EUMETSAT updates since CGMS-52 and report on medium to long-term plans

CGMS-53 plenary, item 3

Coordination Group for Meteorological Satellites

CGMS

EXECUTIVE SUMMARY

EUMETSAT currently operates 10 satellites. The mandatory GEO programme: Meteosat-9 is located at to 45.5°E, Meteosat-10 at 0°, Meteosat-11 at 9.5°E , and Meteosat-12 (MTG-I1) around 0°. Meteosat-12 was declared operational on 4 December 2024. MTG-S1 is scheduled for launch in summer 2025 and will host Copernicus Sentinel-4. The mandatory LEO programme currently covers Metop-B and -C in low Earth sun-synchronous orbits. The launch of the first EPS-SG, Metop second generation carrying Copernicus Sentinel-5, is scheduled for November 2025, with the second one following in summer 2026.
EUMETSAT operates several oceanographic missions, Jason-3, and the Copernicus missions on behalf of the European Commission and international partners (including CNES, ESA, NASA, NOAA), notably Sentinels-3A, -3B, -6/Michael Freilich with the addition of Sentinel-3C confirmed in the meantime. If approved, EUMETSAT expects to operate Sentinels-3D and -6/MF/B. Further, EUMETSAT's planned contributions to CO2M, Sentinel-3 and -6 NG, CIMR and CRISTAL includes ground segment developments and processing activities.

The enhanced EUMETSAT response to the implementation of WIGOS 2040 is currently under consideration with decisions expected in the 2025 timeframe, covering EPS-Sterna, EPS-Aeolus, and continued commercial RO data procurement with a global license.

EUMETSAT is also engaged in space weather matters as well as implementing its roadmap on AI/ML.

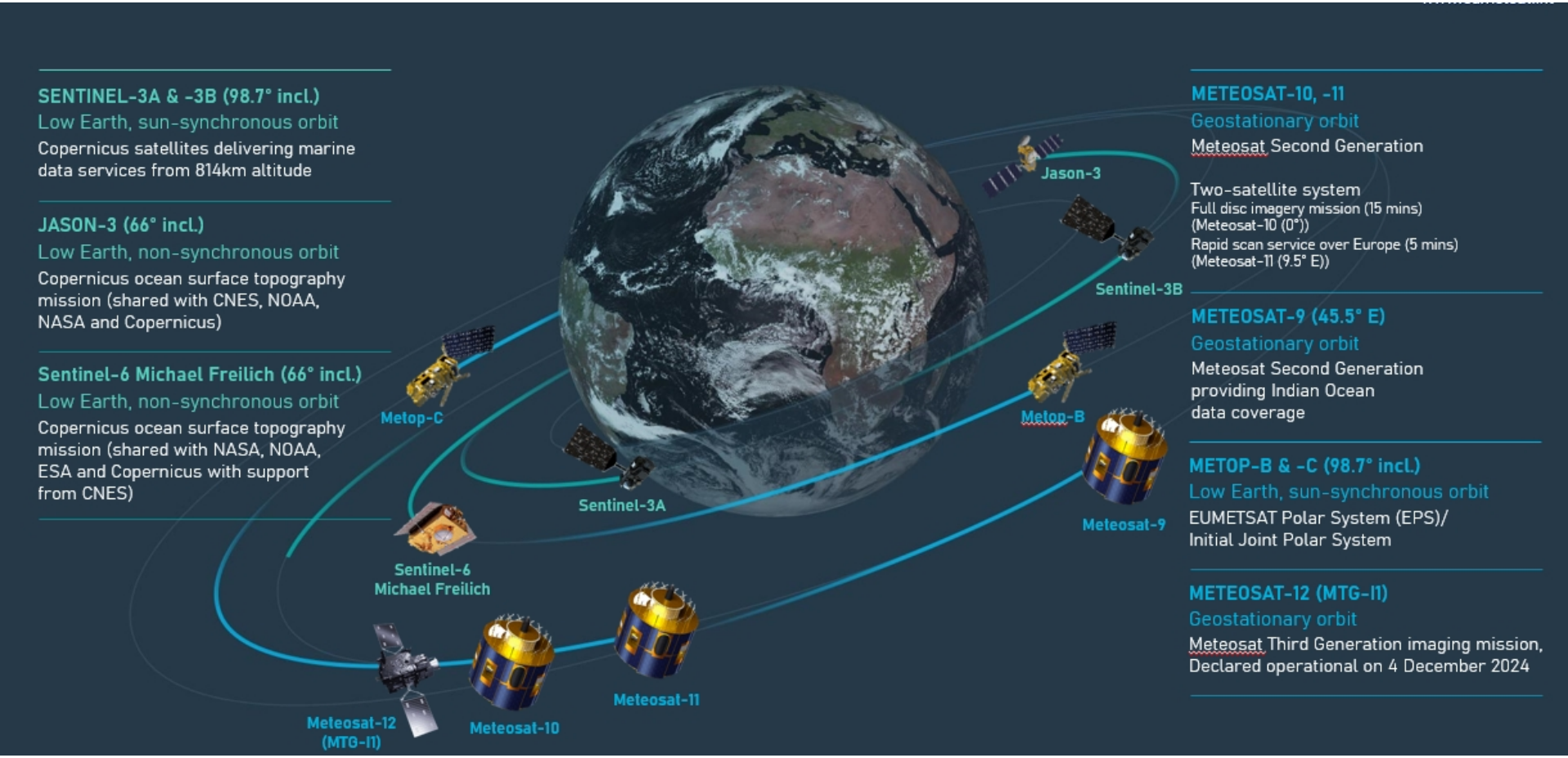
The presentation also provided information on EUMETSAT's response to the WMO Early Warning for All initiative and its activities in Africa providing upgraded infrastructure/reception stations for MTG and EPS-SG reception to secure the continuity. The programme Space for Early Warning in Africa – SEWA – part of the Africa-EU Space Partnership Programme:
The overall objective is to strengthen Africa's capacity to access and utilise space-based meteorological data for early warning and disaster risk reduction. The main activities implemented by EUMETSAT are:

