

Cover Note

Subject	Product Development and Implementation Plan
Action proposed	Decision/Consideration/Information/ <u>Recommendation</u>
Abstract	This document presents an update to the Product Development and Implementation Plan – PDIP for 2027.
Views of other EUMETSAT bodies	
Decision proposed	STG-SWG and STG-OPSWG are requested to invite STG to recommend to Council to approve the 2027 issue of the rolling Product Development and Implementation Plan attached as Annex I.
Majority required in Council	Two-thirds [Art.5.2(d) ii]
Cost implications	-/-
Reference documents	-/-
Annexes / Draft Resolution	Annex I: Product Development and Implementation Plan – PDIP 2027 (EUM2050001, v1C)

**ANNEX I PRODUCT DEVELOPMENT AND IMPLEMENTATION PLAN –
PDIP 2027 (EUM2050001, V1C)**

Product Development and Implementation Plan - PDIP 2027

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Change Record

Version	Date	DCR* No. if applicable	Description of Changes
V1C Draft	16/07/2026		Draft version of PDIP 2027 for STG-SWG no. 61 and OPS-WG no. 60

****DCR = Document Change Request***

DRAFT

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EXECUTIVE SUMMARY

1.1 Purpose

The PDIP 2027 presents the planned product development studies and operational roll-outs for EUMETSAT mandatory and Copernicus missions, covering the 2026–2027 period. It represents the regular update following PDIP 2025 and reflects outcomes of recent STG Science and Operations Working Group reviews.

1.2 Governance

The PDIP is governed through:

- STG Science Working Group (studies);
- STG Operations Working Group (roll-outs);
- Council and Director-General approval;

Progress and priorities are reviewed regularly, ensuring alignment with programme objectives and enabling timely escalation where required.

1.3 Scope and Content

The document:

- Defines the portfolio of product development studies for mandatory and Copernicus missions;
- Describes the associated operational roll-outs;
- Provides traceability to approved product roadmaps and Reference Documents (RD1–RD17);
- Maintains continuity with previous PDIP cycles while incorporating updated priorities.

All planned activities are aligned with approved mission roadmaps and support the continued delivery and evolution of operational and climate data products.

1.4 Key Updates Since PDIP 2025

- Consolidation and continuation of roadmap-driven studies across all mission areas;
- Progression of multiple studies into operational roll-out phases;
- Integration of updated priorities from STG-SWG and STG-OPSWG reviews;
- Continued alignment with Copernicus programme developments.

1.5 Strategic Alignment

The PDIP 2027 supports the delivery of EUMETSAT's strategic objectives by:

- Ensuring continuity and quality of operational meteorological products;
- Advancing climate data record development and validation;
- Supporting Copernicus services through coordinated product development;
- Strengthening the integration of research, development, and operations.

All activities are consistent with approved programme roadmaps and Council decisions.

1.6 Resources

All activities described in PDIP 2027 are planned within the existing approved budget envelope. Detailed resource allocations will be further refined and presented in subsequent PDIP updates (notably PDIP 2028). No additional resource commitments beyond currently approved levels are anticipated.

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2 INTRODUCTION

This document provides an overview of the product development and implementation activities planned by the Secretariat for mandatory missions for 2026 and 2027. It covers activities related to the current operational missions as well as scientific studies supporting enhancements and new developments.

It also includes studies supporting the development of next generation programmes and outlines short-term scientific developments and enhancement activities. These contribute to the broader objectives defined in the product development scientific roadmaps. A summary of the scientific motivation for each is provided together with the corresponding implementation schedule.

For completeness, the document also covers activities supporting Copernicus and third-party missions that began in the previous years and continue through 2026 and 2027.

This version of the Product Development and Implementation Plan (PDIP 2027) is an update to the PDIP 2025 presented to Member States in Spring 2025. It incorporates changes agreed during the 2025 Delegate Body meetings (see [RD-17]) and introduces an updated structure to both reflect these changes and to better align with the interests of the STG-SWG and STG-OPSWG:

- STG-SWG: sections 3 and 5 related to the studies for development of processors;
- STG-OPSWG: sections 4 and 6 related to operational processor roll-outs.

Studies which were completed in 2025 are listed for the mandatory missions in Appendix B. Appendix D provides the same information for Copernicus missions.

2.1 Scientific Development Roadmaps

Scientific development roadmaps were initiated at EUMETSAT in 2016 to improve the consistency of the development of families of products using observations from different satellite systems and instruments, targeting a more modular, flexible and multi-mission approach to algorithms and processors. The published roadmaps serve as reference for planning of activities to be captured in the annual editions of the Product Development and Implementation Plans (PDIPs), as illustrated in Figure 1.

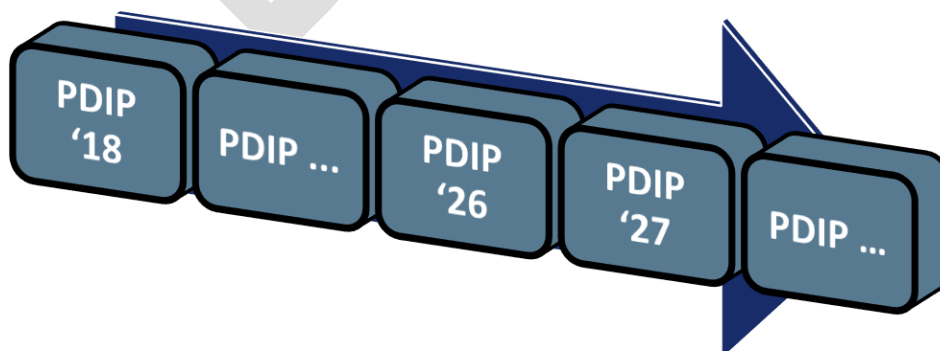


Figure 1: Annual PDIP relationship to the scientific roadmaps

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The “Aerosol”, “Atmospheric Motion Vector (AMV)”, “Image Navigation, Registration and Calibration (INRC)”, “Radio Occultation (RO)” and “Hyperspectral IR” scientific roadmaps were submitted to the Delegate Bodies in Autumn 2017 and Spring/Autumn 2018. The roadmap for Atmospheric Chemistry (ACh) was presented in the Spring 2019 Delegate Body Meeting and approved by Council in summer 2019. Roadmaps for Clouds, and Passive Microwave were presented to Delegate Bodies in Spring 2020, that for Marine was presented in Autumn 2020 and that for Fiducial Reference Measurements was presented in Autumn 2021. The roadmap for Meteorology and Marine Pathfinders was presented in Spring 2022, along with updated roadmaps for Wind (renamed from AMVs) and Aerosol. Outlines of proposed changes to roadmaps for INRC, RO and Hyperspectral IR were shown at the Spring 2022 meeting and the updated roadmap for RO was approved at the Autumn 2022 meeting. The updated roadmap for Hyperspectral IR was approved in Autumn 2023 and the updated roadmaps for INRC and ACh were approved in Autumn 2024. A summary of the roadmap status is given in Table 1.

Roadmap	Status
Aerosol (AER)	Approved in Autumn 2017, update approved in Spring 2022
Wind (previously Atmospheric Motion Vector (AMV))	Approved in Autumn 2017, update approved in Spring 2022
Image Navigation, Registration and Calibration (INRC)	Approved in Spring 2018, update approved in Autumn 2024
Radio Occultation (RO)	Approved in Spring 2018, update approved in Autumn 2022
Hyperspectral Infrared (HSIR)	Approved in Autumn 2018, update approved in Autumn 2023
Marine (MA)	Approved in Autumn 2020, updated concept presented in Spring 2026, updated roadmap to be presented in Spring 2027
Atmospheric Chemistry (ACh)	Approved in Spring 2019, update approved in Autumn 2024
Cloud (CL)	Approved in Spring 2020
Fiducial Reference Measurements (FRM)	Approved in Autumn 2021
Passive Microwave (PMW)	Approved in Spring 2020
Meteorology and Marine Pathfinders (MMP)	Approved in Spring 2022
Hydrology Products	To be presented in Autumn 2028 (TBC)
Optical Imagery	Concept to be presented in Autumn 2026

Table 1: Roadmap status (June 2026)

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2.2 Reference Documents

	Document Title	Reference
RD-1	Scientific Roadmap for the Development of Aerosol Products	EUM/TSS/PLN/17/910992
RD-2	Scientific Roadmap for the Development of Wind Products	EUM/TSS/PLN/17/933419
RD-3	Roadmap for the Development of Image Navigation, Registration, and Calibration Tools	EUM/RSP/MEM/23/1375288
RD-4	Scientific Roadmap for the Development of Hyperspectral Infrared Products	EUM/TSS/PLN/18/1006193
RD-5	Scientific Roadmap for the Development of Radio Occultation Products	EUM/RSP/PLN/22/1315198
RD-6	WMO, Meeting on the Intercomparison of Satellite-based Volcanic Ash Retrieval Algorithms, Madison WI, USA, 29 June – 2 July 2015, Final Report	http://www.wmo.int/pages/prog/sat/documents/SCOPE-NWC-PP2_VAIntercompWSReport2015.pdf
RD-7	Minutes of the 43rd STG-SWG Meeting	EUM/STG-SWG/43/17/MIN
RD-8	A new method for rainfall estimation through soil moisture observations.	Brocca, L., Moramarco, T., Melone, F., & Wagner, W.; Geophysical Research Letters, 40(5), 853- 858, 2013
RD-9	Exploring the assimilation of IASI radiances in forecasting polar lows	Randriamampianina, R., et al.; Q. J. R. Meteorol. Soc. 137, 1700-1715, 2011
RD-10	Scientific Roadmap for the Development of Atmospheric Chemistry Products	EUM/TSS/PLN/18/993023
RD-11	Scientific Roadmap for the Development of Cloud Products	EUM-STG-SWG/47/19/DOC/10
RD-12	Scientific Roadmap for the Development of Passive Microwave Products	EUM/RSP/PLN/19/1142789
RD-13	The 2007–2011 evolution of tropical methane in the mid-troposphere as seen from space by MetOp-A/IASI	Crevoisier et al. 2013 Atmos. Chem. Phys., 13, 4279–4289, 2013 [doi:10.5194/acp-13-4279-2013, 2013]
RD-14	Scientific Roadmap for the Development of Marine Products	EUM/RSP/DOC/20/1185901
RD-15	Scientific Roadmap for Fiducial Reference Measurements (FRM)	EUM/RSP/DOC/19/1147556
RD-16	Scientific Roadmap for the Development of Marine and Meteorological Pathfinders (MMP)	EUM/RSP/DOC/21/1241832
RD-17	59th STG Science Working Group Meeting, Draft Summary Minutes 2-3 September 2025	EUM/STG-SWG/59/25/MIN

2.3 Document Structure

The structure of this document is as follows:

Section 2 (this section): Provides general information on the purpose and scope of the document and lists reference documents.

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Section 3: Studies that were kicked-off in 2025 and new activities for 2026 and 2027, both for current and future **mandatory mission** development can be found, organised according to the current planned scientific product development roadmaps. Activities that concluded in 2025 are listed in Appendix B with links to their web pages. This section is anticipated to be of most interest to STG-SWG.

Section 4: Planned operational product roll-outs (for 2026 and 2027) for mandatory missions are also included with one subsection dedicated to each relevant mission. Roll-outs from 2025 are listed. This section is anticipated to be of most interest to STG-OPSWG.

Section 5: Studies that were kicked-off in 2025 and new activities for 2026 and 2027, both for current and future **Copernicus mission** development can be found, organised according to the current planned scientific product development roadmaps. Activities that concluded in 2025 are listed in Appendix D with links to their web pages. This section is anticipated to be of most interest to STG-SWG.

Section 6: Planned operational product roll-outs (for 2026 and 2027) for Copernicus missions are also included with one subsection dedicated to each relevant mission. Roll-outs from 2025 are listed. This section is anticipated to be of most interest to STG-OPSWG.

Section 7: The resources required for the coordination of the studies are summarised.

Appendix A: The list of Acronyms found in the document is provided.

Appendix B: Studies completed during 2025 for Mandatory Missions.

Appendix C: Roll-outs of 2025 for Mandatory Missions.

Appendix D: Studies completed during 2025 for Copernicus Missions.

Appendix E: Roll-outs of 2025 for Copernicus Missions.

3 STUDIES IN SUPPORT OF THE DEVELOPMENT OF PROCESSORS FOR MANDATORY MISSIONS

The following section provides a summary of the studies that have started in 2025, and planned studies for 2026 and 2027. This section describes studies which support the development of currently operational processors and future programme processors, in accordance with the scientific product development roadmaps.

3.1 Aerosol (AER)

The logic for the Aerosol (AER) scientific product development is outlined in detail in the updated “Scientific Roadmap for the Development of Aerosol Products” presented to the STG-SWG during Spring 2022 [RD-1]. The AER studies described in this section are part of the logic of the aforementioned document.

AER-18-004 - Analysis of 3MI In-flight Polarisation Sensitivity

Description: The analysis of the 3MI in-flight polarisation sensitivity is essential to estimate the end-to-end uncertainty of the L1 products. The aim of this study is to investigate neutral points of the skylight polarisation, i.e. the Arago, Babinet, and Brewster points, at which the degree of polarisation of the Rayleigh atmosphere is zero. This will help to quantify the accuracy of the polarisation direction as the polarised signal should be zero and should also constrain the impact of aerosols (the source of the polarised signal) on the radiometric uncertainty.

Implementation: University of Lille, FR (Work Order as part of CL-20-002)

Timeframe: Q3/2027 to Q2/2029

Comments: Planned, start date changed from Q1/2025

AER-20-003 - Aerosol characterisation from synergy between EPS-SG sensors – MAP product

Description: The MAP product is the EPS-SG follow-on of the operational EPS product PMAp. The MAP product will combine the information from 3MI for aerosol characterisation, IASI-NG for dust detection and Sentinel-5 for absorbing properties and aerosol height estimation. The feedback from PMAp will be included in the analysis. The ability of a GRASP-type approach for an optimal solution will be explored.

Implementation: GRASP-SAS, FR (Work Order as part of AER-21-003-S)

Timeframe: Q3/2026 to Q3/2029

Comments: Planned, start date changed from Q3/2025

AER-22-001-S - Fiducial reference measurements for aerosol products / validation tool (3MI)

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Description: This study will contribute to the identification, and provision of fiducial reference measurements to support the assessment of the performance, then validation, of aerosol products derived from the polarimeter 3MI. By extension, this would also support the multi-sensor MAP product derived from EPS-SG sensors.

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q1/2028

Comments: Planned, start date changed from Q1/2026

AER-23-001-S - Aerosol over clouds from 3MI and METImage

Description: This study will investigate the complex, but frequent, situation of aerosols above cloud layers. This could support the characterisation of aerosol with a considerable impact at the global scale, but also support the cloud characterisation when such an aerosol contribution can be corrected. Measurements from 3MI and METImage (at least) can be used to address this issue. The approach is twofold: propose a BRDF model for the relevant clouds and update the aerosol processor.

Implementation: University of Lille, FR (Work Order as part of CL-20-002) for part-1 and GRASP-SAS, FR (Work Order as part of AER-21-003-S) for part-2

Timeframe: Q1/2025 to Q3/2026 for part-1, Q3/2026 to Q1/2028 for part-2

Comments: Part-1: Ongoing, part-2: start date changed from Q3/2025

AER-24-002-F - 3MI Aerosol product (follow-on)

Description: Follow-on AER-18-001. After the previous aerosol study which provisioned a GRASP baseline for a 3MI aerosol processor as well as internal testing, additional setting, optimisation, evolution (to better fit user needs), and validation are needed.

