

# REPORT OF THE 51<sup>st</sup> PLENARY SESSION OF THE COORDINATION GROUP FOR METEOROLOGICAL SATELLITES

## **EXTRACT** **WORKING GROUP I**

**DRAFT REPORT available for plenary as an  
information document  
(CGMS-51-WGI-WP-12)**

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**CGMS MR 50**

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## PARALLEL WORKING GROUP SESSIONS

### WG I REPORT

**Co-Chairs:** *Dohyeong Kim, KMA / Sean Burns, EUMETSAT*

**Rapporteur:** *Karolina Nikolova, EUMETSAT*

#### 1. WGI meeting introduction and expected outcomes

##### CGMS-51-WGI-WP-01 - 1 WGI Meeting Introduction by Co-Chairs/Co-Rapporteurs

The WGI Co-Chairs and Rapporteur opened the meeting with a welcome address, re-calling the role of WGI within CGMS, the objectives of WGI, its current structure, and status on WGI Co-Chairs / Co-Rapporteurs.

WGI reviewed and adopted the draft agenda proposed by the CGMS Secretariat prior to the meeting, which is in line with the Terms of Reference for WGI.

CGMS WGI was invited to make a decision on the proposed plan to present updated WGI Terms of Reference as an input to CGMS-52, based on the CGMS Future Directions Project outcomes and inputs from the Task Groups.

WGI agreed to the proposal with the following action.

CGMS-50 ACTIONS - WGI					
Actionee	AGN item	Action #	Description	Deadline	Status
WGI Co-Chairs / Rapporteur / WGI Task Group Chairs	1.1	WGI/A51.01	Propose an updated WGI Terms of Reference, based on the CGMS Future Directions Project outcomes and inputs from the WGI Task Groups, to be presented for endorsement to CGMS-52.  The WGI Terms of Reference will be based on inputs from the WGI Task Groups on their latest Terms of Reference.	CGMS-52	OPEN

WGI included representatives of the satellite operators from CMA, ESA, EUMETSAT, JMA, KMA, NOAA, ROSHYDROMET, and WMO (see CGMS report for full list of participants).

The WGI meeting was hybrid, with in-person participation at EUMETSAT and virtual attendance via MS Teams.

In view of the common items of interest in relation to Space Weather, the representatives of WGI, WGIV, and the Space Weather Coordination Group participated also in the joint WGI-WGIV-SWCG Meeting.

#### **CGMS-51-WGI-WP-02 - WGI expected outcomes**

The WGI Co-Chairs and Rapporteur summarised the expected outcomes and key objectives for the CGMS-51 WGI meeting.

It was re-called that, in line with the recommendation from CGMS-50 WGI, all Task Groups should include in their annual reports their:

- Latest Terms of Reference
- Up-to-date list of members
- Status on current and planned activities
- Latest version of Best Practices and any proposed updates
- Status of implementation of Best Practices for each agency

The CGMS-51 WGI agenda and expected outcomes have been structured accordingly.

CGMS agencies were invited to consider nominations for the roles Co-Rapporteur and Co-Chair of WGI.

## **2. Frequency Management**

### **2.1 Frequency management topics including WRC-19 and WRC-23**

#### **CGMS-51-CGMS-WP-01 - SFCG report (including WRC-27 and WMO OSCAR/Space items)**

The 41<sup>st</sup> annual meeting of the Space Frequency Coordination Group (SFCG) took place 19-27 July 2022.

The issues of relevance for CGMS that were discussed and progressed are:

- Update to SFCG Objectives for WRC-23 (extract in Attachment 1);
- SFCG process for gathering remote sensor information for updating the OSCAR/Space database (Attachments 2 & 3);
- Response from SFCG on CGMS activities regarding mechanisms for detection, long-term monitoring and mapping of Radio Frequency Interference (RFI).

Regarding WRC-23, the SFCG Objectives (Status: February 2023) on WRC-23 agenda items of direct interest/concern to CGMS are provided in an extract in Attachment 1. For comparison with the SFCG Objectives, the positions of WMO (Status: October 2022) are also provided in Attachment 1, which are usually largely in line with each other. Both position papers will still be updated to their final versions, WMO at the meeting of ET-RFC in its yearly meeting at 18-20 April 2023 and SFCG-42 in June 2023.

The WRC-23 agenda items of potential concern to CGMS members discussed in this paper are:

- Agenda items 1.2, 1.4, 9.1 Topic C related to IMT (5G) systems;

- Agenda items 1.16, 1.17, 1.18 and 9.1 Topic D related to new frequency usage of commercial satellite systems.

The WRC-23 agenda items of direct interest to CGMS are:

- Agenda Item 1.14: The objective of this agenda item is to ensure that passive microwave measurements in the frequency range 231.5-252 GHz are protected and the required spectrum is allocated to future passive microwave sensors, for example for the Ice Cloud Imager (ICI) instrument on Metop-SG satellites.
- Agenda Item 9.1 Topic A: The status is outlined in detail in CGMS-51-EUMETSAT-WP-06 (Frequency-related topics in support to space weather) to be presented to the Joint WGI-WGIV-SCWG session on 28 April 2023.

The paper also addressed the issues related to ITU-R Resolution 731 (Rev. WRC-19) which deals more generally with the consideration of sharing and adjacent band compatibility between passive and active services above 71 GHz such as, but not limited to, 100-102 GHz, 116-122.25 GHz, 148.5-151.5 GHz, 174.8-191.8 GHz, 226-231.5 GHz and 235-238 GHz. Unfortunately, the listed bands also include bands covered by RR footnote 5.340 (100-102 GHz, 148.5-151.5 GHz, 190-191.8 GHz and 226-231.5 GHz), stating that all emissions are prohibited, in order to protect these specific passive bands. This is interpreted by some ITU member states as if sharing could be envisaged in these purely passive bands, even against the ITU Rules of Procedure. To preserve these unique spectrum resources, it will be important that CGMS members, in response to WGI/A50.02, urge their national regulatory authorities, when establishing new regulations for use of active services and applications, to appropriately take into account the protection requirements of passive sensors and that the bands listed in RR FN 5.340 will not be opened for a shared use with active services. WRC-23 provides a mechanism to eliminate ambiguities through a revision of ITU-R Resolution 731 by means of the standing WRC agenda item 4.