i) Infrastructure for data access: Enhance Africa local and cloud-based infrastructure to access new meteorological satellites (MTG, EPS-SG);
ii) Establish the African Meteorological Satellite Application Facility (AMSAF) with an initial focus on Nowcasting space-based products to track severe weather events and enhance early warning systems; and
iii) Training: Targeting infrastructure operation and maintenance, and use of space-based products for early warning.

EUMETSAT

Programmes and plans

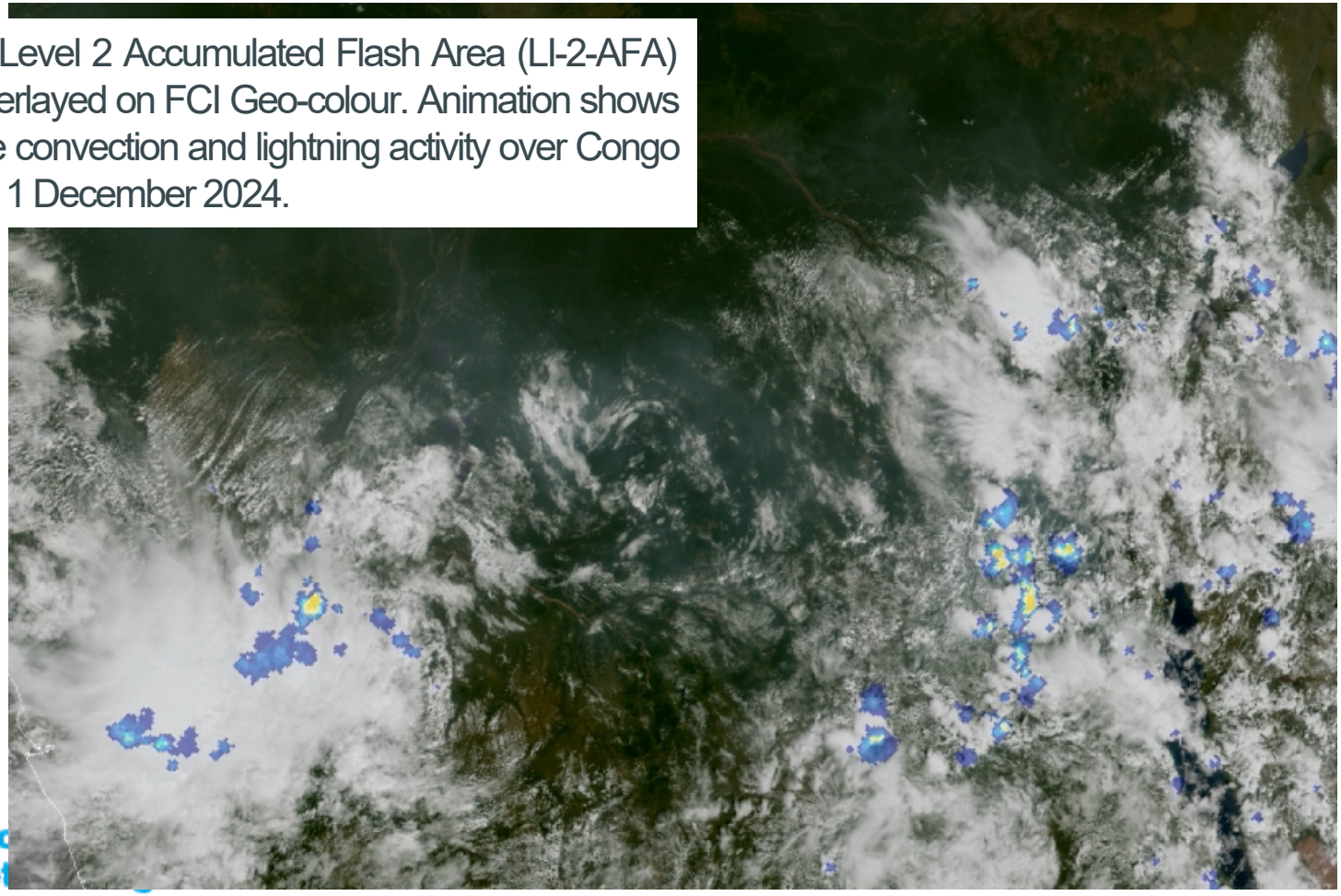
Current satellites operated by EUMETSAT - recap