Implementation: GRASP-SAS, FR (Work Order as part of AER-21-003-S)

Timeframe: Q4/2025 to Q2/2028

Comments: Ongoing, start date changed from Q1/2025

AER-25-001-S - Land Surface Reflectivity

Description: Placeholder for a framework/service. The current action AER-21-002-S is covering a short-term need for S3-Atmosphere. Follow-on tasks + extension to CO2M and other processors seems to be relevant.

Implementation: To be determined (ITT)

Timeframe: Q4/2026 to Q4/2029

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Comments: Planned, start date changed from Q2/2025

AER-27-001-S – Follow-on for Overall Scientific Framework for Studies - Aerosol

Description: Follow-on from AER-21-003-S of overall multi-mission Scientific Framework to support the development of aerosol products

Implementation: To be determined (ITT)

Timeframe: Q4/2027 to Q3/2032

Comments: New, planned

3.2 Atmospheric Chemistry (ACh)

The logic for the Atmospheric Chemistry (ACh) scientific product development is outlined in detail in the updated “Scientific Roadmap for the Development of Atmospheric Chemistry Products” which was presented to Delegate Bodies in Autumn 2024, [RD-10]. There are no ACh studies in support of the mandatory missions.

3.3 Wind (previously Atmospheric Motion Vector (AMV))

The logic for the Wind scientific product development was outlined in detail in the “Scientific Roadmap for the Development of Atmospheric Motion Vectors Products: White Paper” presented to the STG-SWG during the Autumn 2017. This was updated and renamed in accordance with the expanded scope to “Scientific Roadmap for the Development of Wind Products”, [RD-2], and presented to the STG-SWG in Spring 2022. The Wind study described in this section is part of the logic of the aforementioned document.

AMV-25-001-S - LIPAS for EPS-Aeolus slant-angle

Description: A change in the slant-angle for EPS-Aeolus is considered. Aeolus observed at 35 degrees off-nadir but simulations show that a larger angle in the range of 40 to 46 degrees might be beneficial for wind speed accuracy. These studies didn't account for the change in visibility of the atmosphere due to a possible larger obscuration of the line-of-sight by clouds at larger slant-angles.

LIPAS is a simple lidar observation simulator that can easily use realistic meteorological fields from NWP systems as an input. As a complement to the previous investigations, that considered the same atmospheric profiles and only changing the geometry of the observation, this study should help determine the impact of the observability of the atmosphere at larger slant-angles, focussing especially on the change in obscuration by clouds.

Implementation: KNMI, NL (RfQ)

Timeframe: Q4/2025 to Q1/2026

Comments: New, completed

3.4 Cloud (CL)

The logic for the Cloud (CL) scientific product development is outlined in detail in the “Scientific Roadmap for the Development of Cloud Products” which was finalised in Spring 2020, [RD-11]. The CL studies described in this section are part of the logic of the aforementioned document.

CL-24-001-S - Earth Radiation Budget product from the EPS-SG platform

Description: Development of an Earth Radiation Budget (ERB) Day-2 product based on the EPS-SG platform. Feasibility and requirements for an EBAF (Energy Balanced and Filled) product from heritage for EPS-SG. METImage is the baseline, but added-value from 3MI and IASI-NG could be explored. Prototyping and validation will also be performed.

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q4/2028

Comments: Planned, start date changed from Q4/2025

CL-25-002-S - Support to the development of machine learning approaches for the improvement of cloud retrievals

Description: There are two axes for this activity: 1/ Develop methods to homogenise retrievals of cloud microphysics between daytime and night-time observations. The framework developed during this task allows the creation of "nighttime VIS/NIR" images using ML/AI techniques to reconstruct short-wave channels information from thermal channels. The technique showed interesting potential to improve optimal estimation retrieval of cloud microphysics during nighttime. 2/ Study the possibility of enhancing cloud retrievals from passive optical imagers including information from active sensors like lidars and radars to reconstruct the vertical distribution of cloud properties. The work explored the potential of different AI/ML techniques to vertically expand cloud retrievals from imagers showing the potential of the technique but also the technical difficulties linked to the extended training necessary to obtain physically representative profiles.

Implementation: University of Lille, FR

Timeframe: Q3/2025 to Q4/2025

Comments: New, completed

CL-27-001-S - Study exploiting the synergy between IRS and FCI to derive the cloud information

Description: Explore benefits of FCI's higher spatial resolution for sub pixel cloud fractions Explore benefits of adding FCI visible channels information w.r.t daytime cloud detection and retrieval of cloud microphysics e.g. Effective radius.

This document is restricted

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q4/2027

Comments: Planned

3.5 Fiducial Reference Measurements (FRM)

The logic for Fiducial Reference Measurements (FRM) is outlined in detail in the “Roadmap for Fiducial Reference Measurements”, to support the Cal/Val activities of EUMETSAT, presented to the STG-SWG in detail at the Autumn 2021 meeting, [RD-15].

FRM-20-001 - Ground-based Measurements of Infrared Land Surface Emissivity (LSE)

Description: As recommended during the Radiative Transfer and Surface Properties working group during the ITSC-XX conference, there is a need to validate land surface emissivity (LSE) atlases and L2 products in the hyperspectral infrared. The objective of this study is to perform in situ measurements of land surface emissivity in conjunction with ground-based land surface temperature as in the validation sites operated by KIT with the LSA SAF. The study shall also investigate on site the LSE spatial (intra-pixel) and angular variability.

Implementation: Noveltis, FR

Timeframe: Q4/2025 to Q4/2026

Comments: Ongoing, start date changed from Q1/2025

FRM-25-001-S - NADIR Consolidation in Support of the Development of a EUMETSAT Validation Infrastructure

Description: This service shall support the consolidation or development of a tool for a simple and direct access to ground-based and satellite validation data (e.g. EVDC). The tool shall also ensure the content management system (webpage query, matchup, plotting tool).

Implementation: RfQ (NILU, NO)

Timeframe: Q3/2026 to Q3/2031

Comments: Planned, start date changed from Q1/2025, duration extended

FRM-25-003-S - Instrument Commissioning and Cal/Val using German global EarthCARE infrastructure

Description: This budget is to enable access to data through cooperation of already funded Cal/Val activities (network, campaign of opportunity) like e.g. the planned Cal/Val activities related to the EarthCARE mission through cooperation with TBD.

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Implementation: To be determined

Timeframe: Q1/2027 to Q4/2030

Comments: Planned, start date changed from Q3/2025

FRM-25-004-S - Instrument Commissioning and Cal/Val using ground-based ozone sonde campaign and/or network.

Description: This budget is to support ground-based ozonesounding through campaign of opportunity (e.g. airborne campaign) and/or the development/consolidation of Network (e.g. in Africa).

Implementation: RfQ (Vaisala, NASA, TBC)

Timeframe: Q1/2025 to Q4/2027

Comments: Ongoing, scope of work redefined

FRM-25-005-S - Support to Deployment of S-HIS in the NURTURE Campaign

Description: The goal of this proposal is to support the deployment of the Scanning High-resolution Interferometer Sounder (S-HIS) on the NASA 777 for the North American Upstream Feature-Resolving and Tropopause Uncertainty Reconnaissance Experiment (NURTURE) mission, production of the S-HIS Level 1B geolocated radiance and Level 2 Dual Regression De-Aliased (DRDA) retrieval products, and distribution of the final products for mission and EUMETSAT archival.

Implementation: RfQ (University of Wisconsin)

Timeframe: Q2/2026 to Q2/2028

Comments: Ongoing, start date Q2/2026

FRM-25-006-S - Radio Sonde Launch Service in Support of Satellite Commissioning, Validation, and Monitoring

Description: Radio sondes can provide accurate, in-situ temperature and humidity profile information, covering altitudes from the ground to about 30km to 35km. In addition, wind speed and wind direction over this altitude range is obtained. Hence, they are an ideal data set for satellite calibration, validation and monitoring activities. Several EPS-SG instruments identify radio sonde data use in their Cal/Val Plans, e.g. METImage, IASI-NG, MWS, MWI; the ICI Cal/Val Plan even identifies a mandatory radio sonde campaign during commissioning. Radio sondes are launched routinely every day, primarily at synoptic hours, by different meteorological agencies. For satellite calibration and validation activities, these synoptic launches can be a valuable data set. However, this data set is not a homogenous validation source, as it comprises different radio sonde providers with different, and often not specified uncertainty characteristics. These synoptic launches also often have a low vertical resolutions.

This document is restricted

Modern satellite instruments have very high product accuracy requirements, and hence require validation data with well understood, small uncertainties. In addition, uncertainties due to temporal and spatial collocation should be minimised, by launching sondes collocated to satellite overpasses and not at synoptic times. The only radio sonde network that provides a flexible, robust, homogenous data set that includes uncertainty information is the Global Climate Observing System (GCOS) Reference Upper-Air Network (GRUAN), this is an international reference observing network of sites measuring essential climate variables above Earth's surface. GRUAN measurements are providing long-term, high-quality climate data records from the surface, through the troposphere, and into the stratosphere. GRUAN is also specifically identified in the ICI Cal/Val Plan. GRUAN covers > 20 stations around the globe, and a launch service can be run through a single entity (hosted at CNR, the Italian National Research Council, reducing the contract complexity significantly compared to a service consisting of several meteorological agencies, often situated outside the EU). This single entity also assures that measurement principles, equipment, sonde types, data formats, and processing including uncertainty estimates, are consistent throughout the network. In addition, CNR can also work with certain meteorological agencies, and ask for targeted satellite overpasses launches with specific radio sonde types, in case the GRUAN network coverage is insufficient. The GRUAN based processing assures that the data set remains homogenous.

Implementation: RfQ (CNR/GRUAN (IT))

Timeframe: Q4/2025 to Q4/2030

Comments: Ongoing, start date changed from Q1/2025

FRM-25-008-S - Service for Characterising and Standardising Surface Emissivity for Weather and Climate Applications

Description: Infrared spectral emissivity is fundamental in determining radiative emission throughout the Earth system, influencing the surface energy budget and the efficiency with which the Earth cools to space.

Knowledge of infrared surface emissivity (including any angular dependence) is essential for satellite instruments exploiting these wavelengths to retrieve surface temperature and/or vertical profiles of certain atmospheric constituents.

Next generation satellite missions will have enhanced spatial and/or temporal resolution as well as enhanced spectral coverage and require baseline emissivity observations to be made at the representative resolution and range to allow them to be fully exploited.

The objectives of the Emissivity Service are the development of new emissivity libraries specifically designed to provide ground-truthing and the a priori estimates needed for emissivity (and associated surface temperature and profile) retrievals from spaceborne sensors.

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The service will provide as baseline new spectral emissivity databases, with characterized uncertainties, for targeted surface types. Additional activities focus on emissivity monitoring sites, investigations of the angular and temporal dependence of emissivity and its impact on the interpretation of satellite radiances, and analysis of the role of emissivity in retrievals of LST and targeted atmospheric constituents.

Implementation: RfQ (NCEO – UK)

Timeframe: Q4/2026 to Q4/2031

Comments: New, planned

FRM-26-003-S - Spectroscopy in support of IASI/IASI-NG

Description: The Infrared Atmospheric Sounding Interferometer (IASI) and its Next Generation successor (IASI-NG) instruments are of sufficiently high spectral resolution that exploitation of radiance data, whether through assimilation or optimised retrieval schemes, is sensitive to the details of atmospheric radiative transfer models requiring accurate spectral line parameters of the many trace gases which detectably contribute to the measurement. Increasingly, our use of satellite data is placing more stringent accuracy requirements on the underlying spectroscopic line parameters and necessitating more complex characterisation of spectroscopic lineshape and collisional effects, and there are still many improvements needed in the available spectroscopic data in databases such as HITRAN.

This service is anticipated to:

1. Achieve high accuracy and consistency in intensity between absorption bands of the same molecule in different regions of the spectrum.
2. Derive non-Voigt lineshape parameters and their temperature dependences, which are particularly important for atmospheric absorbers with large optical depths.
3. Derive line-mixing parameters and their temperature dependences

Implementation: RfQ (NCEO – UK)

Timeframe: Q1/2027 to Q1/2032

Comments: New, planned

FRM-26-004-S - Conducting LMA campaign in Europe for improving LI L1 filtering

Description: Lightning Mapping Arrays (LMAs) are ground based systems designed to monitor atmospheric electromagnetic activity over regions with typical extension of hundreds of kilometres. LMAs' lightning monitoring capabilities are the best currently available measurements, and hence, the best reference systems to be used for space-based systems like MTG-LI.

The only LMA system available in the field-of-view of MTG-LI is the Ebro LMA (ELMA) of the Polytechnical University of Catalonia (UPC).

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In this study, we propose to perform a systematic comparison between ELMA and MTG-LI Level 1b (and possibly Level 0) with the goal of:

1. characterizing low level MTG-LI lightning detection efficiency and
2. understand/quantify the impact of MTG-LI Level 1b filtering of false events on MTG-LI lightning detection efficiency

Implementation: To be determined (ITT)

Timeframe: Q3/2026 to Q3/2027

Comments: New, planned (partly replaces FRM-23-002-S - Conducting LMA campaigns in Africa in the context of the LI Cal/Val)

FRM-26-005-S - Validating FRP from LEO satellites based on reference airborne datasets

Description: Fire Radiative Power (FRP) is a key parameter for quantifying the radiative strength of actively burning fires that consume vegetation and/or organic soil and release significant amounts of toxic smoke into the atmosphere. It plays an important role in pollutant emissions estimation, atmospheric composition monitoring, and wildfire emergency management. Satellite-based FRP products provide global and Near Real-Time (NRT) observations of fire activity; however, their accuracy depends on sensor characteristics, retrieval assumptions, and observation conditions.

Low Earth Orbit (LEO) satellite missions provide operational NRT FRP products with global coverage and day-night observation capability, forming a key component of European fire monitoring systems. Independent validation is required to ensure the high product performance and to support future development aligned with user needs.

This study will focus on the validation of satellite-derived NRT FRP products using airborne reference observations, with consideration of applicability to relevant LEO satellite missions.

Implementation: RfQ (NRC-Canada, CA)

Timeframe: Q3/2026 to Q2/2031

Comments: New, planned

FRM-27-002-S - Cal/Val instruments

Description: To support the provision of hardware to consolidate networks and fill gaps (e.g. instrument adaptation for shipborne measurements) of in-situ and fiducial reference measurements for the Cal/Val of all missions operated by EUMETSAT.

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q4/2030

Comments: New, planned

FRM-27-003-S - Provision of in-situ and fiducial reference measurements

Description: To support the provision of in-situ and fiducial reference measurements for the Cal/Val of all missions operated by EUMETSAT. This through e.g. support to campaign of opportunity including processing and access to campaign data.

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q4/2030

Comments: New, planned

3.6 Hyperspectral Infrared (HSIR)

The logic for the Hyperspectral Infrared Soundings (HSIR) scientific product development was originally documented in the first issue of the “Scientific Roadmap for the Development of Hyperspectral Infrared Soundings Products” [RD-4] presented to the STG-SWG during the Autumn 2017 and Spring 2018. An updated roadmap was presented to Delegate Bodies in Autumn 2023. The HSIR studies described in this section are part of the logic of the aforementioned documents.

HSIR-25-002-S - Enhancing the IRS spatial resolution using successive shifted dwell acquisitions

Description: MTG-IRS will acquire spectra over 160x160 pixels covering an area of 640x640 km at nadir i.e. a spatial resolution of 4 km. However, the movement of the platform will induce slight shifts between successive acquisitions of the same area with a maximum extent of the order of 50 km North-South and 5 km East-West. It is proposed to investigate the possibility to retrieve high spatial resolution spectral images (and/or retrievals) using the fusion of such a series of acquisitions.

