation Radar Mission

Q. Ochiai presented an update on the JAXA's future precipitation radar mission. JAXA has studied a feasibility of a next generation precipitation radar with Japanese science team and user community. Their targets for the next generation precipitation radar will be high sensitivity instrument with scanning and Doppler capabilities.

In August 2021, JAXA Mission Definition Review (MDR) for the next generation Precipitation Radar satellite was completed. The review board confirmed that the JAXA mission with a spacecraft carrying Ku-band Doppler radar is a successor for GPM/DPR. The IPWG report and the support letter by CGMS members were well received as requirements from international user communities. JAXA appreciates the efforts by CGMS and IPWG.

In December 2021, Implementation Plan of the "Basic Plan on Space Policy" noted the Precipitation Radar Satellite Phase A activity and in January 2022 Precipitation Measuring Mission (PMM) Pre-Project Team was established for the JAXA Spacecraft including Ku-band Doppler Precipitation Radar. System Requirements Review (SRR) is now scheduled in June 2022. Further on, JAXA has participated in NASA's Atmosphere Observing System (AOS) Pre-Phase A activities and attended its Mission Concept Review (MCR) held in the NASA/GSFC in May 2022.

A. Taube was asking about the schedule of the next phases. O. Ochiai responded that exact schedule is not clear, but overall progress of the mission looks very positive.

CGMS-50-joint-ESA/EUM-WP-01: Introduction to Doppler Wind Lidar

R. Chalex from EUMETSAT gave a presentation on Doppler Wind Lidar (DWL). DWL capability was strongly requested by EUMETSAT members in 2003 during post-EPS user consultations. However, it was not selected at that time due to missing technology maturity. Later on, EUMETSAT Council identified DWL as an important and affordable contribution to the Vision for the WMO Integrated Global

Observing System (WIGOS) in 2040. Then ESA Aeolus was launched mid-2018 with very positive impact on NWP after Aeolus data were operationally assimilated by several global NWP centres. It also highlighted in orbit demonstration of technologies with challenges for an operational mission. In 2019 EUMETSAT and ESA agreed on a joint study roadmap to be prepare for affordable operational programmes and initiated system studies. As a result, ESA initiated pre-development activities in 2020 and will now propose Aeolus-2 cooperation programme together with EUMETSAT in 2022 ESA Council at ministerial level.

Aeolus-2 mission objectives are similar to original mission: Wind profiles measurement along the Line-Of-Sight direction throughout the troposphere and the lower stratosphere with a vertical resolution and accuracy meeting Numerical Weather Prediction (NWP) requirements. Also, aerosol profiling capability improvement is under assessment by ESA with possible piggyback of a Radio Occultation instrument requested by EUMETSAT. Overall goal is to make Aeolus an operational mission and not improve its performance. It will have two spacecrafts with 10-year mission time. The first launch is planned in 2030.

B. Kotaro was asking if the slightly higher orbit altitude has any impact of the measurement accuracy. R. Chalex responded that it has no impact, because instrument SNR can handle the increase of the altitude increase. R. Saunders was asking if it is going to be a two-satellite concept flying together. R. Chalex responded that there is only one satellite operating at the time. The second one is launched after the end of life of the first one.

J.V. Thomas was commenting that india is also looking at wind data observation capabilities, because it is very important for tropical region. He was curios that what is the effect of cloud cover related to Aeolus observation. R. Chalex responded that Aeolus signal does not penetration into cloud, so there are no observations below the cloud cover. J.V. Thomas was asking that why the lifetime of Aeolus-2 is 5 years instead of 3 years with Aeolus. R. Chalex responded that laser design was changed for Aeolus-2 and this is why it has longer life time extending then the instrument lifetime.

CGMS-50-SWCG-WP-09: SWCG: Space weather missions

This agenda item was withdrawn.