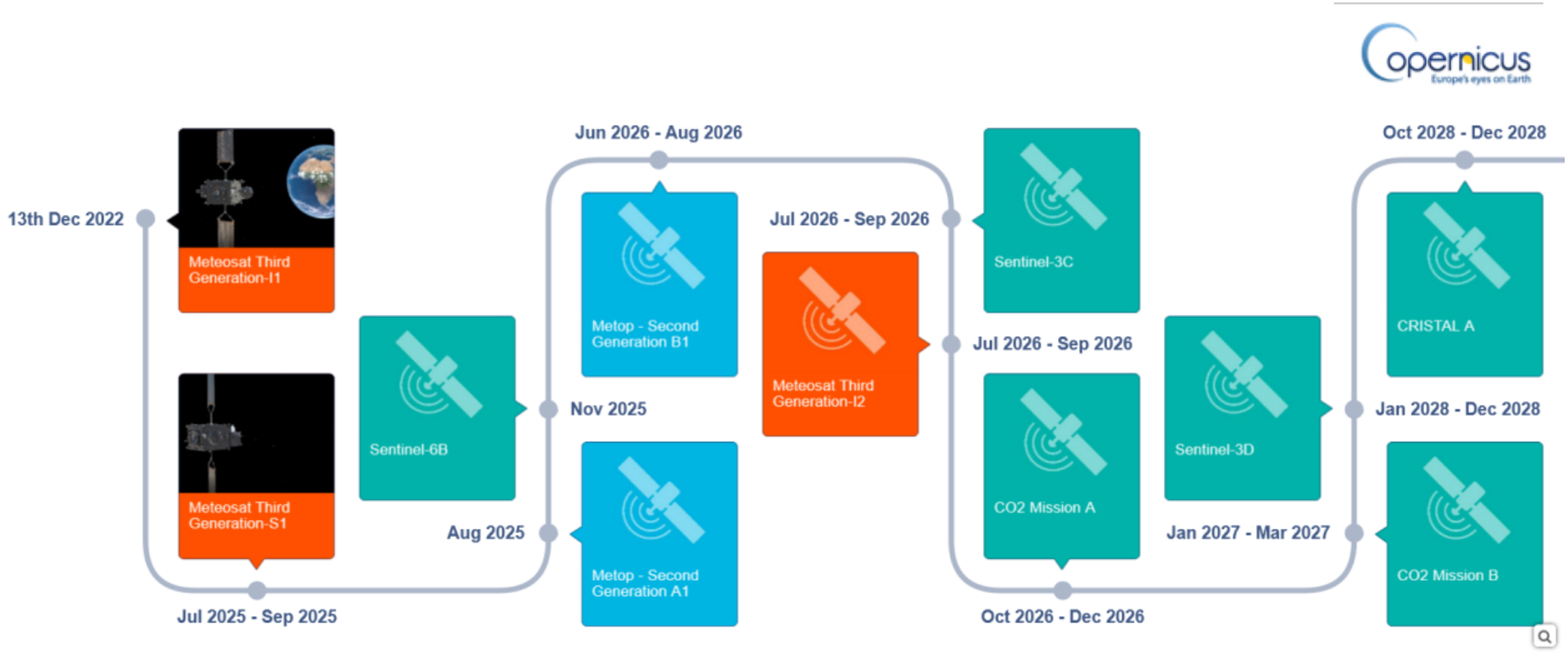
FIRST METEOSAT THIRD GENERATION SATELLITE OPERATIONAL

MTG-I1 fully operational since 4 December 2024 ⇨ renamed **METEOSAT-12.**
On 16 June it will be the primary operational satellite for the full disc scanning service.

LI Level 2 Accumulated Flash Area (LI-2-AFA) overlayed on FCI Geo-colour. Animation shows the convection and lightning activity over Congo on 1 December 2024.



DEPLOYING EUMETSAT NEXT GENERATION AND THIRD PARTY SATELLITES



Sentinels-4 and -5 will fly on the platforms of MTG-S1 and EPS-SG A1 respectively

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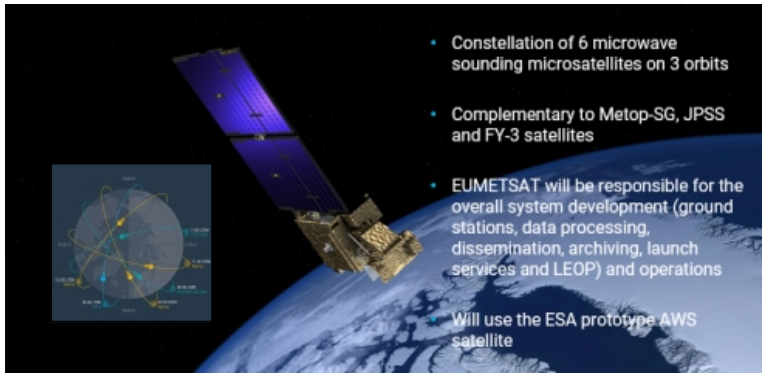