Implementation: Université libre de Bruxelles, BE

Timeframe: Q3/2025 to Q2/2027

Comments: Ongoing, start date changed from Q2/2025

HSIR-25-004-S - IASI-NG and IRS Level 2 commissioning support

Description: The objective is to provide support to EUMETSAT during the IASI-NG and IRS Level 2 commissioning activities. This support is based on the extensive expertise accumulated over the past 20 years in the development of IASI L1D (principal components) and L2 hyperspectral infrared processing, as well as in the validation of related products. This expertise has been directly applied to the definition, development, and validation of IASI-NG and IRS PC and L2 prototype and operational processing. As such, it will be instrumental in ensuring the successful commissioning of both commissioning.

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Implementation: RfQ (Tim Hultberg)

Timeframe: Q3/2025 to Q3/2027

Comments: Ongoing

HSIR-26-003-S - Fusion of high spectral resolution data and high spatial resolution data (ex IASI-NG and IRS, L1 or L2)

Description: Data fusion algorithms have been proven useful to merge geostationary and low-Earth orbits acquisition (Zopetti et al., AMT 14, 2021, Weisz et al. JARS 11(3), 2017). It is proposed to investigate the simultaneous use of MTG-IRS and IASI-NG data to improve the level-2 retrievals (e.g. temperature and water vapour profiles). Additionally, the application of such techniques to fill the spatial gaps of the IASI-NG level-1 products or the spectral gaps of L1 IRS products should be explored.

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q4/2028

Comments: Planned

HSIR-27-002-S - Framework on hyperspectral IR NWP studies

Description: This would cover the following areas:

- The possibility to assimilate full-sky IR measurements
- The impact of missing the LWIR band on the forecasts
- The impact of losing current measurements in the future like for example, the 13:30 orbit, on the forecast

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q4/2031

Comments: New, planned

3.7 Image Navigation, Registration and Calibration (INRC)

The logic for the Image Navigation, Registration and Calibration (INRC) scientific product development activities was outlined in detail in the “Roadmap for the Development of Image Navigation, Registration and Calibration Tools: White Paper”, [RD-3], presented to the STG-SWG during the Autumn 2017 and Spring 2018, and was updated and presented to the Delegate Bodies during Autumn 2024. The focus of INRC activities is on the quality monitoring and analysis of Level 1 products of EUMETSAT’s optical missions, as well as enhancement of the Level 1 products. Two major multi-mission tool developments are described in the roadmap, i.e. the Mission Integrated Calibration Monitoring & Inter-Calibration System (MICMICS) and the Performance, Image Quality, Monitoring and Characterisation System (PIQMICS). The development milestones of MICMICS and PIQMICS as well as the associated

This document is restricted

INRC studies described in this section will be part of the logic of the aforementioned documents.

PIQMICS Developments

The studies described in the following sub-sections are performed for the development of the PIQMICS tool during 2022-2027.

INRC-24-003-S - Prototype AI application for geometric quality assessment

Description: Study to analyse and prototype AI application for geometric quality assessment and observable creation for INR. In order to assess the geometric quality of satellite sensor data, the processes established at EUMETSAT rely on measurements of positions of stars, earth horizons and features on ground (landmarks, ground control points). These observables are then subject to analysis not only for quality assessment but also for updating the processing parameters. The measurements based on landmarks and ground control are currently based either on feature tracking or correlation with isolated, predefined items on images or maps. The results are very noisy and need extensive quality checking, including the analysis of cloud cover. These methods reach their limit when images contain non or a very low number of pre-defined ground control points. On the other hand, modern machine learning and Artificial Intelligence have made enormous progress in particular in the field of image recognition. In this study, these innovative technologies shall be used to exploit the full area of an image (wherever enough information is contained) and to determine the any potential shift in each location with high precision. The result should be presented in a form to allow its use for quality assessment as well as image processing parameters update.

Implementation: To be determined (ITT)

Timeframe: Q4/2026 to Q4/2027

Comments: Planned, start date changed from Q4/2025

MICMICS Developments

The Mission Integrated Calibration Monitoring Inter-Calibration System (MICMICS) integrates and consolidates the set of tools to perform and monitor the vicarious calibration and inter-calibration.

Over the last years the first versions of MICMICS have been developed, integrated and deployed in the TCE (technical computing environment) under full INRC control. MICMICS is already routinely used for the operational missions and is an essential calibration tool for MTG-I1 FCI.

These versions cover MSG, EPS, S3 and MTG-I and feature the following modules:

1. Lunar calibration (VIS-NIR)
2. Desert vicarious calibration (VIS-NIR)
3. Deep Convective Clouds inter-calibration and vicarious calibration (VIS)

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4. Inter-calibration with hyperspectral instrument (IASI and CrIS) (IR)
5. Inter-calibration with SEVIRI (IR)

The main foreseen evolutions are as follows:

- EPS-SG Sat A: the METImage, 3MI and UVNS modules will be completed and integrated by 2025.
- MTG-S: the UVN modules will be prototyped, implemented and integrated in 2025.
- CO2M: the CO2-I, MAP and CLIM modules will be defined in 2024, and prototyped, implemented and integrated in 2025 and 2026.
- Development of lunar VIS-NIR and IR radiance models in 2026 and 2027.
- Deployment of MICMICS modules for SEVIRI, OLCI, SLSTR, AVHRR, FCI and LI into MME-MON_A in 2025.
- Deployment of MICMICS modules for UVN, METImage, 3MI and UVNS into MME-MON_A in 2027.

INRC-19-004 - Development of a Polarisation Model of the Moon Light

Description: The light reflected by the Moon is polarised. The level of polarisation depends on the level of illumination of the Moon. Currently the moon calibration models ROLO and GIRO cannot resolve polarisation of the Moon signal. This is initially needed for MTG/FCI, whose instrument polarisation sensitivity needs to be accounted for when monitoring the radiometric accuracy of the instruments and estimating the uncertainties on the radiometric calibration. The study would focus on developing a polarisation model of the Moon light in order to complement the current version of the ROLO/GIRO and consequently to achieve a higher accuracy with lunar calibration. It is foreseen that SCIAMACHY and GOME-2 Moon data sets would constitute a validation benchmark as the model would be developed from the currently available literature on the subject. Ultimately this study will also benefit other missions, such as EPS-SG/METImage and 3MI.

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q1/2028

Comments: Planned, start date changed from Q4/2026

INRC-24-002-S - Development of a new lunar reflectance model using AI techniques

Description: This study will develop a lunar reflectance model using artificial intelligence techniques. This innovative model would complement and enhance the current set of lunar reflectance models currently available within the EUMETSAT Mission Integrated Calibration Monitoring Inter-Calibration System (MICMICS).

The purpose of the study is to derive an accurate lunar disk reflectance model using an artificial intelligence-based approach. A series of datasets is proposed to develop the method. Those datasets are only indicative and envisaged as a starting point for this project. Once the methodology is established, more datasets can be incorporated

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as they become available, so that the overall accuracy can be improved and range of applicability of the model can be expanded.

Implementation: To be determined (ITT)

Timeframe: Q4/2026 to Q4/2029

Comments: Planned, start date changed from Q1/2026

3.8 Marine (MA)

The logic for the Marine (MA) scientific product development is outlined in detail in the “Scientific Roadmap for the Development of Marine Products” presented to the STG-SWG during the Autumn 2020, [RD-14], and which is currently undergoing revision. The purpose of this roadmap is to advance the marine applications product portfolio from EUMETSAT missions. MA studies described in this section are part of the logic in the aforementioned document.

MA-19-003 - SCA Faraday Rotation Accuracy

Description: At the moment, the quality and reliability of the Faraday rotation contamination ratio in the SCA Level 1 products is unknown. This study will investigate the quality of the Total Electron Content and magnetic field data which are the basis for estimating the Faraday contamination ratio and propose Day-2 improvements to the algorithm in SCA Level 1 processing.

Implementation: To be determined (ITT)

Timeframe: Q2/2027 to Q2/2028

Comments: Planned

MA-22-020-S - Ocean surface currents from Doppler information from SCA

Description: The study will investigate the capabilities of the EPS-SG scatterometer for ocean motion retrieval using Doppler techniques. It aims to prototype the Doppler processing specifically for the SCA instrument and will evaluate the retrieval accuracy of this approach. The study will follow-on a more theoretical investigation led by ESA, answering to long-standing requests from the user community.

Implementation: To be determined (ITT)

Timeframe: Q3/2027 to Q3/2028

Comments: Planned, start date changed from Q2/2026, feasibility of this study has to be rediscussed following the results of the ESA study.

*This document is restricted***MA-23-001-S - New content DINEOF analysis for marine ST validation activities**

Description: This study aims to implement the Data INterpolating Empirical Orthogonal Function (DINEOF) technique, developed at the University of Liege, for the creation of gap-free IST data for validation activities in polar regions and for EUMETSAT and OSI SAF high-latitude SST and IST algorithm intercomparisons. The study will investigate spatial and temporal patterns in IST fields over polar regions and will help in detecting outliers. The aim is to support validation activities and further improve product quality for EUMETSAT IST/SST high-latitude products.

Implementation: RfQ (University of Liège, BE)

Timeframe: Q1/2027 to Q1/2028

Comments: Planned, start date changed from Q1/2025

MA-24-006-S - Reassessing the use of altimeter sea surface height information in coupled data assimilation systems

Description: Altimeters currently provide important information for operational applications, including 10 m wind speed over the ocean, significant wave height (SWH) and sea level anomaly (SLA). ECMWF uses the altimeter wind speed for numerical weather prediction (NWP) forecast verification, the SWH information is assimilated in the wave DA system and the SLA is assimilated in the ocean DA system. This work will focus on potential improvements in the assimilation of information measured by the altimeters.

Implementation: RfQ (ECMWF, UK)

Timeframe: Q4/2025 to Q4/2029

Comments: Ongoing, start date changed from Q3/2025, duration increased

MA-24-011-S - Modelling Subsurface Scattering Effects in METOP-SG SCA Soil Moisture Retrievals (SCA-SMR)

Description: The major scientific challenges of the work will be to (i) develop robust methods for detecting subsurface scattering, and (ii) find suitable parameterizations of the extended TU Wien change detection model.

Implementation: RfQ (University of Wien, AT)

Timeframe: Q4/2025 to Q4/2028

Comments: Ongoing, start date changed from Q1/2025

MA-25-004-S - Sea Level Rise Uncertainty Stability Budget of Non-Reference Altimetry Missions

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Description: For the last 30 years, the reference altimetry missions have been operated on the same orbit (Topex-Poseidon, Jasons 1-2-3, Sentinel 6 MF) and we will continue with Sentinel-6B and C. The objective of this study is to investigate alternative orbit solutions for S6NG and assess the impact for climate applications.

Implementation: RfQ (Magellium, FR)

Timeframe: Q4/2025 to Q1/2027

Comments: New, ongoing

MA-26-009-S - Ocean surface currents from FCI

Description: Traditional approaches to get knowledge of ocean surface currents are limited to in-situ measurements. Altimetry is very useful but provides only the geostrophic component of the currents. Luc Lenain from Scripps has developed a novel approach to retrieve surface ocean currents from space, based on existing high spatio-temporal resolution broad banded geostationary satellite data of the sea surface temperature together with machine learning techniques trained on state of the art ocean models. The objective of this study will be to demonstrate the feasibility of this approach with the FCI products and to assess its performances.

Implementation: Scripps Institution of Oceanography, USA (RfQ)

Timeframe: Q4/2026 to Q4/2027

Comments: New, planned

3.9 Marine and Meteorology Pathfinders (MMP)

The logic for the Marine and Meteorology Pathfinders (MMP) scientific product development is described in the “Scientific Roadmap for the Development of Meteorology and Marine Pathfinders Products” which was presented to the STG-SWG during the Spring 2022 meeting, [RD-16]. The purpose of this family of products is to take advantage of capabilities of EUMETSAT, non-EUMETSAT and Third-party missions to meet future EUMETSAT and Member State needs for meteorology and marine products and applications. MMP studies described in this section are part of the logic in the aforementioned document.

MMP-20-001 - All-sky Regional EPS Sounding Products for the Monitoring of Polar Lows

Description: The study is to explore the potential of the EPS/IASI L2 combined MW+IR products to support the characterisation and monitoring of Polar Lows. Because of the short-scale and short-life formations, Polar Lows are difficult to forecast and represent in numerical weather prediction models [RD-9]. This study shall investigate how the forecast-free products can be used for the automatic recognition of the early phases and the monitoring of the Lows with the T/q vertical profiles and the spatial information provided within 30' from sensing by the EARS-IASI L2 service.

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Implementation: CNR-IMAA, IT

Timeframe: Q3/2025 to Q2/2026

Comments: Ongoing, start date changed from Q1/2025

MMP-22-006-S - Synergy between winds: scatterometry/altimetry/SAR

Description: This study will assess surface winds derived from different spaceborne instruments. For a number of applications it is important to understand the impact of wind variability on different spatial scales. For this reason, the work will investigate the synergy / complementarity of surface wind measurements acquired with different microwave sensors, additionally taking into account the accuracy of the different wind retrieval methods.

Implementation: To be determined (ITT)

Timeframe: Q3/2027 to Q3/2028

Comments: Planned

MMP-25-001-S - MTG FCI Flood Monitoring product

Description: One of the major impacts that climate change is causing to the Earth's environment and population is the increasing frequency of extreme weather events. The development and usage of tools for natural disaster monitoring can play a crucial role in increasing the resilience to such calamities. A reliable flood detection and monitoring product from satellite data can deliver actionable insights to emergency services to mitigate the impact of flood events. The main purpose of this study is to develop a flood detection algorithm and a flood mapping system for the geostationary optical Meteosat Third Generation - Flexible Combined Imager (MTG-FCI, thereafter simplified to FCI) instrument.

Implementation: RfQ (City College of New York, US)

Timeframe: Q3/2025 to Q3/2027

Comments: Ongoing, start date changed from Q2/2025, duration increased

MMP-25-002-S - Synergy among MTG instruments (FCI, LI, IRS)

Description: As described in our Cloud roadmap, a synergistic use of the sensors from MTG can be initiated, the 3 instruments having different abilities to observe the clouds. This is especially interesting for the monitoring of severe weather.

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q1/2029

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Comments: Planned, start date changed from Q1/2026

MMP-25-003-S - Quantification and understanding the impact of the choice of the EPS-Aeolus bias correction model

Description: The aim would be to reproduce the NOAA experiment (ref Hui Liu et al. (<https://doi.org/10.1002/qj.4600>)) and to derive a second set of correction for Aeolus data from a model that would be different enough from the ECMWF and run assimilation experiments with both data sets. They would work on the latest reprocessed data, possibly with some support from the DISC to ensure consistent treatment and run an experiment long enough to be significant (ideally 6 months or more).

Implementation: To be determined (ITT)

Timeframe: Q2/2027 to Q1/2030

Comments: Planned, scope under review, start date changed from Q3/2026

MMP-25-006-S - Study for continuity of a diurnally resolved ERB record from MTG

Description: The scope of this study is to assess the potential for a higher-quality OLR product from FCI and a new RSW product, develop a prototype and perform a validation

Implementation: RfQ (NCEO (Imperial College), UK)

Timeframe: Q3/2026 to Q3/2028

Comments: New, planned

MMP-25-007-S - Characterising Stratospheric Temperature Retrieval Performance from Thermal Infra-red Hyperspectral Sounders

Description: This study aims to validate the performance of IASI temperature soundings in the stratosphere in terms of data quality and stability for trend analysis

Implementation: RfQ (NCEO (University of Leicester), UK)

Timeframe: Q4/2026 to Q4/2027

Comments: New, planned

MMP-26-001-S - EPS Aeolus miscellaneous studies

Description: EPS Aeolus miscellaneous studies in preparation of the programme - replacement for MMP-23-006-S which was deleted in July 2024.