WRC-23 will also determine the agenda for WRC-27. Possible new WRC-27 agenda items, supported by WMO and SFCG, were introduced. Generally, it should be noted that the proposals for WRC-27 from the individual regions/countries are still not formally finalised yet. Thus, an outlook on the WRC-27 agenda cannot be provided at this stage.

Related to the activities for updating OSCAR/Space within SFCG, this document also responds to WGI/A50.04, which calls upon the SFCG Liaison Officer and WMO to propose a process for providing accurate and timely updates on satellite frequencies recorded in OSCAR/Space database. Considering that the basic process for updating OSCAR/Space is already well established, it is proposed to complement this process with the same approach for providing updates to the remote sensor information in OSCAR/Space as established between the SFCG and WMO. The proposal is that WMO introduce the templates agreed with the SFCG, as given in Report SFCG 40-1R1 (see Attachment 3), for updating the remote sensor information in OSCAR/Space into the current procedure through the OSCAR/Space Support Team (O/SST). Each agency has to ensure that the updates provided through SFCG and CGMS are aligned in order to not to present contradicting information to WMO.

The group discussion highlighted the importance of thoroughly reviewing all existing information in the database, and filtering out outdated data. A question was raised on the potential of merging the OSCAR/Space database and SFCG database, but the group discussion concluded that while this has been discussed in the past, the databases continue to serve different purposes. The SFCG database focuses on frequency information, while the OSCAR/Space database has a wider range of information. The importance of synchronisation between the two databases was reiterated.

The WGI/A50.04 action on proposing a process for accurate and timely updates on satellite frequencies recorded in OSCAR/Space database was closed.

WGI agreed to the following new actions.

CGMS-50 ACTIONS - WGI					
Actionee	AGN item	Action #	Description	Deadline	Status
WMO	2.1	WGI/A51.02	SFCG Representative to distribute to CGMS the final WMO position paper on WRC-23. CGMS members would then need to ensure the final WMO positions known to its members' national and international preparation processes for WRC-23.	June 2023	OPEN
WMO	2.1	WGI/A51.03	WMO to introduce the templates agreed with the SFCG for updating the remote sensor information in OSCAR/Space into the current procedure through the OSCAR/Space Support Team (O/SST).	End of 2023	OPEN

The report also noted that the Liaison Officer between SFCG and CGMS informed SFCG about the work of a Task Group established in the framework CGMS Working Group I, dealing with RFI detection, monitoring and mapping. SFCG noted these developments in CGMS and will provide relevant information on this subject by means of the report of the Liaison Officer back to CGMS once there is something to report. It was noted that SFCG is interested in the progress of this activity in the framework of CGMS.

CGMS was invited to provide feedback and information on its activities via the CGMS/SFCG Liaison Officer to SFCG-42 (30 May – 7 June 2023) on any frequency related matter as appropriate.

### 3. RFI detection, monitoring and mapping

**CGMS-51-WGI-WP-03** - Report from the CGMS WGI Task Group on RFI detection, monitoring and mapping (incl. latest ToR, status on current & proposed/planned activities)

Triggered by Working Paper CGMS-49-CGMS-WP-11, CGMS-49 requested agencies to nominate participants to a Task Group to establish the initial ideas about mechanisms regarding the detection, monitoring and mapping of RFI, initially in the 24 GHz passive band. The Task Group on RFI Detection, Monitoring and Mapping (TGRFI) was established in response to this request.

Terms of Reference, consisting of the initial tasks of the group was presented. The current membership of the TGRFI was listed and includes members from CMA, EUMETSAT, KMA, NOAA and WMO.

The Task Group on RFI Detection, Monitoring and Mapping began its work in 2022, and since then has collected inputs describing how CGMS members are assessing the impact of RFI.

The activities throughout the last year included three intersessional meetings, with inputs from CMA, EUMETSAT, KMA and NOAA. In those, CMA, EUMETSAT and NOAA gave presentations on their spectrum concerns and activities on RFI detection, monitoring and mapping. KMA confirmed that no such RFI monitoring activities are undertaken by KMA, KARI (Korea Aerospace Research Institute) or KASI (Korea Astronomy and Space Science Institute).

Based on the presentations, the capability of Metop-SG Micro-Wave Imager (MWI) to monitor RFI (comparing Gaussian and non-Gaussian signals) were noted. Additionally, the impact of RFI on the MWRI instrument of FY-3D was noted, focusing on 10 and 18 GHz interference. Impact has been shown both detected in the signal (cold look calibration mode) from ~45 North over Europe and North America, and using O-B methods for 10 GHz over the oceans. TGRFI identified similar monitoring on a recurrent basis as a key approach to assessing the possible impact of 5G.

At the yearly meeting of the Space Frequency Coordination Group (SFCG) in July 2022, IEEE provided information on developments of a standard for RFI assessment in Earth Environmental Sensor Systems (EESS) frequency bands in IEEE Geoscience and Remote Sensing Society (GRSS) Frequency Allocations in Remote Sensing (FARS) Technical Committee. The TGRFI invited Paolo De Matthaeis and Roger Oliva from IEEE to join its meeting in December 2022, in order to learn about their experience developing this standard.

The TGRFI have also discussed the monitoring of RFI on the Data Collection Service (DCS). The topic has been addressed at the DCS workshop at the Meteorological Technology World Expo in Paris in October 2022, and at the CGMS WGI Task Group on Data Collection Systems. In this discussion, EUMETSAT explained the planned use of a DCS interference register used to track messages lost due to interference – NOAA also noted the use of a similar mechanism, also including the platform identification.

The Group's next tasks are to analyse the inputs provided by CMA, EUMETSAT and NOAA, and to look for common approaches. These can then be used as a basis for the establishment of a set of best practices for RFI detection, monitoring, and mapping. Once established, the best practices can be endorsed by CGMS and used to help members implement a standard approach for assessing RFI. The group discussion

highlighted that this is a challenging, but important task aiming for a coordinated CGMS approach on RFI. It was recalled that the trigger of these activities within CGMS was the plans for 5G deployment in 24 GHz (not deployed as of 2023).

WGI agreed that action WGI/A50.01 on formation of the Task Group on RFI can now be closed – the TG is formed and way forward for next actions has been proposed.

WGI agreed to the following new action.