3.2 Research missions

CGMS-50-NASA-WP-03: NASA status report (Tempo) (Maudood Khan)

M. Khan gave a presentation on NASA's Tropospheric Emissions: Monitoring of Pollution (TEMPO) mission. TEMPO comprises UV and VIS Offner Grating spectrometer that is hosted on a commercial communication satellite for measuring athmospheric pollutions covering most of the North America at hourly temporal frequency, and high spetral resolution. It will measure ozone, nitrogen dioxide, sulfur dioxide, formaldehyde, glyoxal, aerosols, cloud parameters, and UV-B radiation. TEMPO will create a

revolutionary dataset that provides understanding and improves prediction of air quality and climate forcing. TEMPO will be on GEO orbit and it will measure air pollution at 355 times the spatial resolution of the GOME-2 satellite, and 50 times the resolution of the OMI instrument aboard the Aura satellite.

Together with Sentinel-4 and Geostationary Environmental Monitoring Spectrometer (GEMS), TEMPO will form a virtual geostationary constellation for monitoring changes in atmospheric composition. Observations will advance the study of intercontinental air pollution transport across Atlantic and Pacific Oceans; help assess the impact of air pollution on public health, and improve the reliability of air quality forecasting systems.

TEMPO will be hosted on an Intelsat Commercial Satcom mission (IS40e) and launched to 91 deg W. Maxar Technologies holds the prime contract for hosting services and Intelsat is a subcontractor to provide host operations and data routing. The satellite launch is scheduled in Jan 2023 at the moment and data will be publcily available then in June 2023.

M. Rattenborg commented that HLPP has the objective on the operational continuation for this kind of mission (UV and emissions) togehter with Sentinel and GOME-2. P. Zhang was asking that what is the baseline definition for that M. Rattenborg confrmed that CGMS baseline is statement of two baseline instruments for UV spectropmeter.

4. CGMS baseline and risk assessment

4.1 Outcome and finalisation of 4th risk assessment (including mitigation actions for consideration by plenary)

CGMS-50-CGMS-WP-04: Status and outcome of the 4th CGMS risk assessment

A. Mehta presented CGMS Risk Assessment workshop outcome. He shortly presented the process and the steps before WG-III review including updates with member reports, risk assessment and actual Risk Assessment workshop. He stated that the current process is fairly smooth, and it works well. Further on, he explained the objectives of the workshops and the assumptions (same as 2021) used in CGMS Risk Assessment.

The Risk Assessment showed an improved risk posture as a result of CMA's plans for FY-3J beyond FY-3E, which provided continuity in the early morning orbit for a microwave sounder, hyperspectral sounder, and multi-mission imager. FY-3J also provided long-term continuity for short- and long-term radiometers. FY-3I provided continuity for precipitation radars beyond FY-3G.

The lack of geographically dispersed radio occultations; especially in the equatorial regions continues to be a risk. The CGMS Baseline commitment for RO observations is not being met until 2024, and there is a continuity risk from low inclination orbits in the later part of the decade as there are no plans for a follow-on to COSMIC-2. Long-term plans for scatterometers and SWIR Imaging Spectrometer are needed to ensure continuity in the afternoon orbit in the later part of the decade. There is also a Slight

continuity risk for the VIS/UV Spectrometer in the 128.2E slot in the early 2030s. Related to space weather there continues to be a risk of a gap for coronal imaging and plasma analysers at L1 until the SWFO-L1 mission is launched.

The WGIII reviewed the results of the Risk Assessment, which included the 2022 Risk Assessment and updates to the CGMS Baseline Document with recommended actions.

Related actions were commented by M. Rattenborg stating that original issue was NRT access for space weather instruments. E. Talaat commented that IROWG shall define requirements they needed for space weather and ground resources. M. Rattenborg commented that tracking of STEREO and PUNCH shall be also included, which was agreed by E. Talaat. J.V. Thomas commented on OceanSat-3 follow-on mission that funding discussions are ongoing and plans beyond OceanSat-3A cannot be yet confirmed.

