Report from CGMS WGI Task Group on Space Environment Sustainability

Presented to CGMS-52 WG-I session, agenda item 6.1

Coordination Group for Meteorological Satellites

EUMETSAT CGMS

Executive summary of the WP

This document reports on the background and content of the Terms of Reference for the newly formed CGMS WGI Task Group on Space Environment Sustainability, relevant to CGMS member current and planned missions.

The members of the Coordinated Group for Meteorological Satellites (CGMS) rely on the sustainability of the space environment to ensure their satellite missions remain able to deliver meteorological and space weather data to global forecasting services. In this regard, safety on Earth is very much intertwined with safety in space. CGMS has therefore established a Task Group on Space Environment Sustainability which shall address all aspects of operations in the space environment where CGMS member coordination can help improve the safety and sustainability of space operations for all space actors. The objectives include establishing best practices covering Space traffic coordination, lifetime extensions, end-of-life disposal and space weather mitigation of risks and effects. It is foreseen that a proposal on acceptable space traffic coordination practices can be submitted for consideration by UN COPUOS.

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TASK GROUP BACKGROUND

- Builds upon the preliminary work initiated by its predecessor, the Space Debris and Collision Avoidance Task Group established in 2019:
  - no activities since 2022
  - activities conducted were limited to bilateral interactions between NOAA and EUMETSAT
  - references to the documentation / reports are in the new Terms of Reference

- The name of this revived Task Group has been changed in recognition of the broader scope of activities, dealing not only with debris but also with safe operations in increasingly congested orbits and additionally taking into account potential impacts from space weather

- Furthermore, the objectives and actions from the CGMS Future Directions Project SSA theme are to be considered

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SCOPE OF THE TASK GROUP TERMS OF REFERENCE

- The Terms of Reference is addressed to all CGMS participants and is relevant for all management, engineering and legal functions responsible for ensuring the definition, implementation and operation of CGMS agency space-based systems is compatible with the space environment and its sustainability

- The Task Group objectives and activities defined by the Terms of Reference are therefore applicable across all satellite-based programmes in all mission phases

- The Terms of Reference intends to cover all space sustainability issues of relevance to CGMS missions without exclusion. In particular, this ToR includes all SSA aspects associated with the Short-, Medium- and Long-term Goals for CGMS* and split into the following categories:
  - Space Traffic Coordination
  - Space Weather
  - Space Sustainability

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** CGMS future direction 2022+ Position paper theme: Space Situational Awareness*

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TASK GROUP ROLE

- The following description has been submitted via WMO to UNOOSA* for inclusion in UN-Space** Special Report on Space Debris to be presented at UN-COPUOS*** in June 2024.

- *The members of the Coordinated Group for Meteorological Satellites (CGMS), of which WMO is one, rely on the sustainability of the space environment to ensure their satellite missions remain able to deliver meteorological and space weather data to global forecasting services. In this regard, safety on Earth is very much intertwined with safety in space. CGMS has therefore established a Task Group on Space Environment Sustainability which shall address all aspects of operations in the space environment where CGMS member coordination can help improve the safety and sustainability of space operations for all space actors. The objectives include establishing best practices covering Space traffic coordination, lifetime extensions, end-of-life disposal and space weather mitigation of risks and effects. It is foreseen that a proposal on acceptable space traffic coordination practices can be submitted for consideration by UN COPUOS.*

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* *United Nations Office for Outer Space Affairs*
** *Inter-Agency Meeting on Outer Space Activities*
*** *Committee on the Peaceful Uses of Outer Space*

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Objectives / Deliverables Highlights (abridged)

Full Terms of Reference available on WGI agenda [CGMS Agenda and Working Paper Tool (cgms-info.org)](cgms-info.org) *CGMS-52-WGI-WP-05*

1. **Objective**: Stay abreast on the status, current events and foreseen evolutions of the space environment, together with related regulations, guidelines, approaches, tools and services with the potential to constrain or inform in-orbit and planned CGMS mission services