CGMS-50 ACTIONS - WGI					
Actionee	AGN item	Action #	Description	Deadline	Status
TGRFI	3.1	WGI/A51.04	Analyse the inputs provided by CMA, EUMETSAT, KMA and NOAA on spectrum concerns and activities on RFI detection, monitoring and mapping, and pursue the establishment of a draft set of best practices by CGMS-52, based on the common aspects of the approaches already adopted by members.	CGMS-52	OPEN

#### CGMS-51-NOAA-WP-05 - Active Spectrum Management with Passive Bands

The paper raised awareness on the proposals and plans for spectrum sharing that may impact meteorological and climatological data. It highlighted the risks of non-natural RF contamination, noting that years of spectrum management experience demonstrate RFI contamination will only increase in intensity and in spectrum proliferation. Resolving this type of RF contamination is not easy and may not be affordably possible. Today, it is expected the presence of anthropogenic energy can only be identified and mitigated with the aid of several different methods. A broad and continuous effort is needed, in the regulatory arena (international and national), policy (responding to changes), and technical (adding things like new robustness to future systems).

The EESS (passive) bands are at a very significant risk of increased noise levels from today's conditions. It has been calculated that low anthropogenic noise levels will be indistinguishable from natural radiation and that high levels of anthropogenic noise will simply eliminate observation data for that geographical area. It pointed to the experience observed with each generation of advanced wireless services, from 1G to tomorrow's 6G, whereby each of the generations requires a greater degree of access to the RF spectrum. The implementation of 5G and following generations of broadband are expected to affect the EESS (passive) bands. There is still no information on actual interference to a microwave sounder and it is not clear that it can easily be identified as such. As designed, MW sounders only measure the total amount of radiative power as received by the antenna. 5G signals change due to varying factors (outside temperature, usage, power). To a MW sounder, these changes look like changes in signal power and thus variations in temperature.



5G is not the only expected source of passive band degradation. Commercial non-geostationary (NGSO) satellites are being deployed in large mega-constellations and require higher data rates and volume. There is also awareness that there may be a variety of currently unknown sources of contamination that have yet to be identified as new technologies are developed and implemented.

Predominantly bands near and between 24 to 86 GHz are today's most significant risks for passive band degradation and corruption, however passive bands both below and above this range are also at or have been at risk.

With the degradation of MW sounder data, there will be an impact to weather models and forecasting accuracy. The paper recommended that there be an emphasis on the development and implementation of RFI identification and sensor robustness measures. It highlighted that if no action is taken, it will not be clear when or how much the meteorological mission has been degraded by RF contamination.

The paper highlighted areas where efforts are underway to develop methods and technologies that may reduce the risk of data corruption and loss, including flagging of data, mapping areas of contamination, determining impact on NWP, developing systems to use higher frequencies is possible (though noting these would not have the same performance as the original bands), constantly assessing and modifying product development to make maximum use of data, as well as reaching out to community to expand on mitigation approaches.

The paper recommended that CGMS members monitor WRC-23 agenda items that may affect satellite remote passive sensing, and continue to seek increased robustness in satellite passive sensors. It recommended continuation of actions by TGRFI for development of mitigation techniques for use by CGMS members.

WGI discussed that it would be of interest to explore the potential / existing uses of AI/ML and pattern recognition in the area of RFI detection.

WGI agreed to the following new action.

CGMS-50 ACTIONS - WGI					
Actionee	AGN item	Action #	Description	Deadline	Status
TGRFI	3.1	WGI/A51.05	Explore the potential / existing uses of AI/ML and pattern recognition in the area of RFI detection	CGMS-52	OPEN

#### 4. Satellite Data and Codes

**CGMS-51-WGI-WP-04** - Report from the CGMS WGI Task Group on Satellite Data and Codes (incl. latest ToR, status on current & proposed/planned activities)

The CGMS Task Group on Satellite Data and Codes (TGSDC) has been actively supporting the coordination of work on satellite product format issues within the CGMS community and providing support to the work of WMO's expert teams since its first meeting in 2008.

As of 2022, the activities of the CGMS WGI ad hoc team on coordination of CF-netCDF standards have been assimilated into the work of this Task Group, with no specific outcomes since CGMS-50 to report to CGMS-51.

This paper briefly summarised the status of the Task Group and its upcoming activities.

The current membership of the TGSDC was listed and includes members from CGMS, CMA, EUMETSAT, JMA, KMA, NOAA, SRC Planeta and WMO. As noted also in CGMS-50, an additional member from ISRO would complement the current composition well.

The Task Group has worked with the WMO Secretariat and the WMO Expert Team on Data Standards (ET-Data) and its Task Team on Table Driven Code Forms (TTDCF) on the development of a number of new BUFR encoding sequences and Common Code Table entries, such as for FY-4B GIIRS, TROPICS and Metop-SG. In each case, the Task Group acts as a reference group of experts who are invited to consider and endorse relevant proposals going through WMO's approval process.

The Group continues to encourage WMO to ensure that OSCAR/Space includes references to the Common Code Table entries used for satellite identifiers (table C-5) and instruments (C-8). At the last OSCAR/Space workshop it was confirmed that these changes would be included in the forthcoming update to OSCAR/Space. The related WGIV/A49.02 action is therefore progressing, but will remain open until the changes are included.

The Task Group on Satellite Data and Codes continues to play a useful role. Between CGMS 51 and CGMS 52, the Task Group will continue to work on coordinating format standardisation for satellite data, implementation of WIGOS station identifiers for satellite platforms, and providing subject matter expertise to WMO Expert Teams. A key activity will be to ensure that the BUFR encoding sequences for the remaining Metop-SG products are introduced to the WMO approval process, targeting approval with Fast Track 2023-II in November 2023.

WGI discussed the process the Task Group follows in preparation for future systems. The preparations are normally driven by the provider of the data, and usually triggered by the release of sample / test data.

The Task Group Chair agreed to provide the Task Group's later Terms of Reference.

WGI encouraged active participation in the work of the Task Group from all satellite operators.

## 5. Direct Broadcast System

**CGMS-51-WGI-WP-06** - Report from the CGMS WGI Task Group on Direct Broadcast Systems (incl. latest ToR, status on current & proposed/planned activities)

The core meteorological satellite systems in LEO orbits, and other operational satellite systems where applicable, should ensure low latency data access of imagery, sounding, and other real-time data of interest to users. Application areas where low latency and availability is suitable include Severe Weather Monitoring, Nowcasting and Short- and Medium-Range Numerical Weather Prediction. Other application areas could also benefit from very low latency products, e.g. ionospheric monitoring.