M. Goldberg noted that NOAA-15 to 19 satellites should have the same EoL dates in the risk assessment flight out charts. S. Burns also noted that MSG satellites have some incorrect details in the flight out charts. M. Johnson took a note and fixed the typos. Corrected Risk Assesment was provided to WG III members for further review.

K. Dohyeong commented that GK-2B VIS/UV spectrometer plans are not confirmed, but the expection is that follow-on missions will continue with the same capabilities.

CGMS-50 actions - WGIII					
Actionee	**AGN item**	**Action**	**Description**	**Deadline**	**Status**
NOAA	4.1	WGIII/A50.01	NOAA to review additional ground resources needed to track STEREO-A and PUNCH to provide additional coverage in the near-term.	CGMS-51	**OPEN**
KMA	4.1	WGIII/A50.02	KMA to confirm plans beyond GK-2B for visible/UV spectrometer and Narrow Band imager.	CGMS-51	**OPEN**

CGMS-50-WMO-WP-08: WMO gap analysis

H. Pohjola presented WMO Gap Analysis. He explained the three different perspectives of Gap Analysis: CGMS Baseline, User Requirements and WIGOS Vision 2040. WMO Gap Analysis is a follow-on from the earlier work documented in CGMS-49-WMO-WP-13 (WMO Gap Analysis 2021) mostly under the user requirements viewpoint guiding future developments for the medium and long-term. It concludes finding in 16 gap areas listed below. Gap areas were presented together with related items in CGMS Baseline, HLPP or CGMS actions.

New areas recognized compared to earlier WMO Gap Analysis are green house gas monitoring (GHG) and wind profile measurement. For GHG the recognized gap is due to EoL of TES on Aura. After that the

single cross-track IR spectrometer from LEO with substantially high spectral resolution is IASI-NG on EPS-SG. Other IR spectrometers are designed mainly for meteorological application and designed mainly for total column measurement. For the wind profile measurement, the gap is due to near real time observations of horizontally projected line-of-sight wind profiles from doppler wind lidar will cease within a couple of years (Aeolus). There are no firm commitments for a follow-on. These measurements have been demonstrated to have clear positive impacts on global NWP forecasts.

01	Early-morning LEO	09	Sea surface temperature and Ocean colour
02	Coverage from GEO	10	Soil moisture, Snow, Sea-surface salinity, Sea ice
03	Trace gas and GHG monitoring	11	Space weather from L_1
04	Earth Radiation Budget	12	Space weather from the Ecliptic
05	Aerosol observation	13	Space weather from solar orbits
06	Precipitation measurement	14	Space weather from GEO and Molniya orbits
07	Sea-surface wind and wind profile	15	Space weather from HEO and MAG
08	Ocean altimetry	16	Space weather from LEO

In addition, WMO Gap Analysis was raising gaps in IR/MW limb sounding and µwave sounding capability to be considered to include in HLPP. IR/MW limb sounding is identified gap not only for atmospheric chemistry but climate observations (GCOS) for many years. It is high priority for operational services as MLS on Aura is close to EoL (2023).

Also, the continuation of µwave sounding capability after the EoL of NOAA-15-19 satellites, which have provided a pseudo constellation for the µwave sounding in recent years with significant positive NWP model impact. The new small sat constellations (e.g. TROPICS) are now being launched and they will provide new datasets to be evaluated for all-sky radiance assimilation of T/RH sounding, clouds and precipitation as key applications.

4.3 Any outstanding items on the baseline and risk assessment

4.2 Outcome and finalisation of 4th CGMS baseline review - for recommendation to plenary

CGMS-50-CGMS-WP-07WGIII: CGMS Baseline - draft revision following the 4th risk assessment workshop (for recommendation to CGMS-50 plenary)

A. Taube presented the updated CGMS Baseline document for the meeting. Most of the changes in the document were editorial. The list of reference documents was updated to point to the current versions

of the reference documents. Evolution of the Baseline chapter says that the document will be updated every four years, but recently the activity was taking place every year. This was updated in the document then.