   Deliverable: Accessible Resource database

2. **Objective:** Establish a Best Practice on Space Environment Sustainability aspects for CGMS member's missions covering:
   i. Space Traffic Coordination
   ii. Lifetime extensions and end-of-life disposal
   iii. Break-up and atmospheric re-entry notification process
   iv. Space weather forecast usage and mitigation of risks and effects

   Deliverables:
   a) A best practice document on Space Environment Sustainability based primarily on existing practices, but also with a view to emerging technologies and concepts for long-term, system lifecycle sustainability
   b) A gap analysis on global Space Traffic Coordination capabilities and alignment
   c) Updated proposal for best practices based on outputs from (a), (b), targeting approval by CGMS for submission to UN COPUOS, with focus on Space Traffic Coordination

3. **Objective:** Identify and act upon risks to sustained operations

   Deliverable: A space environment sustainability SWOT analysis, with identified actions

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Call for Members

A call for members was sent to the CGMS List Server and WGI members on 19 February 2024:

- All CGMS members actively involved in space operations or supporting SSA / Space Weather data provision to spacecraft operators invited to join this effort
- Due to the scope of the Task Group, a secretarial function supporting the Co-Chairs would be welcomed
- ISES Membership is also invited in order to support the objectives on space weather service utilisation by spacecraft operators and a presentation to ISES on this TG (and the spacecraft anomaly TG of SWCG) was made on 22 February 2024
- Identification of experts to enable deeper understanding of issues between agencies is also foreseen

The current status of membership is provided on next slide.

Currently confirmed membership

Colour coding:

Participants confirmed

Participants to be nominated

Role	Organisation	Function	Names
Co-Chair	EUMETSAT	SES / LEO Satellite Operations	Andrew Monham Andrew.Monham@eumetsat.int
Co-Chair	ESA	Head of Space Weather, CGMS Future Project SSA lead	Juha-Pekka Luntama Juha-Pekka.Luntama@esa.int
Secretary	TBC		
Member	CMA		Cong HUANG huangc@cma.gov.cn
Member	CNES		
Member	CNSA		
Member	IMD		
Member	ISRO		
Member	JAXA		
Member	JMA		
Member	KASI	Chief Manager / Principal Researcher, Space Hazards Program Office	Dr. Eun-Jung Choi eunjung@kasi.re.kr
Member	KMA	Senior Researcher of Satellite Operation Divison	Jaeyoung Byon jybyon@korea.kr
Member	NASA		
Member	NICT	Executive Researcher Space Environment Laboratory	Tsutomu Nagatsuma tnagatsu@nict.go.jp
Member	NOAA		Scott Leonard scott.leonard@noaa.gov
Member	ROSCOSMOS		
Member	ROSHYDROMET		
Member	WMO		Heikki Pohjola hpohjola@wmo.int
Member	ISES	Representatives of Space Weather Services	

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Meetings Held / Planned

The first Task Group meeting open to all interested CGMS members was held on 6 March 2024 with attendance of CGMS Secretariat, CMA, ESA, EUMETSAT, KASI, KMA, NICT, WMO.

Proposed CGMS-52-53 TG Meetings (all virtual, starting 12:00 UTC)

- 27 June 2024
- 19 September 2024
- 28 November 2024
- 29 January 202512 March 2025

Opportunities for face-to-face discussions as side meeting in other conferences shall also be considered.

Key issues of relevance to CGMS:

- The Space Sustainability Task Group addresses the following aspects of the HLPP:
  - 2.5 Operational issues related to space weather
  - 2.6 Space traffic coordination
  - 2.7 Space Sustainability

- UN COPUOS will have visibility to this Task Group Effort from the UN-Space Special Report on Space Debris to be presented in Vienna in June 2024.

To be considered by CGMS:

- Existing action: WGI/A50.07: Deliver a Best Practice document on Space Environment Sustainability, with supporting presentation to CGMS WGI, for recommendation for endorsement in CGMS-52
  - Recommend to set due date to CGMS-53

- WGI requested to support the call for membership from each CGMS member organisation to help ensure the objectives can be met.