Today, LEO meteorological satellites have two distinct services for providing low latency data to users:

- Global service: where the full orbit data is stored on-board and served at the pole(s);
- Regional or local service: real time dissemination of instruments data to a network of direct broadcasts stations.

The historical distinction between global and regional missions could disappear in the next generation of LEO meteorological satellites, with constant data access to the satellites (internet in space concept).

The goal of this CGMS paper was to identify low latency data access solutions that could be part of the next generation of LEO meteorological satellites and assess them through a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. This SWOT analysis paper is extending the scope of the previous CGMS paper [CGMS-50-CGMS-WP-08] which focused on regional low latency data access.

Three global low latency data access solutions were studied in this paper:

- GEO Data Relay Service (GEO DRS)
- MEO/LEO Data Relay Service (LEO DRS)
- Global Network of Ground Stations Service (GNGS)

The paper compared the pros and cons of each solutions and summarised the findings. Currently, CGMS agencies retain full ownership of the data transmission chain. There are historical lessons to limit dependence on third parties to secure a timely and systematically access to data. For example, the reception points at the poles to the operating centres of the CMGS agencies have a dedicated terrestrial link to keep ownership of the transmission chain. Commercial services have risks, enterprises subject to change (new shareholder, change of group, bankruptcy, etc). Political scenario may also change and impose bans and restrictions on commercial services. Keeping ownership of the access to LEO meteorological is key, keeping full control on the end-to-end data dissemination chain. However, new market opportunities are offering innovative way of low latency data access from LEO meteorological data.

The study suggests that future LEO weather satellites systems could have a backbone of LEO meteorological satellites where the ownership of the data chain is conserved (as for the FY3/JPSS/METOP satellites of today), completed by lower cost LEO satellites constellation using innovative low latency data access mechanisms as detailed in this paper.

Timeliness is one critical aspect of a LEO weather satellite for now-casting and numerical weather applications, innovative and cost effective solutions offering global low latency data access mechanisms could be part of future LEO weather satellites programmes. The implications of this transition could result into global services (orbit data reception at the poles) and local services (direct broadcast) to be merged into a single global low latency data service. Requirements for these new types of LEO meteorological satellites would need to be assessed, for example in terms of the space segment architecture, orbit types, orbit coordination, etc.

The joint Direct Broadcast Systems and LEO Coordination tasks groups SWOT analyses, performed in response to Action WGI/A50.09, has explored the emerging technologies which can be expected to remove the historical architectural boundaries between global data access and direct broadcast systems, providing low latency data delivery for both global and local applications.

The paper proposed the merge of the Direct Broadcast Systems and LEO Coordination tasks groups into a single “Low latency Data Access from LEO Satellites” task group, with Andrew Monham and Antoine Jeanjean as Co-chairs. A preliminary draft of the merged Terms of Reference for this joint group was provided and will be at the Kick-Off of the proposed Task Group for iteration with WGI and taking into account the specific goals from the CGMS Position Papers, in particular the “Future Information Technologies” and “Future Observing (Hybrid) Space Infrastructures”.

WGI agreed to the proposed merge of the Task Groups. In view of the merge of the Task Groups, WGI encouraged review of the membership and active participation in the work of the Task Group from all satellite operators.

WGI agreed that the SWOT analysis can be considered completed, so Action WGI/A50.09 was closed. It was noted that the SWOT analysis should be kept current, as part of the routine activities of the merged Task Group. It was discussed that part of keeping the SWOT analysis current would involve realistic and current data rate scenarios. It was also agreed that a summary outcome of the SWOT analysis should be developed and disseminated to the remaining CGMS Working Groups.

WGI agreed to the proposal with the following action to continue the effort:

CGMS-50 ACTIONS - WGI					
Actionee	AGN item	Action #	Description	Deadline	Status
LLDA TG	5.1	WGI/A51.06	<p>Merge the Direct Broadcast Systems and LEO Coordination tasks groups into a single “Low latency Data Access from LEO Satellites” task group, with Andrew Monham and Antoine Jeanjean as Co-chairs.</p> <p>Finalise the draft Terms of Reference with inputs from WGI and taking into account the specific goals from the CGMS Position Papers, in particular the “Future Information Technologies” and</p>	CGMS-52	OPEN

			<p>“Future Observing (Hybrid) Space Infrastructures”.</p> <p>Present the finalised ToRs for endorsement to CGMS-52.</p> <p>The work of the TG should include keeping the SWOT analysis current (process to be noted in the ToRs).</p> <p>As part of the merge, update and present the list of members, create a new mailing list <a href="mailto:LWGI_LLDA@LISTSERV.EUMETSAT.INT">LWGI_LLDA@LISTSERV.EUMETSAT.INT</a>, remove old mailing list.</p>		
<b>LLDA TG</b>	<b>5.1</b>	WGI/A51.07	Distribute a summary of the SWOT analysis on Low Latency Data Access from LEO meteorological satellites to the remaining CGMS Working Groups.	CGMS-52	<b>OPEN</b>

Additionally, the paper noted that during the ESA IoT for Earth Observation workshop, presentations were given on innovative concept of satellite platform as a service (SPaaS). The commercial concept is to provide a full integrated service on a satellite platform providing power, commanding, internet downlink, launch service, etc. The customer furnished item is an instrument payload.

Some SPaaS providers offers a downlink internet connection via GEO relay solutions. The ground reception points are located on directly on the rooftop of cloud providers, offering low timeliness before processing.

SPaaS are highly relevant to the topic of low latency data from LEO satellites, therefore the paper suggested it would be beneficial to further analyse SPaaS in a CGMS document memo in terms of internet connection speed, hosted instruments specifications (size/weight/power), orbit type, satellite lifetime and cost breakdown.

WGI agreed to the proposal with the following action.