Implementation: ITT

Timeframe: Q1/2027 to Q4/2029

Comments: New, planned

MMP-26-004-S - Service for Cold Region Hydrology

Description: This service for cold region hydrology will contribute to:

- EUMETSAT's ongoing evaluation of cold-region hydrology user needs and the corresponding development and advancement of cryo-hydro products, Cal/Val, modelling and applications and decision-making tools;
- the implementation of the NRC/EUMETSAT scientific cooperation agreement;
- the development of demonstrational products for evaluation against user needs, with the aim of operational implementation if user requirements are met.

Implementation: RfQ (Hydro-EO, PT)

Timeframe: Q4/2026 to Q3/2031

Comments: New, planned

MMP-26-005-S - Exploration of Machine Learning regional NWP techniques to further exploit remote sensing data

Description: The main objectives of this study are: 1. What is the added value of using satellite observations in combination to analysis data in a Machine Learning (ML) regional forecast system; 2. How does the usage of satellite observation in this ML context compare with the usage by traditional Data Assimilation; (e.g. can these methods overcome some difficulties faced with variational algorithms like the modelling of observation error covariances, can these methods be seen as new opportunity to perturb forecasts and generate ensembles?) 3. Can a Multi-Encoder/Multi-Decoder framework be trained before the actual availability of new observations, e.g. with simulated observations, to reduce/optimize the preparation time for using new datasets shortly after launch and avoid the need to accumulate long data records, usually needed for the training of AI/ML techniques.

Implementation: Météo France, FR as part of existing framework

Timeframe: Q2/2026 to Q2/2028

Comments: New, ongoing

MMP-26-007-S - LI – GLM data fusion for extended space-based lightning monitoring

Description: With the beginning of the LI operational dissemination in November 2024, users of lightning data all over the world have access to lightning flash products from three operational geostationary lightning location systems, namely, LI on MTG-

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I1, GLM on GOES-East and GLM on GOES-West, respectively. The geographical coverage of the three systems combined extends from New Zealand (west-most edge), through the Pacific Ocean, Americas, Atlantic Ocean, Europe, Africa to part of the Arabic Peninsula and Indian Ocean (east-most edge). At EUMETSAT, we have extensive knowledge of the relative performances between LI and GLM on GOES-East: the two systems have comparable lightning detection performances and their respective flash measurements are in very good agreement in the overlap region over the Atlantic Ocean. Relative performances between GLMs on GOES-East and -West have been extensively characterized at NOAA.

Based on the current knowledge of the three Systems, it comes very natural to put forward the definition of a single/fused flash dataset with seamless transition across the field-of-view of the three instruments. This could be employed for continental/oceanic lightning monitoring, data assimilation, climate applications, etc. It has to be stressed that this would also be the very first dataset over global scales for which very fine details of the Detection Efficiency would be publicly available. In fact, this is a considerable limiting factor when it comes to use commercial lightning data for which detection performances are not available for users. In addition, GLM and LI combined deliver unprecedented and almost uniform Detection Efficiency across their merged field-of-view.

Implementation: Internal

Timeframe: Q1/2026 to Q4/2026

Comments: New, ongoing

MMP-26-009-S - Advancing the Characterisation of Deep Convection in Tropical Cyclones from Meteorological Satellite Observations

Description: The objective of this study is to gain a better understanding of the processes governing the development and evolution of deep convective structures associated with tropical cyclones. A particular focus of the study will be on assessing the value of EUMETSAT observations for monitoring and forecasting tropical cyclones. Special attention will be given to the capabilities offered by the new Meteosat Third Generation (MTG) mission, notably the Flexible Combined Imager (FCI).

Implementation: RfQ (Météo France, FR)

Timeframe: Q4/2026 to Q4/2028

Comments: New, planned

3.10 Passive Microwave (MW)

The logic for the Passive Microwave (MW) scientific product development is outlined in detail in the “Scientific Roadmap for the Development of Microwave Products” was presented to the STG-SWG during the Autumn 2019 meeting and in Spring 2020, [RD-

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12]. The MW studies described in this section are part of the logic of the aforementioned document.

MW-22-004-S - Development of vicarious calibration tools for MWI and ICI using radiosoundings

Description: Information gathered by the global radiosounding observation (RAOB) network will be needed to support MWI and ICI Cal/Val activities. Moreover, the GCOS Reference Upper Air Network (GRUAN, [<https://www.gruan.org/>]) provides stable long-term high quality upper air reference observations through a combination of in-situ balloon and ground-based sensors over several sites across globe. Indirect comparison with radiosoundings allows for validation of L1 measurements through forward modelling with GRUAN and operational data of humidity and temperature profiles. Triple collocation with colocated NWP RTM simulations will provide further insights in the evaluation of calibration biases for MWI and ICI and characterization of errors.

Implementation: CNR, IT

Timeframe: Q4/2022 to Q2/2026

Comments: Completed, end date changed from Q1/2026

MW-24-001-S - Application of intercalibration procedures to a constellation of MW radiometers

Description: This study is in line with the Scientific Roadmap for the Development of Passive Microwave Products, aiming to explore all the aspects related to the intercalibration of a constellation of microwave sounders (and eventually also microwave imagers), in order to support climate monitoring and numerical weather prediction.

Implementation: DEIMOS and University of Barcelona, ES

Timeframe: Q4/2024 to Q2/2026

Comments: Completed, end date changed from Q4/2026

MW-25-002-S - Algorithm development for snowfall retrieval for the Arctic Weather Satellite

Description: This study proposes the development of an algorithm for a level 2 product for the estimation of liquid and ice water path and surface snowfall rate from Arctic Weather Satellite.

Implementation: ISAC-CNR, IT

Timeframe: Q1/2026 to Q4/2027

This document is restricted

Comments: Ongoing, start date changed from Q2/2025

MW-25-003-S - MWS calibration monitoring using NWP fields

Description: EPS-SG Microwave Sounder (MWS) Bias validation using NWP fields will be supported through comparison with radiative transfer model (RTM) simulations to identify relevant biases. This requires availability of NWP fields as close as possible in time to the actual observations and careful analysis. This method allows for a rapid build-up of representative statistics, supporting the Cal/Val activities.

Implementation: ECMWF, UK

Timeframe: Q3/2025 to Q3/2026

Comments: Ongoing

MW-25-004-S - Development of an MWI-ICI combined L2 retrieval based on a Machine Learning approach

Description: The unprecedented opportunity to exploit the entire range of microwave, millimetre, and sub-millimetre frequencies from 18 to 664 GHz on a single LEO platform enables a thorough and detailed retrieval of both liquid and solid hydrometeor properties. The advanced sampling features of the MWI and ICI instruments, which include significant oversampling across adjacent pixels and spatial displacement between channels within the same instrument, support the application of a machine learning (ML) approach. This study focuses on the development of an ML-based algorithm that is suitable for operational use—flexible, fast, and computationally efficient for the retrieval of integrated water vapour, liquid water path, integrated ice water path and exploring the possibility to retrieve profiles of LWC and IWC.

Implementation: Chalmers University of Technology, SE

Timeframe: Q1/2026 to Q1/2028

Comments: Ongoing, start date changed from Q2/2025

MW-26-003-S - Optimization of the MWI-ICI L2 Algorithm Prototype in Support of Cal/Val

Description: This study focuses on optimizing the Level-2 algorithm prototype for the EPS-SG Microwave Imager (MWI) and Ice Cloud Imager (ICI) instruments, with an emphasis on improving computational efficiency, to ensure its suitability for calibration and validation (Cal/Val) activities.

Implementation: To be determined (ITT)

Timeframe: Q4/2026 to Q4/2027

Comments: New, planned

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MW-26-004-S - NWP monitoring support MWI and ICI Cal/Val activities

Description: This activity aims to provide scientific and technical support for the Cal/Val of the EPS-SG Microwave Imager (MWI) and the Ice Cloud Imager (ICI) benefitting from the preparatory work already performed in a previous study. This support will be of fundamental importance to perform a thorough assessment of the calibration quality of these new and innovative instruments. The methodologies applied will ensure a representative analysis both in terms of statistical robustness and in terms of spatial and temporal representativeness.

Implementation: ECMWF, UK as part of framework

Timeframe: Q3/2026 to Q2/2027

Comments: New, planned

MW-26-005-S - NWP impact of sounding constellations complementary to EPS-Sterna

Description: The main objective of this activity is to assess the Numerical Weather Prediction impact of assimilating data from various possible constellations of microwave sounders in equatorial orbit. Such an equatorial constellation would represent a complementary system to EPS Sterna. The assumed sensor will be considering both temperature and water vapour sounding channels.

The assessment will be performed with a state-of-the-art global NWP system, applying an Ensemble of Data Assimilation (EDA) approach.

Implementation: Météo France, FR as part of framework

Timeframe: Q3/2026 to Q2/2028

Comments: New, planned

MW-27-002-F - Global NWP scientific support service

Description: This set of activities will aim at providing quantitative assessments of the impacts on Global Numerical Weather Prediction (NWP) at ECMWF of current spaceborne observing systems and future remote sensing technologies that could be onboard future generations of European meteorological satellites. The future technologies that could be addressed in this project could encompass both passive measurements (e.g. microwave sub millimetric sounders, microwave hyperspectral sounders, infrared hyperspectral sounders), active measurements (e.g. Space radars, Doppler wind lidars) as well as several observation strategies (constellation of LEO satellites or GEO satellites) and advanced Radio Occultation - RO - e.g. Polarized RO (RO). Another potential element in the frame of the activities will be the study of ways for improving the exploitation of remotely sensed data thorough advanced assimilation techniques or the use of machine learning-based weather forecasting systems. These

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activities require a tailored planning, and a five-year scientific framework is well adapted to address the topics listed above.

Implementation: RfQ (ECMWF, UK)

Timeframe: Q2/2027 to Q2/2032

Comments: New, planned

3.11 Radio Occultation (RO)

The logic for the Radio Occultation (RO) scientific product development was outlined in detail in the “Scientific Roadmap for the Development of Radio Occultation Products” presented to the STG-SWG in Autumn 2017 and Spring 2018, [RD-5]. Updates have been identified and were outlined to the STG-SWG in Spring 2022, and a new release of the roadmap was approved in Autumn 2022. The RO studies described in this section are part of the logic described in the aforementioned documents.

RO-19-002 - Science Support Services for Bernese POD Development

Description: Scientific Service contract in support of the transition to the Bernese POD software in EUMETSAT’s operational environments.

Implementation: University of Bern, CH

Timeframe: Q1/2021 to Q1/2026

Comments: Completed (passed to OPS), end date changed from Q1/2025

RO-25-002-S - Radio Occultation Planetary Boundary Layer height validation Study

Description: This study aims to validate Planetary Boundary Layer height products derived from radio occultation (RO) measurements using in situ and remote sensed equivalent products, over ocean and over land.

Implementation: To be determined (ITT)

Timeframe: Q4/2026 to Q2/2028

Comments: Planned, start date changed from Q3/2025

RO-25-004-S - Evolution of the commercial RO processing facilities to support the end-to-end processing from level 0 data

Description: This internal study for the evolution of the commercial RO processing facilities to support the end-to-end processing from level 0 data will improve both the data quality of level 1 products sent to operational NWP centres as well as the monitoring of the data delivered by commercial data providers. This can take place as

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soon as Beidou precise orbits and clocks become available from RSN in the context of EPS-SG.

Implementation: Internal development

Timeframe: Q2/2025 to Q2/2026

Comments: Ongoing

RO-26-001-S - Synergistic multi-sensor Planetary Boundary Layer Detection Study

Description: This study aims to characterize the planetary boundary layer, exploiting the multi-sensor capabilities (AMSU/MHS, IASI, AVHRR, GRAS) provided by the EPS Metop platforms and using available radio occultation measurements from existing RO constellations, e.g. from commercial/third-party RO during intense observation periods.

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q1/2029

Comments: Planned, start date changed from Q3/2026

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4 OPERATIONAL PRODUCT ROLL-OUTS FOR MANDATORY MISSIONS

The processors are maintained under version control and are referred to in the different Programmes as:

Programme	Acronym	Meaning
EPS	PPF	Product Processing Facility (Level 1 and Level 2)
MSG	IMPF MPEF	Image Processing Facility (Level 1) Meteorological Products Extraction Facility (Level 2)
MTG	IDPF-I L2PF	Instrument Data Processing Facility (for MTG-I1) Level-2 Processing Facility

The Core Ground Segments at EUMETSAT receive the raw data streams from the ground stations (such as Svalbard, MacMurdo, Fairbanks) and have three instances, whose purposes and terminology are recalled hereafter:

Ground segment purpose	EPS	MSG/ MTG
Operation: operational facility including full redundancies. They generate the operational products for NRT dissemination and archiving.	GS1	OPE
Validation: facility hosting any new processor version for validation before operational release. Their hardware configurations are quasi-identical to those in operations and new processor versions are normally run with same input products version in order to guarantee testing in a representative environment. In specific cases, products under qualification can be disseminated to validation users in parallel to the operational stream. The validation environment also constitutes contingency for continuity in case of operational facility outage.	GS2	VAL
Verification: this is the integration and test environment dedicated to the verification and basic functional testing of any new processing facility and their dependencies.	GS3	VER

Any new products processor version is deployed first on the **verification** facility. After a short functional test period, it is deployed on the **validation** facility, where the exhaustive qualification will cover compliance to requirements: completeness, timeliness and quality of the new product versions. The duration of validation campaigns is related to the amount and scope of the validation data, and the possible implication of external validation partners. It may vary between a few days for the correction of simple anomalies, to several months when a new parameter or significant product format changes are introduced. Product changes may be reviewed in a dedicated Product Validation Review. Upon its satisfactory completion, the new processor version is then installed and activated in **operations**, with prior notification to the users.

4.1 EPS

The following sections address the Product Processing Facilities (PPF) in the EPS Core Ground Segment.

4.1.1 ASCAT Level 1 Product Processing Facility

Changes and updates deployed in 2026:

- Version 11.7 – Corrective maintenance, M01/XCL file update

The next ASCAT L1 processing updates are as follows:

- None foreseen

4.1.2 ATOVS Level 1 Product Processing Facility

Changes and updates deployed in 2026:

- Version 5.10.7-3 – Corrective maintenance
- Deployment of the new AVHRR solar calibration based on MICMICS, replacing the current NOAA input files. This evolution follows the proposal presented to, and formally accepted by, the 59th STG Science Working Group, which endorsed the transition from NOAA vicarious calibration to a MICMICS-based calibration approach for the AVHRR instrument (ref. EUM/STG-SWG-59/25/VWG/11).

The next ATOVS L1 processing updates are as follows:

- Q3/2026 (planned maintenance): OS security upgrade
- Q1/2027 (planned maintenance): GRIB2 changes related with ECMWF IPS cycle 50r2

ID	Version	Planned operational release
PPF-ATOVS1	OS security upgrade	Q2/2026
PPF-ATOVS1	GRIB2 updates	Q1/2027

4.1.3 AVHRR Wind Product Processing Facility

Changes and updates deployed in 2026:

- Version 3.4.1-2 (corrective maintenance): this release updates the selection policy for forecast file (EPS/AR/20780)
- PGF_RULES 2.7.5 and PFG_RULES 2.7.11 update for alignment with the actual time separation between Metop-B and Metop-C.
- Version 3.4.1-3 - Fix occasional incomplete Metop-B and Metop-C products

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The next AVHRR AMV processing updates are as follows:

- Q3/2026 (planned maintenance): OS security upgrade

ID	Version	Planned operational release
AVHRR AMV PPF	OS security upgrade	Q3/2026

4.1.4 GOME-2 Level 1 Product Processing Facility

Changes and updates deployed in 2026:

- M01 CAL/INS updates for solar model deactivation in Metop-B

The next GOME-2 L1 processing updates are as follows:

- Version 7.2 - This release will implement an alternate spectral calibration algorithm based on Fraunhofer line spectral fitting. The alternate spectral calibration algorithm is intended to replace the nominal one in case of failure of the on-board spectral light source (SLS). It has required significant optimization in the calculations to meet the NRT requirements to which PPF L1B must comply.
- Q3/2026 (planned maintenance): M01 CAL/INS updates for solar model activation in Metop-B
- Q3/2026 (planned maintenance): OS security upgrade

ID	Version	Planned operational release
GOME-2 L1 PPF	PPF 7.2	Q3/2026
GOME-2 L1 PPF	M01 CAL/INS updates for solar model activation	Q3/2026
GOME-2 L1	OS security upgrade	Q3/2026

4.1.5 GRAS Level 1 Product Processing Facility

Changes and updates deployed in 2026:

- Version 6.1.1 - Updates to the L1B format to align the operational processing with the reprocessed GRAS data.