In the Observation and Orbits chapter, the hosted payloads and commercial data were added:

"CGMS members may elect to host their sensors on platforms not owned by the member (hosted payloads). Hosted payloads will be reflected in the CGMS baseline and risk assessment when the CGMS Member commits to provide the sensor data consistent with the Baseline principles."

"CGMS members may provide commercially sourced data to meet their commitments to the CGMS Baseline [under licenses] that conform to CGMS principles."

The sensor type definition of the energetic particles was divided into three different classes: Low energy electrons and protons, high energy electrons and protons, very high energy protons and energetic heavy ions. These definitions should be followed also in OSCAR/Space. Also, for many space weather observations Sun-Earth line is more relevant definition than orbit itself. This should be again followed in OSCAR/Space.

A. Mehta was asking about the documentation of the commercially sourced capabilities in CGMS Baseline. M. Rattenborg was commenting that fly out charts in the risk assessment does not include commercial satellites. It is up to CMGS member agency if they commit to CGMS Baseline based on commercially sourced data. J.V. Thomas added that CGMS Baseline already says that members may provide commercially sourced data like edited above in the Observation and Orbit chapter.

M. Rattenborg was commenting that characteristics of the added energy ranges in the Sensor Type table need to be added. E. Talaat commented that the definitions are in his presentation. Space weather capabilities and their distinction between operational and science missions were discussed.

It was also discussed if the end of life beyond design lifetime should be mentioned in the baseline document. It was agreed that this should be kept in the contingency plan document.

Related to the end of life of MLS on Aura, it was discussed if continuation of MW limb sounding was considered by NOAA when planning JPSS. M. Goldberg responded that it was not considered at that time by NOAA, but he will reactivate that topic. He was also asking how MLS was used operationally. K.-Holmlund and R. Saunders responded that ECMWF was using it, but it was not assimilated. It was used as a verification dataset. It was not clear what ECMWF is using after MLS's EoL.

CGMS-50 actions - WGIII					
Actionee	**AGN item**	**Action**	**Description**	**Deadline**	**Status**
CGMSSEC	4.2	WGIII/A50.03	To add characteristics/definitions of the new energy ranges related to the high energy particles in the Sensor Type table of the CGMS Baseline document.	RA workshop 2023	**OPEN**

CGMS-50 actions - WGIII					
Actionee	**AGN item**	**Action**	**Description**	**Deadline**	**Status**
WMO	4.2	WGIII/A50.04	To implement energy ranges for high energy particle classification to OSCAR/Space as defined in the CGMS Baseline.	RA workshop 2023	**OPEN**

CGMS-50 actions - WGIII					
Actionee	**AGN item**	**Action**	**Description**	**Deadline**	**Status**
WMO	4.2	WGIII/A50.05	To implement the feature of Sun-Earth line instrument filtering for the OSCAR/Space Gap Analysis.	RA workshop 2023	**OPEN**

4.4 CGMS contingency plan

CGMS-50-CGMS-WP-25: CGMS contingency plan review

M. Rattenborg presented the contingency plan. It contains guidance and process identifying, mitigating and coping with risk to the continuity of the CGMS Baseline. It works as a reference for CGMS satellite operators and outlines a process for risk assessment. The content of contingency plan was introduced and the areas where improvements could be made. He listed following topics where it could be improved:

- Reference documents to be updated
- No discussion of role of CGMS instruments hosted on third-party satellites
- No discussion of role of Commercial data provision in Risk Mitigation
- No detailed consideration of help-your-neighbour scheme for GEO
- CGMS Risk Assessment description is very short, does not reflect experience from first three RA workshops

It was agreed that the outcomes of the M. Rattenborg's review are very relevant and they should be updated in the next version of the document.