CGMS-50 ACTIONS - WGI					
Actionee	AGN item	Action #	Description	Deadline	Status
<b>LLDA TG</b>	<b>5.1</b>	WGI/A51.08	Analyse potential role of satellite platform as a service (SPaaS), considering current and expected providers, internet connection speed, hosted instruments specifications (size/weight/power), orbit type, satellite lifetime and	CGMS-52	<b>OPEN</b>

			cost breakdown. Report to CGMS-52.		
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**CGMS-51-CMA-WP-01** - Operational Direct Broadcast Systems status report + status of implementation of best practices (CMA)

This paper presented the status of implementation at CMA of the CGMS Agency Best Practices in support to Local and Regional Processing of LEO Direct Broadcast data (CGMS/DOC/18/1008274, v1B) for each of the FY-3D and FY-3E LEO satellite missions.

Working Group I took note of the status of implementation of the best practices of CMA.

**CGMS-51-EUMETSAT-WP-01** - Operational Direct Broadcast Systems status report + status of implementation of best practices (EUMETSAT)

This paper presented the status of operational direct broadcast systems and implementation of the CGMS Agency Best Practices at EUMETSAT in support to Local and Regional Processing of LEO Direct Broadcast data (CGMS/DOC/18/1008274, v1B) for each of the METOP and EPS-SG LEO satellite missions. This paper also introduced available direct broadcast information about the EPS Sterna constellation, for which approval of the programme is targeted in mid-2025. The EPS-Sterna information presented in this document may evolve depending on the development of the programme.

Working Group I took note of the status of implementation of the best practices of EUMETSAT.

**CGMS-51-NOAA-WP-02** - Implementation of CGMS Best Practices for Leo Direct Broadcast Data at NOAA

This paper presents status of implementation at NOAA of the CGMS Agency Best Practices in support to Local and Regional Processing of LEO Direct Broadcast data (CGMS/DOC/18/1008274, v1B) for NOAA-18, NOAA-19, S-NPP, NOAA-20 and NOAA-21.

Working Group I took note of the status of implementation of the best practices of NOAA.

**CGMS-51-CGMS-WP-03** - Best Practices in support to Local and Regional Processing of LEO Direct Broadcast data - latest version and new proposals

The Task Group on Direct Broadcast Systems and Task Group on the Coordination of LEO Orbits were tasked, via WGI/A50.10, with reviewing the overlap between their proposed and published Best Practices:

- The published BPs in support to local and regional processing of LEO direct broadcast data (CGMS/DOC/18/1008274)
- The BPs proposed for the Coordination of Data Acquisition for Low Earth Orbit (LEO) Satellite Systems (CGMS-50-NOAA-WP-05)

In view of the proposal for the merge of the two task groups, the paper proposed to close action WGI/A50.10 and open a new action to merge the LEO and DB best practices.

WGI agreed to the proposal with the following action.

CGMS-50 ACTIONS - WGI					
Actionee	AGN item	Action #	Description	Deadline	Status
LLDA TG	5.5	WGI/A51.09	<p>Merge the LEO (Global) and DB (regional) best practices into a single “Low Latency Best Practices” document proposed to be structured as follow:</p> <ul style="list-style-type: none"> <li>• Common BPs for both regional and global missions</li> <li>• BPs specific for DB</li> <li>• BPs specific for global mission</li> </ul> <p>Present the merged BPs for endorsement to CGMS-52.</p>	CGMS-52	OPEN

## 6. Coordination of LEO Orbits

**CGMS-51-WGI-WP-05** – Report from the CGMS WGI Task Group on the Coordination of LEO Orbits (incl. latest ToR, status on current & proposed/planned activities)

This paper recalls the work performed so far by the LEO Coordination of Orbits Task Group, as well as its final Terms of Reference. This complements paper CGMS-51-WGI-WP-06 (Combined Report from the CGMS WGI Task Groups on Direct Broadcast Systems and LEO Coordination of Orbits (LCOO TG), which proposed to consolidate the existing Task Groups into a new single Low Latency Data Access Task Group (LLDA TG), such that activities may be taken into account in the new LLDA TG. Refer to CGMS-51-WGI-WP-06 for formal recommendations and proposed actions for merge of the Task Groups.

Reference is also made through this consolidated TG approach to the Best Practices formulated in the LCOO TG, while a separate Paper CGMS-51-CGMS-WP-02 formally closes the action.

**CGMS-51-CGMS-WP-02** - Best Practices for the Coordination of Data Acquisition for LEO Satellite Systems - proposed way forward

The Task Group on Direct Broadcast Systems and Task Group on the Coordination of LEO Orbits were tasked, via WGI/A50.10, with reviewing the overlap between their proposed and published Best Practices:

- The published BPs in support to local and regional processing of LEO direct broadcast data (CGMS/DOC/18/1008274)
- The BPs proposed for the Coordination of Data Acquisition for Low Earth Orbit (LEO) Satellite Systems (CGMS-50-NOAA-WP-05)



The Task Groups have confirmed that the proposed Best Practices are valid as written and do not overlap with the existing Direct Broadcast Best Practices.

However, the Task Groups on LCOO and DB are proposed to be consolidated into a single TG on Low Latency Data Access. This new LLDA TG will restructure the existing Best Practices into a generic data access part and separate parts for any practices specific to the regional or global missions.

In view of the proposal for the merge of the two task groups, the paper proposed to close action WGI/A50.10 and open a new action to merge the LEO and DB best practices.

WGI agreed to the proposal to close WGI/A50.10. Refer to CGMS-51-WGI-WP-06 for formal proposed actions for merge of the Best Practices.

## 7. Space Debris and Collision Avoidance

### **CGMS-51-WGI-WP-07** - Discussion on future CGMS WGI efforts on Space Debris and Collision Avoidance

The paper recalled CGMS efforts on Space Debris and Collision Avoidance so far, from CGMS-46 until CGMS-51. In CGMS-50 WGI, the preliminary work between NOAA and EUMETSAT since CGMS-49 was outlined (CGMS-50-WGI-WP-02). Terms of Reference for a Task Group on Space Debris and Collision Avoidance was provided, and WGI members were encouraged to nominate additional members, in order to expand the TG membership to all CGMS members. An action WGI/A50.07 was open for the Task Group to deliver a Best Practice document on collision avoidance and debris mitigation for recommendation for endorsement in CGMS-51.

The Task Group has not met since CGMS-50. In order for the Task Group to proceed with its activities, the paper proposed the following next steps:

- Identify leadership and membership of the Space Debris and Collision Avoidance TG;
- Build on the NOAA-EUM work already performed, with wider Agency participation;
- Propose to integrate agreed steps from the final SSA Position Paper with appropriate delivery dates.