The next GRAS L1 processing updates are as follows:

- Q3/2026 (planned maintenance): OS security upgrade

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- Q4/2026: PPF v6.2 (evolution) will include error estimates on GRAS L1b products
- TBC: the following development cycle (towards v7) will focus on enhanced uncertainty characterisation, improved monitoring capabilities, and a replacement of the operational POD component of the PPF.

ID	Version	Planned operational release
GRAS L1 PPF	OS security upgrade	Q3/2026
GRAS L1 PPF	PPF 6.2	Q4/2026
GRAS L1 PPF	PPF 7.0	TBC

4.1.6 IASI

4.1.6.1 IASI Level 1 Product Processing Facility

Changes and updates deployed in 2026:

- Version GRD.M01.33 & BRD.M01.63 - On-ground processing update for Metop-B - update of dead pixel table
- Version BRD.M03.29 - TOP on-board update for Metop-C - update of CS coding table for the moon acquisition

The next IASI L1 processing updates are as follows:

- Q3/2026 (planned maintenance): OS security upgrade

ID	Version	Planned operational release
IASI L1 PPF	OS security upgrade	Q3/2026

4.1.6.2 IASI Level 2 Product Processing Facility

Changes and updates deployed in 2026:

- Version 6.7.5 (corrective maintenance): this release fixes AVHR AMV gaps of Metop-B data due to wrong IASI L2 product format (EPS/AR/20910).
- Version 6.7.6 (corrective maintenance): this release removes the impact of AMSU channel degradation on MW-IR synergistic all-sky processing (EPS/AR/20889).

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The next IASI L2 CAF processing updates are as follows:

- Q3/2026: deployment of the new subversion of the IASI L2 PPF v6, the v6.8, which will implement a major update to the PWLR3 algorithm and fix EPS/AR/19569
- Q3/2026: OS security upgrade
- Q4/2026: following the activation of an independent AC SAF PPF, which natively will integrate the AC SAF processors, we will deactivate the processing of these products in the IASI L2 PPF through an update that will be named v6.8.1.

ID	Version	Planned operational release
IASI L2 CAF	PPF 6.8	Q3/2026
IASI L2 CAF	OS security upgrade	Q3/2026
IASI L2 CAF	PPF 6.8.1	Q4/2026

4.1.6.3 IASI 3D-Wind Product Processing Facility

Changes and updates deployed in 2026:

- None.

The next IASI 3DW processing updates are as follows:

- Q3/2026 (planned maintenance): OS security upgrade
- Version 2.0 - The aim is to define a confidence parameter for quality assessment. The PPF should also be able to handle extensive areas of missing data in the input dataset. This will be particularly important when applying the algorithm to the future MTG/IRS data if only clear sky areas are considered at the Level 2 processing stage. In addition to MTG/IRS, it is planned to apply the same algorithmic model (processor core) to the EPS-SG/IASI-NG mission.

ID	Version	Planned operational release
IASI 3DW	OS security upgrade	Q3/2026
IASI 3DW	PPF 2.0	TBC

4.1.7 Polar Multi-sensor Aerosol Product Processing Facility

Changes and updates deployed in 2026:

- None

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The next PMAp processing updates are as follows:

- Q3/2026 (planned maintenance): OS security upgrade
- Q4/2026: PPF v2.3 (evolution) will account for the feedback from CAMS and other users

ID	Version	Planned operational release
PMAp PPF	OS security upgrade	Q3/2026
PMAp PPF	2.3	Q4/2026

4.2 EPS-SG

4.2.1 RO/GRAS-2 Level 1B Product Generation Facility

Current operational version v2.1

Changes and updates deployed in 2026:

- None

The next GRAS-2 PGF processing updates are as follows:

- Version v2.2 – Regional Processing
- Version v2.3 – Metop-SGB1 readiness
- Version v2.4 – Metop-SGB1 L1B operational

ID	Version	Planned operational release
GRAS-2 PGF	v2.2	Q3/2026
GRAS-2 PGF	v2.3	Q4/2026
GRAS-2 PGF	v2.4	Q2/2027

4.2.2 Product Release Schedule for remaining EPS-SG Processors

This information is updated and communicated to EUMETSAT delegates on a monthly basis. The dates below are valid as of **8 July 2026**.

Commissioning Phase:

Product Development and Implementation Plan - PDIP 2027

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Global Mission Product (with TGPS)	Cal/Val Phase	Product Validation Review Board (PVRB) Dates
RO L1	October-November 2025	Demonstrational: 31 October 2025 Pre-operational: 27 November 2025 Operational: 20 April 2026
MWS L1	November 2025 – February 2026	Demonstrational: December 2025 Pre-operational: 24 February 2026
METImage L1B	February 2026 – June 2026	Demonstrational: 27 March 2026 Pre-operational: July 2026
3MI L1B	February 2026 – June 2026	Demonstrational: 17 June 2026 Pre-operational: August 2026
IASI-NG L1C	November 2025 – July 2026	Demonstrational: 4 May 2026 Pre-operational: July 2026
3MI L1C	May – September 2026	Demonstrational: 17 June 2026 Pre-operational: October 2026
METImage L2 CM	May – July 2026	Demonstrational: July 2026 Pre-operational: August 2026
S5 L1	August 2026 – February 2027	Demonstrational: September 2026 Pre-operational: March 2027
S5 L2 Day-1 selected products *	June – June 2027	Demonstrational: September 2026 Pre-operational: November 2027

* Remaining products to be completed progressively

Post-Commissioning Phase:

Global & Regional Missions Products (with PDAP)	Delta Cal/Val Phase	Product Validation Review Board (PVRB Global) dates
METImage L1b	Q1 2027	Operational: Q2 2027
METImage L2CM/L2	Q1 2027	Operational: Q2 2027
IASI-NG L1C	Q1 2027	Operational: Q2 2027
IASI-NG L1D/L2	Q1 2027	Operational: Q2 2027
MWS L1	June 2026	Operational: July 2026 (global) August 2026 (regional)
MWS L2	August 2026	Operational: September 2026
3MI L1B/L1C	Q1-Q2 2027	Operational: Q2 2027
RO L1B	Q2 2026	Operational: Q3 2026 (global) Q4 2026 (regional)
S5 L1 (Global only)	Q2 2027	Operational: Q3 2027
S5 L2 Day-1 products (Global only)	Q3-Q4 2027	Operational: Q2 2028

This document is restricted

4.3 MSG

The following sections address the Processors in the MSG ground-segment.

4.3.1 Level 1 Product Processing Facility

Current IMPF operational version: R1.7.6

Changes and updates deployed in 2026:

- Version R1.6.0 – Use of MICMICS for SEVIRI VNIR calibration
- Version R1.7.6 – Maintenance update fixing compiler warnings to increase the robustness of the software

The next IMPF L1 processing updates are as follows:

- Version R1.8.0 – engineering changes
- Version R1.9.0 – Update of GSICS coefficients in SEVIRI L1.5 image header from MICMICS running on MON_A and interface directly with IMPF

ID	Version	Planned operational release
IMPF	R1.8.0	Q3/2026
IMPF	R1.9.0	Q4/2026

4.3.2 Level 2 Product Processing Facility

Current MPEF operational version: v2.12.7

Changes and updates deployed in 2026:

- Version v2.12.1 – align SEVIRI MPEF L2 processing with concurrent changes to the SEVIRI L1 VIS/NIR calibration scheme implemented in IMPF
- Versions v2.12.2 – v2.12.7 – Maintenance updates

The next MPEF processing updates are as follows:

- Version v2.13 – Maintenance update, no expected impact on users

ID	Version	Planned operational release
MPEF	V2.13	Q1/2027

4.4 MTG

The MTG system related to MTG-I1 was handed over to operations in December 2024, with the renaming of the satellite to Meteosat-12. With this evolution, the nominal roll-out schedule tracking in the PDIP will start also for IDPF-I and L2PF.

With the launch of MTG-S1 in July 2025, followed by a 12-month commissioning, the tracking of roll-outs for IDPF-S and MTG-S1 related elements of L2PF in the PDIP will follow the operational handover of MTG-S1.

The following sections address the operational processors in the MTG ground-segment.

4.4.1 IDPF-I

Current IDPF-I operational version: v5.15

Changes and updates deployed in 2026:

- Version v5.15 – MAKIMA resampling update for FIR3.8 channel

The next IDPF-I processing updates are as follows:

- Version v5.16 – MTG-I2 preparation fixes. Update to handle MTG SCCDB deficiencies for pixel map changes. The delivery will also include External VNIR calibration change.
- Version v5.17 – Addition of Cold start tool in IDPF-I. Currently Cold start tool runs on offline facility and generates GEOSV for example after maneuvers
- Version v.5.18 – Maintenance update

ID	Version	Planned operational release
IDPF-I	v5.16.1	Q3/2026
IDPF-I	v5.17	Q3/2026
IDPF-I	v5.18	TBD

4.4.2 IDPF-S

Current IDPF-S pre-operational version: v3.2.2 (for the Trial dissemination)

Changes and updates deployed in 2026:

- None

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The next IDPF-S processing updates are as follows:

- Version v3.4.2 – to include the cloud module, the deconvolution and missing flags.
- Version v3.4.3 – potential candidate for IRS L1 pre-operational dissemination to all users starting end of July 2026.
- Version v3.5 – maintenance.

ID	Version	Planned operational release
IDPF-S	V3.4.2	Q3/2026
IDPF-S	V3.4.3	Q3/2026
IDPF-S	V3.5	Q4/2026

4.4.3 L2PF-I

L2PF current operational version: v5.1.2.4

Changes and updates deployed in 2026:

- Version v5.1.1.2 – Improved FCI cloud detection. Improved FCI OCA cloud property retrieval for two-layer clouds and areas of low-level thermal inversion. Improved computation of FCI AMV quality index without forecast (QIx).
- Version v5.1.2.2 – Generation of new and improved FCI static auxiliary data. Improved FCI cloud detection and cloud property retrievals. Added solar and satellite zenith angles to FCI ASR products.
- Version v5.1.2.4 – Improved FCI OCA cloud top height retrieval for high thin single-layer ice clouds

The next L2PF processing updates are as follows:

- Version v5.2.1.2 – Implementation of snow/ice and dust detection in FCI cloud mask product. Improved cloud type/phase classification. Improved cloud top pressure retrieval in case of low-level thermal inversion. Implemented functionality to ingest CRM data in case of facility cold start.
- Version v5.3.x – Major update of several software components. Maintenance and minor scientific evolutions and alignment with NWC-SAF SW for FCI CLM/CLA products.

ID	Version	Release
L2PF	5.2.1.2	Q3/2026
L2PF	5.3.x	Q2/2027 (after commissioning of MTG-I2)

This document is restricted

4.4.4 IRS L2PF-S

IRS L2PF current version in commissioning: v5.2.1.5

Changes and updates deployed in 2026:

- None

The next L2PF IRS processing updates are as follows:

- Version v5.2.1.6 – contains L2OP V2.7
- Version v5.3 – maintenance

ID	Version	Release
L2PF IRS	5.2.1.6	Q3/2026
L2PF IRS	5.3	Q1/2027 (only on DEV in current planning)

4.4.5 Product Release Schedule for Sentinel-4/UVN Processors

Mission product	Cal/Val Phase	Product Validation Review Board (PVRB) Dates
S4 L1 products	July 2026 – February 2027	Demonstrational (L1GF): 22 June 2026 Pre-operational (L1OP): March 2027 Operational (L1OP): June 2027
S4 L2 products	August 2026 – July 2027	Demonstrational: August 2026 Pre-operational: July 2027 Operational: Q4 2027

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5 STUDIES IN SUPPORT OF THE DEVELOPMENT OF PROCESSORS FOR COPERNICUS MISSIONS

The sections below are structured by mission. As for the mandatory missions, studies which started in 2025 and planned studies for 2026 and 2027 are included. Sentinel-3 is further subdivided by roadmap, whereas activities for other missions currently are resulting from only one roadmap for each.

Where a study also partly contributes to a mandatory mission, detailed information is included in section 3, and a cross reference provided.

5.1 Sentinel-3

5.1.1 Aerosol (AER)

The following studies have been defined as part of the logic of the Aerosol roadmap, [RD-1].

AER-21-001-S - Improvement of the Sentinel-3 NRT Aerosol product

Description: This study will propose improvement of the Sentinel-3 Near-real-time products. This will cover the improvement of the current processor (SLSTR), the development of aerosol retrieval for OLCI and the synergy between OLCI&SLSTR, the prototyping, and validation of the performance. Note: Part of Aerosol Scientific Service

Implementation: GRASP-SAS, FR (Work Order as part of AER-21-003-S)

Timeframe: Q2/2025 to Q2/2030

Comments: Ongoing

AER-25-001-S – Land Surface Reflectivity

Comments: For details, see section 3.1

AER-25-002-F - Improvement of the Sentinel-3 NRT Aerosol product - follow-on ITT from AER-21-001-S

Description: This study will follow on from previous activities performed in AER-21-001-S for the improvement of the Sentinel-3 Near-real-time products. This will cover the improvement of the current processor (SLSTR), the development of aerosol retrieval for OLCI and the synergy between OLCI&SLSTR, the prototyping, and validation of the performance.

Implementation: To be determined (ITT)

Timeframe: Q3/2026 to Q2/2031

Comments: New, planned

5.1.2 Cloud (CL)

The following studies have been defined as part of the logic of the Cloud roadmap, [RD-11].

CL-21-001-S - Development of Sentinel-3 Cloud Products

Description: This study will develop a cloud product from Sentinel-3. This includes the definition of the product (parameters), the prototyping, the development and the validation.

Implementation: Contractor to be determined (part to be performed as a Work Order as part of CL-20-002)

Timeframe: Q3/2026 to Q3/2031

Comments: Planned, schedule defined

CL-23-003-F - Copernicus Cloud Mask and Cloud Top Pressure

Description: Follow up contract to refine and operationalize S3 Cloud Mask and Cloud Top Pressure prototype algorithm.

Implementation: University of Lille, FR (Work Order as part of CL-20-002)

Timeframe: Q3/2026 to Q1/2030

Comments: Planned, start date changed from Q2/2025

CL-23-004-F - Sentinel-3 Synergy Cloud Mask (SYN-CM) - follow-on

Description: This is the follow-on study to CL-18-003 on which a first prototype has been developed based on the Synergy between SLSTR and OLCI to derive a new type and more robust cloud mask. Using as input the feedbacks from beta testers (end 2022), this study will improve the observed limitations as well as the content of the products to better match the user needs. The prototype will also be consolidated to be used as a processor in an operational framework.

Implementation: University of Lille, FR (Work Order as part of CL-20-002)

Timeframe: Q3/2026 to Q3/2027

Comments: Planned, start date changed from Q3/2025

CL-23-005-S - Ice and Snow Cloud screening for Sentinel-3

Description: Follow up to synergy cloud mask (CL-18-003) other elements would be added as requirements consolidate.