CGMS-50 actions - WGIII					
Actionee	**AGN item**	**Action**	**Description**	**Deadline**	**Status**

CGMS-50 actions - WGIII					
Actionee	**AGN item**	**Action**	**Description**	**Deadline**	**Status**
CGMSSEC	4.4	WGIII/A50.06	Contingency to be updated according to the findings in the working paper CGMS-50-CGMS-WP-25 in WG III (presentation).	RA workshop 2023	**OPEN**

5 WMO OSCAR/Space database status update

CGMS-50-WMO-WP-07: Current Status of WMO OSCAR/Space

H. Pohjola presented the OSCAR/Space development completed in 2021 and the ongoing development to be completed this year. In addition, he presented the procedure in place for the content updates of OSCAR/Space.

The major development item completed last year was the implementation of the Restful JSON API to make OSCAR/Space machine readable. Also, the instrument classification according to WIGOS Vision 2040 was implemented making WMO Gap Analysis possible according to WIGOS Vision.

The ongoing development is implementing new frequency record structure to OSCAR/Space supporting SFCG interest of using OSCAR/Space as an information source for the passive and active remote sensing bands, and to identify future remote sensing spectrum needs. Also, in addition to many new features data latency record is implemented to support especially the gap analysis of space weather capabilities.

The main mechanism for the WMO Space Programme Office to collect the relevant information is through templates submitted to the OSCAR/Space Support Team (O/SST) members, usually three to four times per year. O/SST focal points are expected to collect missing or outdate information within their respective organization or agency and to return the completed templates in a timely manner within the stated deadlines. In addition to the information collected through templates, O/SST members are expected to provide to WMO short-term updates as necessary.

6 Socio-economic benefits and impacts of satellite data

There was no report on Socio-economic benefits. It was seen beneficial to have it included in the agenda for the next year, when it is expected that there will be more and more related topics to be reported in the future.

CGMS-50 actions - WGIII					
Actionee	**AGN item**	**Action**	**Description**	**Deadline**	**Status**
EUM, NOAA and CMA	6	WGIII/A50.07	To present outcomes of the undertakings on socio-economic benefits and impact studies.	CGMS-51	**OPEN**

7 Review of CGMS WGIII Terms of Reference

A. Taube presented the proposed changes in the Terms of Reference document. In addition to editorial changes, item on socioeconomic impacts of satellite missions was added. Some additional editorial changes were proposed by the meeting participants. J.V. Thomas noted that socioeconomic impact should be added also under objectives. This was agreed by the meeting. The reference to weather forecasting, ocean etc. was replaced by the reference to the larger observation domains like Earth, Space Weather, Sun etc.

8 Review of WGIII actions and recommendations

GMS-50-CGMS-WP-36WGIII: Status of CGMS-49 WGIII list of actions (13 April 2022)

Actions were reviewed and updated accordingly in the list of actions (Annex 2).

9 HLPP implementation and update

CGMS-50-CGMS-WP-05WGIII: Status of implementation of CGMS High Level Priority Plan (2021-2025)

M. Rattenborg presented the status and the proposed updates of the HLPP targets. The HLPP targets are well covered by the CGMS actions except the target to establish observation requirements for the MW precipitation. He proposed that it should be discussed with WGII and IPWG.

Based on the WMO Gap Analysis presented earlier in the meeting, there are two new targets in HLPP to response the Vision for WIGOS 2040. The first new target is to work towards operational IR/MW limb sounding capability for climate monitoring and NWP applications and the second one is to coordinate the evaluation of small satellite constellations provide sufficient µwave sounding performance for the radiance assimilation. The second target is proposed to be done jointly with WG II/ ITWG.

For the space weather coordination group, the new target on auroral monitoring capabilities was proposed by SWCG related to new ESA mission to monitor auroral. Regarding the impact studies (scientific and socio-economic) activities will be restarted.

M. Rattenborg also presented the document indicating the changes for HLPP in period 2022-2026. He noted that in the risk mitigation area there are still several ongoing actions with slow progress.

A. Mehta commented that early-morning reference could be removed due to evolution of the risk assessment. It was agreed. He also noted that the HLPP target for small satellite constellations provide µwave sounding performance coordination is very specific task. M- Rattneborg commented that we could take this as an action to WG II to look at it, and then may be include it to HLPP only later.