The group discussion highlighted the importance of this Task Group and the need to make progress, starting with identifying the leadership. A discussion on the leadership of the Task Group took place, and WGI endorsed Andrew Monham (EUMETSAT) as interim Chair of the Task Group.

WGI encouraged active participation in the work of the Task Group from all satellite operators.

WGI agreed WGI/A50.07 on best practices on collision avoidance and debris mitigation will be kept open, and pursued by the Task Group in the lead up to CGMS-52. This should be based on previous inputs from EUMETSAT and NOAA, and seek wider participation from CGMS agencies. The future work of the Task Group will also include a review of the Terms of Reference and take into account the work already done in the scope of the Space Situational Awareness theme of the CGMS future direction 2022+ project.



## 8. Data Collection Services

**CGMS-51-WGI-WP-08** - Report from the CGMS WGI Task Group on Data Collection Services (incl. latest ToR, status on current & proposed/planned activities)

This paper presents the status of the Task Group on DCS activities and progress since CGMS-50. The group has held regular intersessional meetings since CGMS-50 and a face-to-face DCS Workshop at the Met Tech Expo in Paris in October 2022, combined with the Satcom Forum. The DCS part focused on reports from each of the member organisations and discussions on the Enhanced DCP standard.

The discussions of the Enhanced DCP (EDCP) standard have continued to be a major topic for the Task Group (TG). The TG has developed a proposal for the way forward in developing a new IDCS/EDCP standard. The TG foresees the following plan and related schedule, which would give the agencies a common standard and would once again allow international use of DCPs:

- 2024:
  - Finalise the EDCP technical standard with the agreement of all agencies and CGMS
  - Relocate current DCPs away from the international identified channels
  - Define how the EDCP project would be funded
- 2025:
  - Produce and test a prototype transmitter
  - Modify reception sites to enable the reception of the EDCP
  - Test the system and verify the performance of the prototype and ensure it covers the transmission different modes
- 2026:
  - Certify the EDCP transmitters from the manufacturers
  - Modify the reception systems of all agencies.
  - Test the reception for all agencies and satellites
- 2027:
  - Declare the EDCP standard operational

WGI discussed and agreed with the proposed plan for development of the EDCP standard, highlighting the need to define the funding of the project, considering a prototype would need to be developed. An additional point that needs to be added to the plan is following up with users on the adoption of the EDCP standard. The plan detailed above is for the engineering timeline, and the discussion highlighted that the user implementation will take additional time.

The progress on the items part of the DCS SWOT analysis was presented, including RFI mitigation, joint DCS PR materials, DCS introduction video, and manufacturers workshop.

For addressing the threat of RFI, the Task Group is proposing to produce an RFI interference register, which would be a CGMS document populated with the history of known interferences, and kept up-to-date with any new interferences. During the DCS workshop NOAA gave a presentation on some DCS interference problems they had observed. Their investigation revealed that the interference was produced by hand held two-way radios. EUMETSAT has also in the past suffered from some external interference, which was suspected to come from ground based radars. WGI discussed and approved the proposal. The output of the DCS register will be provided to the Task Group on RFI, for input in the best practices on RFI. Additionally, WGI discussed if there are plans to create a global RFI register, with a wider scope than DCS, and concluded that agencies are invited to report on RFI issues to SFCG for knowledge exchange and are encouraged to notify ITU.

Some discussions have taken place on the joint DCS promotional materials and DCS introduction video, but these items are still a work in progress. Once the EDCP standard is finalised, a new IDCS guide standard would need to be prepared.

The manufacturers workshop took place as part of the DCS workshop during the Satcom Forum in October 2022.

WGI discussed the importance of the SWOT analysis for the future of the overall system of the CGMS members and their future plans for supporting collection of data from remote regions.

WGI discussed the threat of competing systems, opportunities for commercial support as an augmentation of DCS, and the identification of new uses of DCS, and agreed that these items should be considered as part of the SWOT analysis.

WGI agreed that the SWOT analysis should be kept current, as part of the routine activities of the merged Task Group, and presented on an annual basis. It was also agreed that a summary outcome of the SWOT analysis should be developed and disseminated to the remaining CGMS Working Groups.

WGI agreed to the proposal with the following action.

CGMS-50 ACTIONS - WGI					
Actionee	AGN item	Action #	Description	Deadline	Status
TG on DCS	8.1	WGI/A51.10	DCS TG to complete the DCS SWOT analysis and provide current conclusions and recommendations to WGI.	CGMS-52	OPEN
TG on DCS	8.1	WGI/A51.11	As part of the routine DCS TG activities (to be reflected in the ToR), review and update DCS SWOT analysis yearly and provide to WGI – the next update, which will also take as input the outcomes of the CGMS 2022+ project.	CGMS-52	OPEN

Terms of Reference for a Task Group on DCS was provided. It was noted that the first three items of the proposed Terms of Reference, which are related to the EDCP standard, are rather current actions instead of responsibilities. The regular update of the SWOT analysis should be reflected in the Terms of Reference of the Task Group.

WGI members were encouraged to nominate additional members, in order to expand the Task Group membership to all CGMS members.

#### **CGMS-51-EUMETSAT-WP-02** Operational DCS status report + status of implementation of best practices (EUMETSAT)

This paper presents the status of the EUMETSAT Data Collection Services (DCS), currently supported by Meteosat-10 at 0° and Meteosat-9 at 45.5°E IODC (Indian Ocean Data Coverage). Meteosat-9 took over from Meteosat-8 as the prime IODC satellite 1 July 2022. Meteosat-10 took over from Meteosat-11 as the prime 0° satellite on 21 March 2023.

The paper includes details of channel utilisation, DCP allocation, geographical distribution and DCP data dissemination mechanisms. It covers also details on expected changes to the EUMETSAT DCS service in 2023. The DCS is one of the core services operated by EUMETSAT in support of meteorology and weather prediction. Noting that the EUMETSAT DCS is also embarked on the Meteosat Third Generation (MTG).