Implementation: To be determined (ITT)

This document is restricted

Timeframe: Q2/2027 to Q4/2028

Comments: Planned, start date changed from Q3/2026

5.1.3 Fiducial Reference Measurements (FRM)

The following studies have been defined as part of the logic of the Fiducial Reference Measurements roadmap, [RD-15].

FRM-23-001-S - OC-SVC detailed design – Phase 4

Description: The objective of this contract is the delivery of the detailed design of the future Copernicus Ocean Colour – System Vicarious Calibration. The deliveries will contain all the instructions for sub-component, component and system specifications, scientific design, testing, validation, and planning for Phase 5 (future FRM-28-002-S), which shall safeguard that the design is fully correct and ready for building and, at the same time, that the infrastructure is meeting all its engineering and scientific requirements.

Implementation: To be determined (ITT)

Timeframe: Q3/2026 to Q2/2028

Comments: Planned, start date changed from Q3/2025, Phase 5 in FRM-28-002-S (not included in this issue of the PDIP)

FRM-25-001-S - NADIR Consolidation in Support of the Development of a EUMETSAT Validation Infrastructure

Comments: Copernicus funding no longer to be used. For details, see section 3.5

FRM-26-006-S - Validation of Satellite-Derived Aquatic Optical Parameters Using LiDAR-Based Field Measurements

Description: This study aims to support the validation of satellite-derived aquatic optical parameters through the provision and assessment of field measurements based on LiDAR technology, with a focus on optically complex waters, including coastal environments. The activity is relevant to ocean colour observations from multiple satellite missions, including Sentinel-3 OLCI, Sentinel-2 MSI, and other comparable sensors.

The activity will involve the acquisition of LiDAR-based measurements of key aquatic optical properties (e.g. chlorophyll-a, total suspended matter, and coloured dissolved organic matter), supported by co-located aquatic optical fiducial reference measurements (FRM), and their use in satellite validation exercises.

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q4/2027

This document is restricted

Comments: New, planned

FRM-27-004-S - FRM4SOC maintenance and evolutions (AERONET-OC, BGC-Argo radiometry)

Description: The goal is to ensure the flow of OC FRM data for Copernicus satellite validation and algorithm development and to explore new validation platforms:

- FRM4SOC maintenance: maintain the established OC FRM network of in situ providers, cal/char labs, in situ instrument manufacturers, and the FRM tools and procedures;
- AERONET-OC: take over management and operations of European AERONET-OC stations from JRC, consolidate European AERONET-OC FRM competences, and support international AERONET-OC when needed;
- BGC-Argo radiometry: develop BGC-Argo radiometric FRM protocols / procedures through international collaboration (NASA+ESA), and support BGC-Argo FRM proof of concept.

Implementation: To be determined (ITT)

Timeframe: Q3/2027 to Q4/2030

Comments: New, planned

FRM-27-005-S - OC-SVC science support

Description: The goal is to ensure the highest scientific and technical outcomes from the Copernicus OC-SVC infrastructure development Phase-5 project:

- Support for EUMETSAT to review of scientific and technical developments throughout the project, and independent input on quality and progress;
- Hands-on radiometric FRM expertise on in situ instrumentation and measurements;
- European highest know-how and skills through decades of JRC experience on in-situ radiometry, and OC community leadership.

Implementation: GZ (RfQ)

Timeframe: Q3/2027 to Q3/2030

Comments: New, planned

5.1.4 Image Navigation, Registration and Calibration (INRC)

The following study has been defined as part of the logic of the INRC roadmap, [RD-3].

INRC-27-001-S - Development of a AOLCI/ASLSTR instrument simulator and generation of L1n/L1c test data

Description: Internal development for the instrument+L1 simulator and ITT if needed for the TOA scene generation.

This document is restricted

Implementation: To be determined (ITT)

Timeframe: Q3/2027 to Q2/2030

Comments: New, planned

5.1.5 Marine (MA)

The following studies have been defined as part of the logic of the Marine roadmap, [RD-14].

MA-19-009C - Sea surface topography retrieval for coastal zones

Description: In view of the progress made by coastal altimetry methodologies and in view of the capabilities of the SRAL altimeter, the user community is requiring tailored coastal altimetry products. The community research and development of such products are very active. The development of such a product from SRAL has been proposed, where L1 and L2 algorithms are tailored for use in coastal areas. This study is expected to include and consider the following aspects: 1) the best contents for SRAL/MWR Level 2 user products tailored to coastal zones; 2) an optimal sea surface height retrieval algorithm specific to coastal zones; 3) the impact of the retracers on sea state bias; 4) additional algorithms and/or ancillary variables that would significantly augment such products.

Implementation: CLS, FR, with subcontractor to be determined (Work Package)

Timeframe: Q3/2026 to Q4/2027

Webpage: <https://www.eumetsat.int/copernicus-altimetry-services-copas>

Comments: Planned, start date changed from Q4/2025

MA-21-013-F - GHR SST Project Office - Follow on

Description: Follow-on of the current GHR SST Project Office contract

Implementation: Noveltis, FR, with DMI, DK (Work Package)

Timeframe: Q2/2021 to Q1/2026

Webpage: <https://www.eumetsat.int/Sci4MaST>

Comments: Completed, end date changed from Q4/2026

MA-22-019-S - Alignment of the Sentinel-3/SRAL Level-1 and Level-2 processing to Sentinel-6/Poseidon-4

Description: As knowledge and experience with SAR-mode altimetry has progressed over the last decade, the processing specifications for the Poseidon-4 altimeter on

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Sentinel-6 are much ahead of those implemented for the Sentinel-3 altimeter. This study is expected to identify and propose algorithmic updates to the Sentinel-3 processing specifications and test and analyse their impact on the retrievals so that (a) the algorithms between the two missions are similar within the boundaries of their instrumental capabilities and (b) the retrievals of the missions are most optimally aligned. Further alignment of the SRAL product format to the GDR-F standard shared between Jason-3 and Sentinel-6 is also to be considered.

Implementation: CLS, FR (Work Package)

Timeframe: Q2/2027 to Q2/2028

Webpage: <https://www.eumetsat.int/copernicus-altimetry-services-copas>

Comments: Planned

MA-23-003-S - Antarctic in-situ datasets for validating Sentinel-3 surface temperatures in Southern Hemisphere high-latitude ocean, marginal ice-zone and sea-ice regions

Description: The main purpose of this study is to investigate and compile an inventory of good quality *in situ* data of Antarctic and Southern Hemisphere polar marine surface temperatures and to collect these data and analyse collocated validation data with EUMETSAT high-latitude Sea-Surface Temperature (SST), marginal ice zone temperatures (MIZT) and sea-Ice Surface Temperature (IST). The study shall provide Antarctic *in situ* measurement datasets for use in validation activities covering an agreed time-period and advise on and document near-real time data streams. The study shall provide the validation analysis from collocated datasets provided by EUMETSAT from EUMETSAT and Copernicus SST/MIZT/IST sensor products. A validation exercise shall be performed and a quantitative assessment of the performance of the products provided with documentation and all datasets delivered.

Implementation: To be determined (ITT)

Timeframe: Q2/2027 to Q2/2028

Comments: Planned, start date changed from Q4/2025, moved to Copernicus

MA-23-005-S - Aquatic Carbon

Description: Aquatic carbon is a major component of the Earth system with respect to carbon cycling and carbon sequestration. Ocean Colour measurements can help in assessing aquatic carbon sources, stocks and fluxes. Typical carbon products possible from S3 OLCI are concentrations of particulate organic carbon and particulate inorganic carbon, but also the quantification of dissolved carbon may be possible. The goal is the better understanding of the Biological Carbon Pump and the quantification of the aquatic share of the Earth carbon budget

Implementation: To be determined (ITT)

This document is restricted

Timeframe: Q4/2027 to Q4/2028

Comments: Planned, start date changed from Q4/2025

MA-23-007-S - Consistency of SST products and steps towards harmonisation

Description: The activity will involve the development and tuning of a diurnal variability model for the derivation of SSTdepth and validation of Sentinel-3 SLSTR and EUMETSAT SST products. It will include the development and assessment of multi-way classifiers for SST and IST products and inter-comparisons of SST products towards harmonisation and improved consistency.

Implementation: Noveltis, Météo-France, FR (Work Package)

Timeframe: Q4/2023 to Q2/2026

Webpage: <https://www.eumetsat.int/Sci4MaST>

Comments: Completed, end date changed from Q1/2026

MA-24-002-S - Day-2 Aquatic processing multi-mission multi-resolution multi-spectral

Description: The objective of this study will be the development of a new generation of processing with successive steps: 1/ consistent processing from inland and coastal waters to the open ocean with seamless atmospheric correction algorithmic choices across different atmospheric and water conditions, 2/ optimized processing of synergy OLCI/SLSTR products, 3/ processing of geostationary products from MSG/SEVIRI and MTG/FCI, 4/ consistent processing for Sentinel-2 and Sentinel-3.

Implementation: To be determined (ITT)

Timeframe: Q2/2027 to Q2/2031

Comments: Planned, revised scope and start date changed from Q4/2025

MA-24-003-F - Improvement of Sea Level Estimations into the leads (Polar Ocean) part 2

Description: The study - part 1 - was very successful and was implemented operationally in the Sentinel-3 Polar Ocean processing baseline deployed beginning of 2026. Still in the context of CRISTAL and Sentinel-3, further improvements could be done (as per study final report recommendations). This study will investigate these additional improvements like e.g. weighting windows in azimuth and range or improvement of the SWH spectrum.

Implementation: CLS, FR (Work Package)

Timeframe: Q1/2027 to Q4/2027

This document is restricted

Webpage: <https://www.eumetsat.int/copernicus-altimetry-services-copas>

Comments: Planned, follow-on to part 1, MA-19-014C, start date changed from Q1/2026

MA-24-009-S - Sentinel-3 Improvement of flags

Description: Several issues have been identified in the S3 flags that may be improved. In particular, two flags that are particularly useful for end users should be improved: Open Sea Ice Flag and Rain Flag. There is a recommendation from the ESL Council Meeting #6 to improve the Open Sea Ice flag for SAR & PLRM. The Rain Flag is used in the GPD+ service and an assessment and improvement was recommended in order to improve its use as part of the service. The study will also provide a LUT from IFREMER which is needed to compute a quality flag for the SWH similar to the L2P.

Implementation: CLS, FR (Work Package)

Timeframe: Q3/2027 to Q3/2028

Webpage: <https://www.eumetsat.int/copernicus-altimetry-services-copas>

Comments: Planned, start date changed from Q3/2025

MA-24-010-S - Improved retrieval of the atmospheric attenuation on sigma0

Description: The atmospheric attenuation on sigma0 ($\Delta\sigma_0$) currently provided on Sentinel-3 (S3) products is derived, together with the wet tropospheric correction (WTC), from neural network (NN) retrieval algorithms. This parameter is important in the retrieval of e.g., wind speed (WS) and sea state bias (SSB). The study aims to assess the $\Delta\sigma_0$ present in current products and develop improved algorithms over open ocean and coastal regions, and to improve the coverage of SSHA in the early years of S3A. The objective would therefore be also to recover these gaps in order to have the maximum SSHA coverage possible along all the S3A mission lifetime.

Implementation: UoP, PT (Work Package)

Timeframe: Q4/2027 to Q4/2028

Comments: Planned, start date changed from Q4/2025, duration extended

MA-25-002-S - Assessment of various MWR-derived WTC present in current products

Description: The atmospheric attenuation on sigma0 ($\Delta\sigma_0$) currently provided on Sentinel-3 (S3) products is derived, together with the wet tropospheric correction (WTC), from neural network (NN) retrieval algorithms. This parameter is important in the retrieval of e.g., wind speed (WS) and sea state bias (SSB). The study aims to assess the $\Delta\sigma_0$ present in current products and develop improved algorithms over

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open ocean and coastal regions, and to improve the coverage of SSHA in the early years of S3A. The objective would therefore be also to recover these gaps in order to have the maximum SSHA coverage possible along all the S3A mission lifetime.

Implementation: UoP, PT (Work Package)

Timeframe: Q2/2026 to Q1/2027

Webpage: <https://www.eumetsat.int/copernicus-altimetry-services-copas>

Comments: Planned, title and description updated, start date changed from Q4/2025

MA-25-003-S - Improvements of wind model

Description: Based on the work done by Saleh Aballa for the SCA study, ECMWF will work on the development of a new wind model for the Sentinel-3 and Sentinel-6 missions (SAR/HR and PLRM/LR) and CRISTAL mission (Ka band).

Implementation: ECMWF, UK (RfQ)

Timeframe: Q4/2026 to Q4/2027

Comments: Planned, start date changed from Q3/2025

MA-26-001-S - New scientific service (previously Classifier for SLSTR (clouds, sea ice and sea) and consistency of HL products)

Description: The primary purpose of this study is to develop a multi-way surface classification for sea-ice, water ocean and cloud. This will be done through the addition of an N-way classifier within the Bayesian prototype processor. The aim is to improve the consistency of surface classification for SST, MIZ and IST products to achieve a fully consistent classifier for SLSTR.

Implementation: To be determined (ITT)

Timeframe: Q2/2027 to Q1/2032

Comments: Planned, scope revised, start date changed from Q2/2026, duration increased

MA-26-003-S – New Cal/Val Service (previously Service for Surface Temperature Cal/Val framework and harmonisation)

Description: The service will maintain and support the Surface Temperature (ST) Cal/Val framework and tools for Copernicus reference SST/IST missions (e.g. Sentinel-3 and Sentinel-3NG), for real time, offline and reprocessed activities. The service will conduct end-to-end Cal/Val activities for reference and other (current and future) EUM SST/IST missions, within a cloud-enabled framework. The framework will include tools for satellite validation against in situ data (including FRM including

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diagnostics), inter-comparison with other satellite datasets, interactive mapping and time series analysis of satellite L1/L2/L3/L4, in situ, matchup and model datasets with real time monitoring and alerting. The activities will also improve and develop the integration and harmonisation of all these components and will be designed to be generic.

Implementation: To be determined (ITT)

Timeframe: Q2/2027 to Q1/2032

Comments: Planned, start date changed from Q2/2026

MA-26-004-F - GHR SST Project office - Second Follow On

Description: Follow-on of the current GHR SST Project Office contract, MA-21-013-F. The objectives of this contract are the hosting, operation, management and coordination of the GHR SST international project office (GPO). The activities will include the scientific coordination, web-site management and web-service and administration. It will also include the operation and maintenance of the GHR SST catalogue and support to the data specification definitions and user software.

Implementation: Live Now Technology (ITT)

Timeframe: Q1/2026 to Q1/2031

Comments: New, ongoing

MA-26-008-F - GPD+ wet tropospheric correction - follow-on

Description: The GPD+ (GNSS (Global Navigation Satellite Systems) derived Path Delay Plus) algorithm combines wet path delays from several sources through objective analysis. The first objective of this study was to assess the benefit of this method when applied to the Sentinel-3 reprocessed data and to perform comparison with wet tropospheric correction from operational products (standard NN approach), 1DVAR estimation, AIRWAVE products from SLSTR. The results being successful, the operational implementation has been performed and the contract will continue as a service with operational delivery of these GPD+ wet tropospheric correction for operational use in our Sentinel-3 ground segment.

Implementation: University of Porto, PT (RfQ)

Timeframe: Q4/2026 to Q3/2031

Comments: New, planned

5.1.6 Marine and Meteorology Pathfinders (MMP)

The following studies have been defined as part of the logic of the Marine and Meteorological Pathfinders roadmap, [RD-16].