COMPLEMENTING MTG AND EPS-SG IN 2025-2040

The enhanced EUMETSAT response to the implementation of **WIGOS 2040**

Under consideration with decisions expected in the 2025-timeframe:



EPS-Sterna, a constellation of microwave sounding micro-satellites.

22 out of 30 EUMETSAT Member States have subscribed to the programme, representing 66% of contributions.

Potential continuity of operations of the precursor AWS by EUMETSAT beyond August 2026 (end of ESA mission).

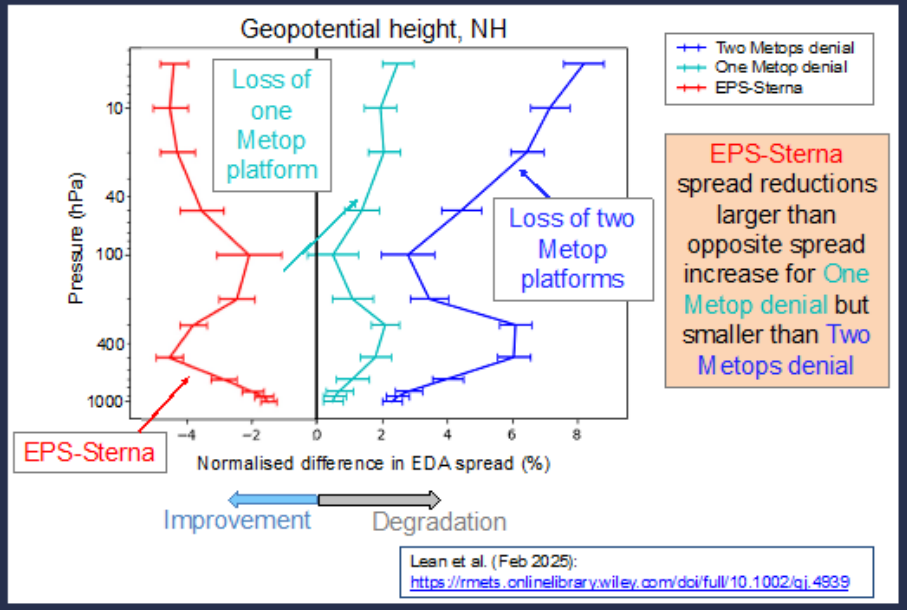
EPS-Aeolus, unique European technological expertise to improve Numerical Weather Forecasts.