The EUMETSAT DCS currently supports both standard-rate (100bps) and high-rate (1200bps) DCPs. The prime IODC application is for the Indian Ocean Tsunami Warning Network (IOTWS). As of 31 March 2023, there are 147 DCP operators located in 78 countries (Europe, Africa, Asia). There are a total of 1691 DCPs allocated, with 455 actively transmitting. Out of those DCPs allocated, 386 are HRDCPs transmitting at 1200 bps (359 supported by Meteosat-10 at 0° and 27 by Meteosat-9 at 45.5°E). The remaining 1305 are Standard Rate DCPs (1158 supported by Meteosat-10 at 0° and 147 by Meteosat-9 at 45.5°E). Since March 2022, 66 new DCPs have been assigned (66 HRDCP and 0 SRDCP). The EUMETSAT DCS has a typical reliability greater than 99%.

The paper also included the EUMETSAT status of implementation of the CGMS Best Practices in support to DCP Transmitter Certification Process (EUM/CGMS/DOC/21/1252912) and DCP Data Access (EUM/CGMS/DOC/21/1252911).

**CGMS-51-ISRO-WP-01** - Operational DCS status report + status of implementation of best practices (ISRO)

There was no report on the ISRO Data Collection Services (DCS) in CGMS-51 WGI.

**CGMS-51-JMA-WP-02** - Operational DCS status report + status of implementation of best practices (JMA)

The Japan Meteorological Agency (JMA) has operated the Data Collection System (DCS) since its first Geostationary Meteorological Satellite (GMS) went into operation in 1978. The system plays important roles in collecting meteorological information as well as seismic intensity and tidal/tsunami data collaborating with the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS). In Japan, more than 400 DCPs collect seismic intensity data. Himawari-8's DCS has been operational since July 2015, and Himawari-9 took over the DCS service in 2022 and will continue in this role until 2029.

The Agency has decided that the planned Himawari-10 program set to replace Himawari-8/9 will assume the same DCS.

The paper also included the JMA status of implementation of the CGMS Best Practices in support to DCP Transmitter Certification Process (EUM/CGMS/DOC/21/1252912) and DCP Data Access (EUM/CGMS/DOC/21/1252911).

WGI discussed a comment from JMA on the DCS use on Himawari-10 and that the potential for DCS on Himawari-11 is dependent on DCS use. [JMA would like to discuss this topic in the consideration of new technologies for satellite system including internet service by small satellites constellation in WGI, aligned with CGMS Future Direction project. It was agreed that a dedicated meeting with JMA will be planned to discussed this topic in more detail.](#)

WGI agreed to the proposal with the following action.

CGMS-50 ACTIONS - WGI					
Actionee	AGN item	Action #	Description	Deadline	Status
TG on DCS	8.4	WGI/A51.12	DCS TG to arrange a dedicated meeting with JMA to give information from the SWOT	CGMS-52	OPEN

			analysis, including information from the 2022 Satcom Forum.		
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### **CGMS-51-NOAA-WP-03 - GOES DCS Status and Best Practice Implementation**

The GOES DCS is an environmental data relay system that supports the collection of over 900,000 message per day from over 32,000 active Data Collection Platforms (DCPs) located throughout the Western Hemisphere. The GOES DCS Program has 672 different user agency agreements representing 61 countries. DCP platforms collect environmental data, transmit this information to a GOES East or West satellite. The satellites then rebroadcast this data to terrestrial receive facilities maintained by NOAA or a user's own facility. NOAA collects the complete range of DCS data, distributes it using the DCS Administrative and Data Distribution System (DADDS) or to other distribution interfaces. The DADDS is the central management for GOES DCS and provides user, DCP, and spectrum management tools.

The NOAA GOES DCS continues to be a highly reliable and highly utilized. The system continues to grow and fulfils many critical roles for many users, including use of environmental data to take action to protect life, property, and the environment. However, the growth of system usage has not had an accompanying maturation in the DCS system itself. Specific challenges include spectrum management and radio frequency interference (RFI). NOAA plans to replace the current version of DADDS, modernize DCP communication technologies, and restore a DCP Command link in order to make GOES DCS a more modern, efficient, and flexible system.

The paper also included the NOAA status of implementation of the CGMS Best Practices in support to DCP Transmitter Certification Process (EUM/CGMS/DOC/21/1252912) and DCP Data Access (EUM/CGMS/DOC/21/1252911).

### **CGMS-51-ROSHYDROMET-WP-01 - Operational DCS status report + status of implementation of best practices (ROSHYDROMET)**

This document addresses the current status and technical specifications of the Russian data collection system and related future plans. The DCS is established to provide collection and distribution of meteorological data from the remote areas and to support natural hazards warning system.

Roshydromet has developed and deployed the national DCS based on geostationary meteorological satellites of Electro-L series (14.5W, 76E, 165.8E) with a backup option via Luch series communication satellite and highly elliptical orbit satellite Arctica-M. There are 696 DCPs currently deployed. DCPs are distributed all over the Russian territory, including 141 DCPs in hard-to-reach areas.

The Russian DCS will be further complemented with the launch of the second highly elliptical orbit satellite Arctica-M.

### **CGMS-51-CGMS-WP-05 - Best practices in support to DCP TX certification process - latest version and new proposals**

This document covers the status of the following document "CGMS agency best practice in support to DCP TX certification process" (EUM/CGMS/DOC/21/1252912 v1, 5 November 2021). This document is still current and covers the best practices sufficiently, so WGI agreed no update is currently needed. With the planning of a new Enhanced DCP standard it may be necessary to update this document in next meeting rounds.

### **CGMS-51-CGMS-WP-06 - Best Practices in support to DCP data access - latest version and new proposals**

This document covers the status of the following document “CGMS agency best practice in support to DCP data access” (EUM/CGMS/DOC/21/1252911 v1, 5 November 2021). This document is still current and covers the best practices sufficiently, so WGI agreed no update is currently needed.

DRAFT

**CGMS-51-NOAA-WP-04 - Small Satellite DCS Use as an Operational Concept**

The Satellite DCS Use Concept Validation project was originally scoped to determine if satellites can successfully interface with the Data Collection System (DCS) receivers (DCPR) and thus provide a low-rate data (100, 300, or greater bps) service to satellite users.

Satellite use of the DCS fosters a new means for collecting and distributing meteorological and climatology data. This can be done using DCS equipped smallsats in polar orbits.

The initial concept has been successfully validated with TES-10. The concept is valid and DCS can be utilised to some degree by satellites. The TES-11 demonstration will be completed by the end of 2023 if the launch occurs as expected. An additional experiment involving both TES-11 and TES-12 as dual DCS hosting satellites may be possible in Q3 of 2023.