MMP-26-002-S - S3-NGO - Synergy Hyperspectral Imagery

Description: Feasibility for aerosols & NO₂ In view of the future AOLCI hyperspectral (1.25 nm, and 150- m spatial resolution), new capabilities for L2 Aerosols (in priority ALH, AOT & SSA) & NO₂ are expected in theory but remain to be quantified. In the context of the future algorithms and feedbacks to mission design / performance, EUMETSAT needs to initiate preparatory studies to clarify the exact L2 performance from such a unique mission, and anticipate potential roadmap for future OPE developments. It is also important to initiate these preparatory activities to anticipate a good position of EUMETSAT on the S3-NGO atmosphere portfolio based on Synergy hyperspectral imagery.

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q4/2028

Comments: New, planned

MMP-26-003-S - S3-NGO - Fires – Feasibility analysis & performance impact in view of the future ASLSTR

Description: In view of the future ASLSTR, new observation types may be expected, such as smaller pixels sizes, different Field Of view shape, and on-ground binning for mitigating the FRP angel dependence. All these items require the development of an algorithm simulator to 1) identify potential candidate algorithm developments, and 2) evaluate 1st sensor performance, and 3) provide feedback to ESTEC and industries. It is also important to initiate these analyses early in view of establishing EUMETSAT on the (future) portfolio.

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q4/2028

Comments: New, planned

5.2 Sentinel-4/5**5.2.1 Atmospheric Chemistry (ACh)**

The following studies have been defined as part of the logic of the Atmospheric Chemistry roadmap, [RD-10].

ACh-23-003-S - Synergy AC products

Description: To investigate the use of multiple sensors on a platform to improve atmospheric chemistry retrievals (e.g. METImage for Clouds with IASI Temperature Profiles to improve S5 retrievals or similar for using FCI and IRS to improve S4 retrievals)

This document is restricted

Implementation: To be determined (ITT)

Timeframe: Q1/2027 to Q4/2028

Comments: Planned

ACH-24-001-S - UVN/UVNS/VNS calibration support

Description: This activity aims at involving external expertise to support the commissioning and in-orbit calibration of Copernicus spectrometers operating in the UV, VIS, NIR and SWIR ranges. The service is foreseen 1) to contribute to the definition and implementation of offline calibration functions, 2) to study and characterize residual imperfections in calibration through the use of level-2 algorithms, as well as 3) to provide general support to cope with the increased complexity RSP will have to face due to unsolved instrument and processing issues expected for Sentinel-4 and Sentinel-5, inherited from the space segment development under ESA responsibility.

Implementation: Triopsys, NL

Timeframe: Q4/2025 to Q3/2028

Comments: Ongoing, start date changed from Q2/2025

ACH-25-002-S - Sentinel-4 Level 2 Operational Processor (L2OP) commissioning and long-term maintenance

Description: This procurement covers the establishment of a new contract directly with the DLR consortium for the provision of on-site and back-office support during the commissioning activities of the S4 L2OP, as well as a contractual framework for the potential long term maintenance support to operations and dissemination of the S4 L2OP products.

Implementation: DLR, DE

Timeframe: Q1/2026 to Q1/2031

Comments: New, ongoing

ACH-26-005-S - NO₂, DOAS and SWIR algorithm maintenance and evolution

Description: This activity aims at involving external expertise to support the algorithm evolution and maintenance for the Sentinel-4 and Sentinel-5 level-2 NO₂, DOAS (O₃, SO₂, HCHO, CHOCHO) and SWIR products (CH₄, CO). These are among the most important products for the operational core user CAMS and are planned to be operationally assimilated. The objective is to fully harmonize the algorithms across Copernicus missions and ensure they are up to date with the latest developments.

Implementation: KNMI, NL (RfQ)

*This document is restricted***Timeframe:** Q3/2026 to Q2/2029

Comments: Procurement in progress, merges the deleted studies ACh-26-001-S - NO2 algorithm maintenance and evolution, ACh-26-002-S - DOAS algorithm maintenance and evolution and ACh-26-003-S - SWIR algorithm maintenance and evolution under one contract

ACh-26-006-S - UVN/UVNS space segment support

Description: Support is anticipated to be needed from the Sentinel-4/-5 instrument supplier to investigate anomalies found in the data during the extended cal/val period. Such support will be requested when needed. It will cover detailed investigations into the cause of an anomaly from the instrument perspective, looking at on-ground test data, instrument design and performance models to understand the anomaly behaviour and aid in the development of data processing corrections or improvements.

Implementation: ADS and TNO (RfQ)

Timeframe: Q4/2026 to Q3/2028

Comments: New, planned

ACh-27-001-S - UVN L1 SW maintenance

Description: This procurement is meant to provide mid- to long-term software maintenance and evolution support for the Sentinel-4/UVN L1 Operational Processor, as integrated in the MTG IDPF-S processing facility and expected to be handed over from PRD to OPS/TSS in the first half of 2027. It will be realized as a direct contract with the developer of the L1OP (ADS).

Implementation: ADS (RfQ)

Timeframe: Q2/2027 to Q2/2032

Comments: New, planned

ACh-27-002-S - UVNS L1 SW maintenance

Description: This procurement is meant to provide mid- to long-term software maintenance and evolution support for the Sentinel-5/UVNS L1 processor, as integrated in the EPS-SG ground segment and expected to be handed over from PRD to OPS/TSS in 2027. It will be realized as a direct contract with the developer of the L1 processor (Gofore, formerly known as Huld).

Implementation: Gofore (RfQ)

Timeframe: Q2/2027 to Q2/2032

Comments: New, planned

ACh-27-003-S - UVNS L2 SW maintenance

Description: This procurement is meant to provide mid- to long-term software maintenance and evolution support for the Sentinel-5/UVNS L2 processors, as integrated in the EPS-SG ground segment and expected to be handed over from PRD to OPS/TSS in 2027. It will be realized as a direct contract with the developer of the L2 processor (S&T).

Implementation: S&T (RfQ)

Timeframe: Q2/2027 to Q2/2032

Comments: New, planned

5.2.2 Fiducial Reference Measurements (FRM)

The following studies have been defined as part of the logic of the Fiducial Reference Measurements roadmap, [RD-15].

FRM-23-004-S - Support to the Pandonia Global Network for Copernicus Mission Cal/Val (PanAMA)

Description: This service shall include complementary scientific and engineering activities to those already covered by ESA, in supporting further development of the capabilities and operations of the PGN for EUMETSAT-operated missions. The objectives of the service are as follows: 1. Level-1 retrieval and instrument improvement tasks; 2. Level-2 retrieval improvement and validation tasks; 3. Network tasks. It is also the intention that where useful for other missions, evolutions can be encouraged for roll-out to the broader PGN, and hence the service includes outreach and support to coordination with other PGN stakeholders.

Implementation: LuftBlick, AT

Timeframe: Q1/2025 to Q1/2030

Comments: Ongoing

FRM-24-005-S - Validation and Monitoring for Air Quality in Urban/Peri-Urban Areas (AURORA)

Description: This service will be in charge of providing Fiducial Reference Measurements for the validation and monitoring for the EUMETSAT products and missions related to air quality (mostly Sentinel-4, -5 and CO2M atmosphere products). It will focus on the provision of reliable trace gases and aerosol data to be used as reference for the Cal/Val activities.

Implementation: University of Thessaloniki, GR

*This document is restricted***Timeframe:** Q1/2026 to Q1/2031**Comments:** Ongoing, start date changed from Q2/2025**FRM-25-002-S - Ground-based Network HW Consolidation – Instrument Commissioning and Cal/Val**

Description: This budget to further consolidate ground-based network (e.g. Pandonia Global Network) to support commissioning and Cal/Val activities of EUMETSAT operated atmospheric composition and air quality missions. Main consolidations are to ensure long term availability, rapid delivery and filling spatial gaps (e.g. ocean, high latitudes, Africa, Asia and South hemisphere). This is e.g. supporting the effort of the commission for the consolidation of Network in Africa.

Implementation: To be determined (ITT)**Timeframe:** Q1/2027 to Q4/2031**Comments:** Planned, start date moved from Q1/2025**FRM-26-002-S - Additional MAGIC sondes for S5 validation**

Description: Provision to MAGIC to cover commissioning as well as operation validation needs.

Implementation: MAGIC**Timeframe:** Q1/2026 to Q4/2028**Comments:** New, ongoing**5.3 Sentinel-6**

The following studies have been defined as part of the logic of the Marine roadmap, [RD-14].

MA-18-005 - Advanced Capabilities of Sentinel-6 Altimeter

Description: This study will aim to fully exploit the advanced capabilities of the Poseidon-4 altimeter, which provides high-resolution (SAR) measurements alongside the conventional low-resolution (LRM) measurements. On the one hand, the frequency and phase information in the high-resolution data should allow fully-focused SAR processing to be performed, with optimal precision and spatial resolution performance. On the other hand, as there remains a strong requirement for high-quality low-resolution products, e.g. for climate data records, with a processing dissimilar to the conventional LRM processing, taking advantage of the 9 kHz echoes. One will study the optimal extraction of 20-Hz and 1-Hz retrievals of range, significant wave height and backscatter from the original 9 kHz echoes, including techniques such as fully-focused SAR, LR-RMC and oversampling.

*This document is restricted***Implementation:** CLS, FR (Work Package)**Timeframe:** Q1/2026 to Q1/2027**Webpage:** <https://www.eumetsat.int/copernicus-altimetry-services-copas>**Comments:** Ongoing, start date changed from Q3/2025**MA-25-005-S – Sentinel-6 processing prototype for inland waters - Placeholder****Description:**

The current operational Sentinel-6 processing chain includes processing over continental waters; however, it has not been specifically designed or optimized to retrieve accurate inland water geophysical parameters such as lake water levels or river discharge. The standard Level-1 and Level-2 processing primarily tailored to ocean applications is used, and therefore do not fully exploit the potential of Sentinel-6 measurements over inland water bodies.

Several studies have nevertheless demonstrated the high potential of the Sentinel-6 mission to provide accurate estimates of inland water parameters, provided that dedicated Level-1 and Level-2 processing algorithms are implemented. Such processing requires adaptations to both the signal processing and geophysical corrections algorithms in order to account for the specific characteristics of the signal backscattered by continental water targets.

The objective of this study with CNES, will be to specify, develop and validate a prototype for Level-1/Level-2 processing of Sentinel-6 observations over continental waters.

Implementation: CNES, FR (RfQ)**Timeframe:** Q2/2028 to Q2/2029**Comments:** New, planned**5.4 CO2M**

The following studies support the logic for the development of the CO2M mission implementation.

GHG-22-003-S - Scientific Service Support for operational central processing of ground-based CO2/CH4 measurements for CO2M GHG product Cal/Val

Description: Development of the ground-based CO2/CH4 measurement network products and algorithms of TCCON and COCCON to make them fit-for-purpose for central operational processing. Note: aerosol and NO2 ground-based network reference data for validation is taken care of by the multi-mission COPER and EPS-SG projects. MicroCarb validation will also benefit from operational central TCCON/COCCON processing (MicroCarb funding should be considered for this).

Implementation: BIRA, BE

This document is restricted

Timeframe: Q3/2025 to Q3/2030

Comments: Kicked-off July 2025. Start date changed from Q1/2025, end date changed from Q1/2030. Contract GHG-24-003-F and GHG-25-002-S

GHG-24-003-F - Scientific service support for preparation and support of level-2 product validation

Description: Scientific support for the commissioning and validation of CO2M level-2 products using reference ground-based, model and other satellite data

Implementation: BIRA, BE

Timeframe: Q3/2025 to Q3/2030

Comments: Kicked-off July 2025. Start date changed from Q1/2025 Contract includes GHG-22-003-S and GHG-25-002-S

GHG-24-004-S - Operations of multiple Pandora ground-based instruments for CO2M GHG product Cal/Val

Description: Operations of multiple Pandora ground-based instruments measuring GHG total column concentrations supporting the validation and monitoring of CO2M level-2 products

Implementation: Luftblick, AT (RfQ)

Timeframe: Q1/2027 to Q4/2030

Comments: Planned, start date changed from Q1/2026. End date changed from 2029

GHG-24-006-S - Update of the top-of-atmosphere test-data for the MAP and CLIM instruments

Description: This work addresses an update to the current version of top-of-atmosphere (TOA) radiance test-data comprising 6 orbits (EUcent, EUwest, EUeast, SAcent, SAwest, SAeast) of measurements of all 4 bands of the CO2M CO2I/NO2I spectrometer – covering individual orbits for a constellation of three CO2M platforms (S7A = cent, S7B = west S7C = east) at two days 3rd of July 2025 (EU) and 23rd of September 2025 (SA). Since the kick-off of the previous study in 2022 and the delivery of the first version of data in 2023, the MAP and CLIM instrument design underwent a few significant evolutions, together with the design of the associated level-1 to 2 processing, which consequently require an update of the forward model and the test-data to be prepared for the version 2L developments of the operational Instrument Processing Facilities (IPFs) at EUMETSAT and in-line with their Critical Design Review (CDR) specifications. The work shall use and is based on the deliverables and processing frameworks developed under EUM_CO_21_4600002584_RL (GHG-21-009-S) and Rider 1 to this contract (no PDIP code for this).

Implementation: Hygeos, FR

This document is restricted

Timeframe: Q3/2024 to Q1/2026

Webpage: <https://www.eumetsat.int/CO2M-MAP-CLIM-TDS>

Comments: Completed, end date changed from Q1/2025

GHG-25-002-S - Operational provision of ground-based reference data for CO2M product validation and monitoring

Description: Operational provision of ground-based reference data for CO2M product validation and monitoring from the GHG, NO2 and Aerosol networks (TCCON, COCCON, NDACC, Aeronet).

Implementation: BIRA, BE

Timeframe: Q3/2025 to Q3/2030

Comments: Kicked-off July 2025. Start date changed from Q1/2025. Contract includes GHG-22-003-S and GHG-24-003-F

GHG-25-005-S - Scientific Support for the development of a level- 4 generator

Description: The procurement addresses the development and provision of scientific tools for validating level-2 product quality through the quantification of derived emissions and the simulation of input radiances. These tools have been developed by SRON in the context of RemoTAP/RemoTEC developments for the TANGO and SPEX missions, but are not part of the corresponding Sentinel 5/CO2M procurements. The adaption of the tools for CO2M can be done in a very cost-efficient way by SRON maintaining their high quality of performance in validating level-2 product quality. This will ensure the timely detection of performance issues in level-2, which may have a negative impact on the side of the Copernicus Atmosphere Monitoring Service (CAMS)

Implementation: SRON, NL (RfQ)

Timeframe: Q1/2026 to Q4/2028

Comments: Ongoing. Start date changed from Q1/2025, end date changed from Q4/2025.

GHG-26-005-S - Scientific Support for the development of a GHG neural net processor

Description: Development of an offline machine learning based processing tool for quick-checks and monitoring of total column Methan and CO2 products from CO2M. The tool will be used in context of CO2M product validation and medium-term monitoring of product performance evolution. The development also will provide some early scientific and engineering insight in the use of neural networks for GHG retrievals in the long term (or as developed and used by commercial satellite providers for cost efficiency).

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Implementation: To be determined (ITT)

Timeframe: Q4/2026 to Q3/2028

Comments: Planned. Procurement delayed. Start date changed from Q1/2026, end date changed from Q4/2027.

5.5 CIMR

The following studies have been defined as part of the logic of the Passive Microwave roadmap, [RD-12].

MW-23-001-S - Scientific study for synergistic global products over ocean in preparation for CIMR

Description: This is a Copernicus study in support of a synergistic approach to the retrieval of L2 products over global ocean from CIMR L1B measurements. The products considered are: Sea Surface Temperature, Sea Surface Salinity, Ocean Surface Wind Vector, Precipitation rate, Liquid Water Path, Total Column Water Vapour. The study shall consider: physical consistency among the various geophysical parameters, potential synergies in product derivation, optimal use of CIMR sampling characteristics, initial definition of product format specifications considering the applicability over global ocean, preliminary considerations for operational implementation.