COMPLEMENTING MTG AND EPS-SG IN 2025-2040

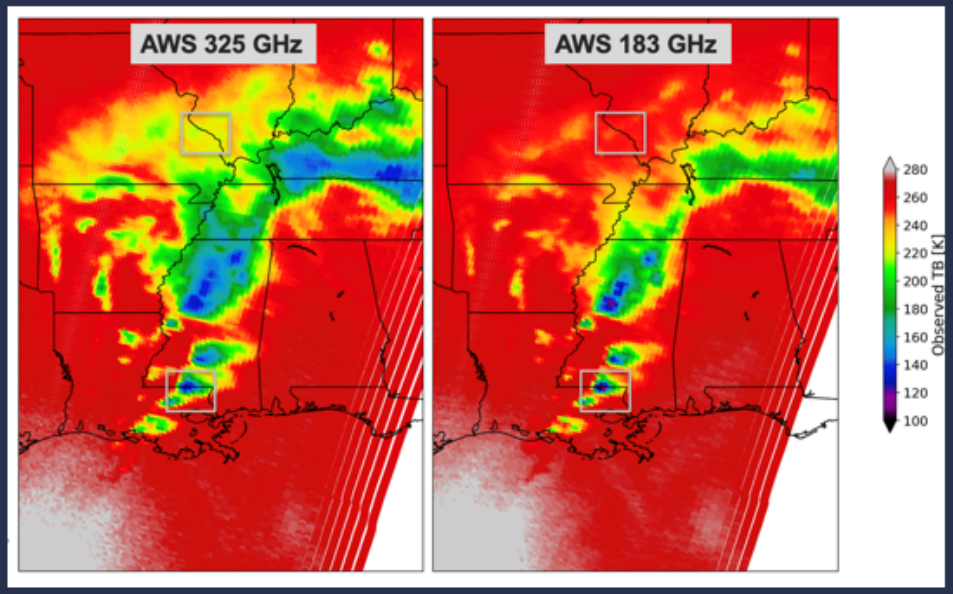
AWS bodes well for STERNA and EPS-SG!

Quote of ECMWF at recent bilateral meeting
*"Impact of EPS-Sterna might have been **underestimated**"*

Forecast impact of 6 satellite STERNA



We can see the ice signatures at 325Ghz

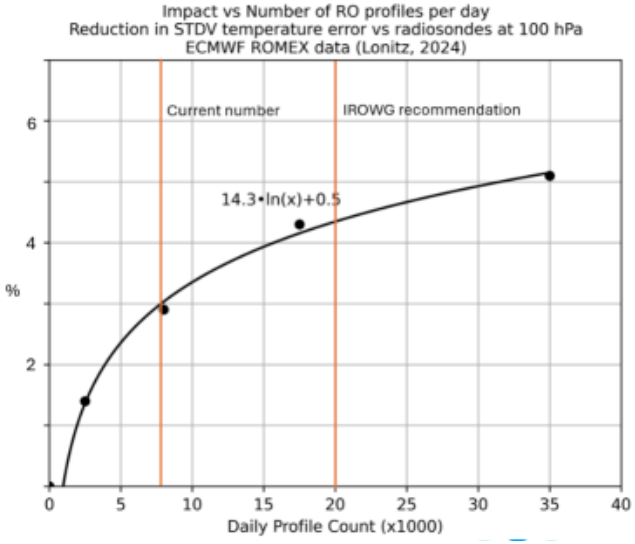


Credit : ECMWF

COMPLEMENTING MTG AND EPS-SG IN 2025-2040

- **Ocean altimetry follow-on programme** highly relevant for the detection of global sea level rise and of climate change. Sentinels-3NG and -6NG tentative launch timeframe: 2033-2037.

- Procurement of complementary **commercial Radio Occultation** data with a global license and a free and open redistribution data policy.