It was commented if the Established observational requirements for precipitation is covering also missing MW precipitation. JAXA commented that realted IPWG report only covers the precipitation radar, and not the MW precipitation observation.

GMS-50-CGMS-WP-15WGIII: Proposed update to the CGMS High-Level Priority Plan (HLPP) for the period 2022-2026

See previous agenda item.

CGMS-50 actions - WGIII					
Actionee	**AGN item**	**Action**	**Description**	**Deadline**	**Status**
CGMSSEC	9	WGIII/A50.08	To add proposed HLPP target for the work towards operational IR/MW limb sounding capability for climate monitoring and NWP application.	CGMS-50 plenary	**OPEN**
CGMSSEC	9	WGIII/A50.09	To add proposed HLPP target to coordinate the evaluation of small satellite constellations capability to provide sufficient µwave sounding performance for the radiance data assimilation.	CGMS-50 plenary	**OPEN**

10 Future WGIII meetings

CGMS-50-CGMS-WP-13WGIII: Nominations and representatives at meetings (CGMS, ISWGs, VLAB - Co-chairs and rapporteurs)

Not discussed due to limited time.

CGMS-50-WGIII-WP-06 (verbal/for decision): Decision on WGIII inter-sessional meetings (CGMS-50 to CGMS-51)

Intersessional meetings are taking place 28th Sep 2022, 18th Jan 2023 and 24th March 2023 online. The 5th Risk Assessment Workshop is taking place from 22nd to 23rd Feb 2023. It is planned to be in-person meeting.

CGMS-50-WGIII-WP-07 (verbal only): Next WGIII plenary session

CGMS-51 plenary session is tentatively taking place from 17th to 18th May 2023 (if a virtual meeting).

11 AOB

No additional topics were discussed.

12 Wrap-up, WGIII report considerations for plenary and conclusions

Cochairs closed the meeting. Concluding documents for the plenary will be prepared and communicated by email.

ANNEX 1.

CGMS-50 actions - WGIII					
Actionee	**AGN item**	**Action**	**Description**	**Deadline**	**Status**
NOAA	4.1	WGIII/A50.01	NOAA to review additional ground resources needed to track STEREO-A and PUNCH to provide additional coverage in the near-term.	CGMS-51	**OPEN**
KMA	4.1	WGIII/A50.02	KMA to confirm plans beyond GK-2B for visible/UV spectrometer and Narrow Band imager.	CGMS-51	**OPEN**
CGMSSEC	4.2	WGIII/A50.03	To add characteristics/definitions of the new energy ranges related to the high energy particles in the Sensor Type table of the CGMS Baseline document.	RA workshop 2023	**OPEN**
WMO	4.2	WGIII/A50.04	To implement energy ranges for high energy particle classification to OSCAR/Space as defined in the CGMS Baseline.	RA workshop 2023	**OPEN**
WMO	4.2	WGIII/A50.05	To implement the feature of Sun-Earth line instrument filtering for the OSCAR/Space Gap Analysis.	RA workshop 2023	**OPEN**
CGMSSEC	4.4	WGIII/A50.06	Contingency to be updated according to the findings in the working paper CGMS-50-CGMS-WP-25 in WG III (presentation).	RA workshop 2023	**OPEN**
EUM, NOAA and CMA	6	WGIII/A50.07	To present outcomes of the undertakings on socio-economic benefits and impact studies.	CGMS-51	**OPEN**
CGMSSEC	9	WGIII/A50.08	To add proposed HLPP target for the work towards operational IR/MW limb	CGMS-50 plenary	**OPEN**

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CGMS-50 actions - WGIII					
Actionee	**AGN item**	**Action**	**Description**	**Deadline**	**Status**
			sounding capability for climate monitoring and NWP application.		
CGMSSEC	9	WGIII/A50.09	To add proposed HLPP target to coordinate the evaluation of small satellite constellations capability to provide sufficient µwave sounding performance for the radiance data assimilation.	CGMS-50 plenary	**OPEN**

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ANNEX 2

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