The launch and operation of TES-11 will provide a more significant validation of the operational challenges of this concept. Regulatory controls for access and protections will need to be considered by CGMS and the DCS hosting agencies once this second test is concluded. An agreement will need to be reached regarding the permitted use of DCS by satellite systems and under what conditions. It is expected that the Task Group on Data Collection Services will prepare for an initial discussion at CGMS-52.

DCS systems have come under pressure from small satellite constellation companies that seek additional usable RF spectrum and wish to increase use of this band for their space operations. It is expected that satellite use of the DCS system will alleviate some of this risk and may further strengthen the value of protecting the system.

Satellite use of the DCS also fosters a new means for collecting and distributing meteorological and climatology data. This can be done using DCS equipped smallsats in polar orbits. Additionally, should a commanding capability be implemented in GOES, this DCS equipped smallsat could also relay these commands from other DCS systems.

WGI agreed to the proposal with the following actions.

CGMS-50 ACTIONS - WGI					
Actionee	AGN item	Action #	Description	Deadline	Status
TG on DCS	8.9	WGI/A51.13	Prepare a proposal on the agreed permitted Smallsat use of DCS by satellite systems and under what conditions, for discussion and endorsement at CGMS-52.	CGMS-52	OPEN

## 9. Space Weather Operational Issues

The report on usage of Space Weather products/services in support to satellite operations (each agency with experience + external speakers) will be covered in the Joint WGI-SWCG-WGIV meeting.

## 10. WGI Coordination Items

### 10.1 Status of CGMS future direction 2022+ project

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

This working paper 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

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

The proposals from the CGMS 2022+ for work to be led by WGI were welcomed. It was noted that many of them fit into existing activities within the various Task Groups. WGI agreed to the proposals for leadership of the different strategic themes.

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.

### 10.2 CGMS Global Contingency Plan, as proposed by WGIII (incl. CGMS Baseline, Risk Assessment Workshop outcomes & Implementation of WGI aspects)

#### **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.

WGI reviewed the draft update of the CGMS Risk Assessment.

#### **CGMS-51-WGIII-WP-01** - CGMS Baseline - draft revision following the 5th risk assessment workshop



The 5<sup>th</sup> CGMS WGIII workshop was held on 21-23 February 2023 on whose occasion the CGMS baseline and related risk assessment was conducted. The baseline is reviewed annually instead of every 4 years. The WMO manual on WIGOS will be updated every year based on the revised CGMS Baseline. The working group reviewed the CGMS baseline and proposed revisions. The draft text of the revision of the CGMS baseline is included in the paper.

The text was reviewed by CGMS-51 WGI and other WGs in April-May 2023, in order to conclude on a final text for endorsement by CGMS-51 plenary in June 2023.

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

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

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-08** - Revised HLPP 2023-2027 - for plenary endorsement

WGI provided inputs for updates to the relevant sections of the HLPP. The HLPP will be updated based on inputs from the WGI meeting and the progress of the CGMS Future Direction 2022+ project, including:

- DCS – include EDCP planned timeline and further work proposals from SWOT
- RFI – include the establishment of best practices on RFI
- Low Latency Data Access – implement updates to reflect the creation of the Low Latency Data Access Task Group and its future work
- Satellite Data and Codes – add updates to reflect the coordination with WMO
- Space Debris and Collision Avoidance – include planned next steps including creation of best practices and updates according to CGMS Future Direction 2022+ project

### 10.4 WGI action items & recommendations (incl. review/updates of existing and proposed new action items & recommendations)

#### **CGMS-51-WGI-WP-09** - WGI action items & recommendations (incl. review/updates of existing and proposed new action items & recommendations)

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



## 10.5 Future WGI sessions (incl. dates for future plenary and intersessional meetings, proposals for new agenda items)

### CGMS-51-WGI-WP-11 - Decision on dates on WGI activities in 2023-2024 (CGMS-51 to CGMS-52)

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

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

WGI	Proposed CGMSG-50 to CGMS-51 WGI intersessional dates
WGI Intersessional meetings	Tuesday 26 September 2023 at 12 UTC Wednesday 24 January 2024 at 12 UTC Tuesday 19 March 2024 at 12 UTC

CGMS-51 WGI agreed on the following WGI Task Group intersessional meetings up to CGMS-52:

WGI Task Group	Task Group Lead	Proposed CGMSG-50 to CGMS-51 WGI intersessional dates
Task Group on Low Latency Data Access	Antoine Jeanjean, Andrew Monham	Tuesday 12 September 2023 at 12 UTC Tuesday 7 November 2023 at 12 UTC Tuesday 23 January 2024 at 12 UTC Tuesday 12 March 2024 at 12 UTC
Task Group on Satellite Data and Codes	Simon Elliott	Thursday 28 September 2023 at 12 UTC Thursday 11 January 2024 at 12 UTC
Task Group on Data Collection Services	Nicholas Coyne	Thursday 18 May 2023 at 12 UTC Thursday 22 June 2023 at 12 UTC Thursday 20 July 2023 at 12 UTC Thursday 14 September 2023 at 12 UTC Thursday 12 October 2023 at 12 UTC Thursday 23 November 2023 at 12 UTC Thursday 25 January 2024 at 12 UTC Thursday 22 February 2024 at 12 UTC Thursday 21 March 2024 at 12 UTC
Task Group on Space Debris and Collision Avoidance	Andrew Monham	To be defined
Task Group on RFI detection, monitoring and mapping	Simon Elliott	Thursday 5 October 2023 at 12 UTC Thursday 18 January 2024 at 12 UTC

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

WGI	Proposed CGMSG-50 to CGMS-51 WGI 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-WGI-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](mailto:cgmssec@eumetsat.int) accordingly.

Specifically for WGI, members were invited to nominate candidates for a co-chair and a co-rapporteur.

Further, the CGMS-51 working groups were requested to secure the nomination of candidates as far as is possible for recommendation to plenary for endorsement.

## 11. AOB

No AOB items were presented.

## 12. Meeting Conclusions

**CGMS-51-WGI-WP-13:** Agreement on Outcomes, Conclusions & Preparations of WGI Report for Plenary (Co-Chairs / Rapporteurs)

The WGI Co-Chairs and Co-Rapporteur thanked the WGI 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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