Reduction of 100 hPa temperature error standard deviation against radiosondes in the ECMWF system (Lonitz, 2024)

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EUMETSAT AND OPERATIONAL SPACE WEATHER SERVICES

Objective

- Leverage experience, processes and architectures established from operational meteorological activities to support the existing European and Member State operational space weather services

Short-Term – Medium Term

- Distribution of Third-Party Space Weather Data
- Processing and delivery of Space Weather Data from EUMETSAT satellites and, in the longer-term, from European space weather missions
- Potential role in operating ESA's Space Weather Service Network

Longer-Term

- L5 (ESA Vigil mission) transition to operational services
- Further ESA Space Weather missions
- Plan for European Space Weather instruments on EPS-TG and M4G

Ongoing considerations: potential establishment of an ESA-EUMETSAT collaboration on operational space weather data provision.

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EUMETSAT AI/ML - TOWARDS 1-KM SCALE TRAINING DATA SETS

NEXT STEPS: EXPLOITING MTG FURTHER

Continuing to investigate the application of satellite and other high-resolution data for essential uses like Nowcasting. Preparing MTG FCI and LI data across Europe for nowcasting and radar-proxy purposes.

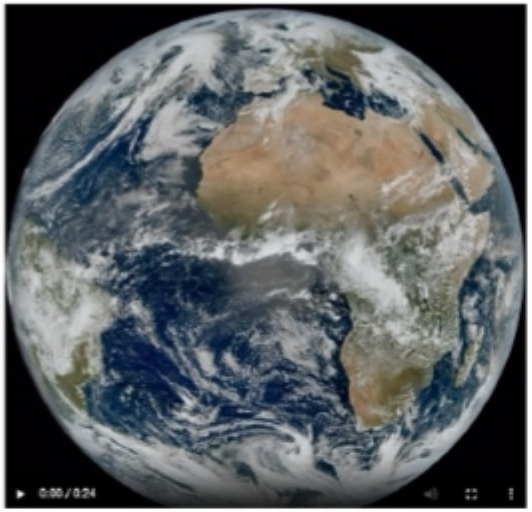
PROGRESS ON TOOLS

AI model development: support the development of small to medium scale machine learning models. AI model inference: facilitate execution of Inference on existing models. AI-ready infrastructure. (DestinE investment)

ADVANCEMENT IN TRAINING DATA SETS

Released OPERA/SEVIRI, improving data access via EWC and data stores, incorporating feedback from Member States, and integrating GEORING and AI-ready Copernicus data.

MTG directly contributes to the WMO multi-hazard Early Warning for All



Space for Early Warning in Africa - SEWA

Part of the **Africa-EU Space Partnership Programme**

Funded by DG INTPA under the EU Neighbourhood, Development and International Cooperation Instrument (NDICI)

- **Overall objective**

Strengthen Africa's capacity to access and utilize space-based meteorological data for early warning and disaster risk reduction

- **Main activities implemented by EUMETSAT**
  - Infrastructure for data access. Enhance Africa local and cloud-based infrastructure to access new meteorological satellites (MTG, EPS-SG).
  - Establish the African Meteorological Satellite Application Facility (AMSAF) with an initially focus on Nowcasting space-based products to track severe weather events and enhance Early Warning systems.
  - Training. Targeting infrastructure operation and maintenance, and use of space-based products for Early Warning.

Implementation period: 2025-2029

Implementing entities: AUC, EUMETSAT, ECMWF

Overall budget: 20M€ *(+5M€)*

Considerations for CGMS

Considerations for CGMS

Issues of relevance to EUMETSAT which might deserve discussion in a CGMS context

- Preparation of future programmes and need for international coordination in their implementation, new architecture concepts, …
  → CGMS space agency coordinated response to WMO WIGOS 2040 update (recommended by CGMS-53 plenary WGIII)

- Evolution of data services using cloud technologies, AI/ML, …
  → exploitation and opportunities for coordination in order to enhance accessibility and usability of satellite data by users (case study to be presented to plenary later)

- Assessment of evolution of requirements from users in preparing for the processing of vast amounts of new data, support to preparation of users, …
  → presentation in a future CGMS plenary

- Evolution of relationships with commercial meteorological data providers complementary to the "CGMS backbone"
  → Secure free and open data access as per the WMO data policy Res. 1

Questions?

Thank you for your attention

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