Implementation: Estellus, FR

Timeframe: Q1/2024 to Q2/2026

Comments: Completed, end date changed from Q2/2025

MW-24-003-S - CIMR L2 algorithms refinements

Description: CIMR L2 products refer to ocean surface (Sea Surface Temperature, Sea Surface Salinity, Ocean Wind Vector) and to Atmosphere (Total Column Water Vapour, Liquid Water Path, Precipitation rate). These two product families have their own specificities, in terms of retrieval. This study aims in defining the retrieval algorithms using future CIMR L1B data considering the separate families (e.g. as first guess algorithms) and considering the potential interactions/synergies and the multiscale nature of the CIMR L1 data. Another aspect to be investigated is the translation of these algorithms into viable machine learning algorithms based on the physical retrieval algorithms.

Implementation: Estellus, FR

Timeframe: Q1/2026 to Q1/2028

Comments: Ongoing

5.6 CRISTAL

The following studies have been defined as part of the logic of the Marine roadmap, [RD-14].

MA-24-001-S - CRISTAL L1/L2 test dataset

Description: The aim of this study will be the generation of Test Data to verify and validate the correct implementation in the Ground Segment of the algorithms defined in study MA-20-005c.

Implementation: CLS, FR (Work Package)

Timeframe: Q4/2025 to Q4/2027

Webpage: <https://www.eumetsat.int/copernicus-altimetry-services-copas>

Comments: Ongoing, start date changed from Q3/2025

MA-26-002-S - CRISTAL Ka band enhancement

Description: After the AltiKa instrument flying on the SARAL mission, CRISTAL will be the first altimetry mission in Ka band processed by EUMETSAT. A specific processing for this new frequency band is required if we want to take benefit of the full capacity of this new instrument. In this context the objective of this study is to adapt the algorithms and models to the Ka band.

Implementation: To be determined (Work Package)

Timeframe: Q1/2027 to Q1/2028

Webpage: <https://www.eumetsat.int/copernicus-altimetry-services-copas>

Comments: Planned, start date changed from Q1/2026 and duration reduced

MA-26-006-S - CRISTAL performance assessment increasing posting rate to 80Hz

Description: While writing the CRISTAL L2 specifications we noted that a challenge for this mission will be the specification of dedicated compression techniques to compress 80Hz to 1Hz data directly. So far, the approach is that this is done in the same manner as compression from 20Hz to 1Hz but further investigation would be needed to assess if this is the correct approach, or more elaborated approaches would improve performance.

Implementation: CLS, FR (WP to COPAS)

Timeframe: Q4/2026 to Q4/2027

Comments: New, planned

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MA-26-007-S - CRISTAL L1B SAR upgrade (placeholder)

Description: Future potential study (one option FFSAR operational feasibility analysis), as generic placeholder in case we find we need R&D study at L1B after the TDS generation.

Implementation: CLS, FR (WP to COPAS)

Timeframe: Q2/2027 to Q2/2028

Comments: New, planned

MA-26-008-F - GPD+ wet tropospheric correction - follow-on

Comments: For details, refer to section 5.1.5.

MA-27-001-S - CNES support for CRISTAL - Placeholder

Description: With the SARAL/AltiKa mission, CNES has gained unique experience and expertise in the field of Ka band altimeter data processing. This objective of this study will be to get the support from CNES to answer specific needs related to CRISTAL processing and Cal/Val.

Implementation: CNES, FR (RfQ)

Timeframe: Q1/2027 to Q4/2028

Comments: New, planned

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6 OPERATIONAL PRODUCT ROLL-OUTS FOR COPERNICUS MISSIONS

As for the Copernicus studies, the sections below are structured by mission.

6.1 Sentinel-3

The Sentinel-3 mission provides high-accuracy optical and altimetry data for marine, land and atmospheric services. Through its delegation agreement from the European Commission, EUMETSAT operates the Sentinel-3 marine and NRT atmospheric data stream.

The following sections address the Instrument Processing Facilities (IPFs) to be deployed to generate data products from the OLCI, SLSTR and SRAL/MWR instruments. It is important to mention that the L1 and L2 processors for marine and NRT atmosphere applications are under full EUMETSAT responsibility. L1 and L2 processors for Land and STC/NTC atmosphere applications are under full ESA responsibility. All the ground segment activities are done with strong collaboration with ESA.

The IPFs have been operated within the Sentinel-3 PDP (Payload Data Processing) since November 2023.

The S3 processors are normally planned to be updated regularly, twice per year. These updates will take on-board user requests from CMEMS, CAMS, CEMS, QWG, S3VT etc., in order to make sure that our products are state of the art and fit our user needs. Any anomalies that may be discovered in the products will also be fixed.

The overall schedule for PDP IPF changes is summarised in the table below.

Version ID	System/ Subsystem	Implementation Date
S3 PDP-IPF 2.3 (Spring 2025)	S3 IPFs	Mar – May 2025
S3 PDP 2.4 (June 2025)	Payload Data Processing	June 2025
S3 PDP 2.5 (June 2026)	Payload Data Processing	June 2026

6.1.1 SRAL/MWR

6.1.1.1 SRAL L1 Instrument Processing Facility

Changes and updates deployed in 2026:

- SR__L1M.006.02.00: major release to improve the retrievals in the polar areas, as requested by CMEMS. This release was delivered to DPSA in late 2025 and ended up going into operations in January 2026. It included for SRAL L1, the application of Marine/Land mask at L1B, the removal production of L1B-S, the

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addition pass number to the L1B filename, also several processing improvements that allowed for better and more stable retrievals. The following anomalies were fixed: EUM/Sen3/AR/8736, EUM/Sen3/AR/8735, EUM/Sen3/AR/8273, EUM/Sen3/AR/9095 and EUM/Sen3/AR/9157.

The next SRAL L1 processing updates are as follows:

- Spring 2026: minor release is expected for potential bug fixes and S3C updates (ADFs) for launch preparation.
- S3C post-launch updates (ADFs) will be deployed in 2027 after commissioning.
- The OS upgrade to RHEL 9.10 will take place in 2027.

ID	Version	Planned operational release
SRAL L1 IPF	Spring 2026 - S3C pre-launch updates (ADFs)	Q3/2026
SRAL L1 IPF	S3C post-launch updates (ADFs)	2027
SRAL L1 IPF	OS update to RHEL 9.10	2027

6.1.1.2 MWR L1 Instrument Processing Facility

Changes and updates deployed in 2026:

- MW__L1_.005.01.03: corrective maintenance release fixing Sen3/AR/8273, along with the update of the processor to use the latest COTS. This release was delivered to DPSA in late 2025 and ended up going into operations in January 2026.

The next MWR L1 processing updates are as follows:

- Spring 2026: minor release expected for potential bug fixes and S3C updates (ADFs) for launch preparation.
- S3C post-launch updates (ADFs) will be deployed in 2027 after commissioning.
- The OS upgrade to RHEL 9.10 will take place in 2027.

ID	Version	Planned operational release
MWR L1 IPF	Spring 2026 - S3C pre-launch updates (ADFs)	Q3/2026
MWR L1 IPF	S3C post-launch updates (ADFs)	2027
MWR L1 IPF	OS update to RHEL 9.10	2027

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6.1.1.3 SRAL/MWR L2 Marine Instrument Processing Facility

Changes and updates deployed in 2026:

- SM__WAT.006.02.00: major release to improve the retrievals in the polar areas, as requested by CMEMS. This release was delivered to DPSA in late 2025 and ended up going into operations in January 2026. It included for SRAL/MWR L2, update of the SAMOSA+ retracker, the addition of the waveform classification using neural network (asset 105220), correction of vertical wave motion to SWH and other scientific updates. The anomalies EUM/Sen3/AR/8915, EUM/Sen3/AR/8914, EUM/Sen3/AR/8916, EUM/Sen3/AR/8795, and EUM/Sen3/AR/8273 were also fixed.

The next SRAL/MWR L2 processing updates are as follows:

- Spring 2026: minor release expected for potential bug fixes and S3C updates (ADFs) for launch preparation.
- S3C post-launch updates (ADFs) will be deployed in 2027 after commissioning.
- The OS upgrade to RHEL 9.10 and the updates to account for the GRIB2 migration related with the ECMWF IFS Cycle 50r2 will take place in 2027.

ID	Version	Planned operational release
SRAL/MWR L2 IPF	Spring 2026 - S3C pre-launch updates (ADFs)	Q3/2026
SRAL/MWR L2 IPF	S3C post-launch updates (ADFs)	2027
SRAL/MWR L2 IPF	OS update to RHEL 9.10	2027
SRAL/MWR L2 IPF	GRIB2 updates	2027

6.1.2 OLCI

6.1.2.1 OLCI L1 Instrument Processing Facility

Changes and updates deployed in 2026:

- None

The next OLCI L1 processing updates are as follows:

- Spring 2026 release: minor release expected for potential bug fixes and S3C updates (ADFs) for launch preparation.
- S3C post-launch updates (ADFs) will be deployed in 2027 after commissioning.

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- The PUG removal of the OLCI chain, the OS upgrade to RHEL 9.10 and the updates to account for the GRIB2 migration related with the ECMWF IFS Cycle 50r2 will take place in 2027.

ID	Version	Planned operational release
OLCI L1 IPF	Spring 2026 - S3C pre-launch updates (ADFs)	Q3/2026
OLCI L1 IPF	S3C post-launch updates (ADFs)	2027
OLCI L1 IPF	OS update to RHEL 9.10	2027
OLCI L1 IPF	PUG removal and GRIB2 updates	2027

6.1.2.2 OLCI L2 Marine Instrument Processing Facility

Changes and updates deployed in 2026:

- OL__L2M.004.00.00: major release to the level 2 Water products under the Collection-4 processing baseline. Collection-4 introduces a major consolidation and enhancement of the OLCI ocean-colour processing chain, with an updated atmospheric correction. The update introduces the use of fully normalized remote sensing reflectance ($R_{rs} = \rho_w/\pi$), corrected for the BRDF by O25 algorithm. A new fluorescence product (FPH) is introduced and some variables names updated (chlor_a, Kd_490). The water quality flags are restructured, with obsolete flags removed, several renamed, and new flags added. Collection-4 also includes new system vicarious calibration gains for both OLCI-A and OLCI-B, corrections for radiometric discontinuities between cameras 3, 4 and 5, extended sun glint retrievals, and improved sea-ice screening. Finally, uncertainty processing is de-activated in NRT products, while NTC products retain uncertainty parameters with full propagation from L1B radiance.

The next OLCI L2 processing updates are as follows:

- OL__L2M.004.01: minor release to improve chlorophyll product and flagging and S3C updates (ADFs) for launch preparation.
- S3C post-launch updates (ADFs) will be deployed in 2027 after commissioning.
- The PUG removal of the OLCI chain and the OS upgrade to RHEL 9.10 will take place in 2027.
- The following main step will be in 2027-2028 (TBC) with the deployment of a Day-2 processor (or Collection-5) with a fully new design.

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ID	Version	Planned operational release
OLCI L2 IPF	OL__L2M.004.01	Q3/2026
OLCI L2 IPF	S3C post-launch updates (ADFs)	2027
OLCI L2 IPF	OS update to RHEL 9.10	2027
OLCI L2 IPF	PUG removal	2027
OLCI L2 IPF	Collection-5	2027-2028

6.1.2.3 OLCI L2 TCWV Instrument Processing Facility (New)

Changes and updates deployed in 2026:

- None (new processor)

The next OLCI L2 TCWV processing updates are as follows:

- H2O_NRT.001.00.00: first operational implementation together with S3C updates (ADFs) for launch preparation.
- S3C post-launch updates (ADFs) will be deployed in 2027 after commissioning.
- The PUG removal of the OLCI chain and the OS upgrade to RHEL 9.10 will take place in 2027.

ID	Version	Planned operational release
OLCI L2 TCWV IPF	H2O_NRT.001.00.00	Q3/2026
OLCI L2 TCWV IPF	S3C post-launch updates (ADFs)	2027
OLCI L2 TCWV IPF	OS update to RHEL 9.10	2027
OLCI L2 TCWV IPF	PUG removal	2027

6.1.3 SLSTR

6.1.3.1 SLSTR L1 Instrument Processing Facility

Changes and updates deployed in 2026:

- None

The next SLSTR L1 processing updates are as follows:

- SL__L1_.005.00.00: major release including the PUG removal of SLSTR chain and major L1 processor evolutions. The release will include F1 overshooting

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correction, introduction of TSIS-1 solar irradiance reference spectrum in SLSTR L1B products, updates in vicarious calibration and removal of obsolete clouds masking modules. These changes, implemented locally in RSP will be merged with the changes provided by ESA, in particular an increase of the VISICAL threshold for OLQC tests and minor bug fixes.

- Spring 2026: minor release expected for potential bug fixes and S3C updates (ADFs) for launch preparation.
- S3C post-launch updates (ADFs) will be deployed in 2027 after commissioning.
- The OS upgrade to RHEL 9.10 and the updates to account for the GRIB2 migration related with the ECMWF IFS Cycle 50r2 will take place in 2027.

ID	Version	Planned operational release
SLSTR L1 IPF	Spring 2026 - S3C pre-launch updates (ADFs)	Q3/2026
SLSTR L1 IPF	S3C post-launch updates (ADFs)	2027
SLSTR L1 IPF	OS update to RHEL 9.10	2027
SLSTR L1 IPF	GRIB2 updates	2027

SLSTR L2 Marine Instrument Processing Facility

Changes and updates deployed in 2026:

- None.

The next SLSTR L2 Marine processing updates are as follows:

- SL__SST.004.00.00: major release implementing the SLSTR L2 day-2 SST and Day-1 IST processor and the PUG removal in the SLSTR chain. The Day-2 SST/Day-1 IST pre-operational processor is running routinely in WEkEO within expected 4-6h timeliness since April 2024 for early user familiarisation. The deployments are expected on OPE in June 2026 (SST) and July 2026 (IST).
- Spring 2026: release to account for the S3C updates (ADFs) for launch preparation. S3C post-launch updates (ADFs) will be deployed in 2027 after commissioning.
- The OS upgrade to RHEL 9.10 and the updates to account for the GRIB2 migration related with the ECMWF IFS Cycle 50r2 will take place in 2027.
- In 2027-2028 there is also foreseen a release about a year after SLSTR L2 day-2 SST deployment for a scientific update.

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ID	Version	Planned operational release
SLSTR L2 IPF	SL__SST.004.00.00	Q3/2026
SLSTR L2 IPF	Spring 2026 - S3C pre-launch updates (ADFs)	2027
SLSTR L2 IPF	S3C post-launch updates (ADFs)	2027
SLSTR L2 IPF	OS update to RHEL 9.10	2027
SLSTR L2 IPF	GRIB2 updates	2027
SLSTR L2 IPF	SLSTR day-2 SST updates	2027-2028

6.1.3.2 SLSTR L2 NRT FRP Instrument Processing Facility

Changes and updates deployed in 2026:

- FRP_NRT.003.01.00: minor release for anomaly fixing (Sen3/AR/8553, Sen3/AR/8749 and Sen3/AR/8782).

The next SLSTR L2 NRT FRP processing updates are as follows:

- FRP_NRT.003.02.00: update in the L2 NRT FRP processor to account for the evolutions in the L1 processor (vicarious calibration), creation of a new side-product FGE (containing the image grid for the non-fire pixels, as needed by CAMS/GFAS developers) for enhanced user-friendliness and reduction of the size of the FRP product, consolidation of computation of the confidence levels and classes for each detected hotspot, and flagging of daytime false alarms, like the ones caused by large photovoltaic solar farms, high bright clouds in very high latitudes, or cloud edges.
- Spring 2026: release to account for S3C updates (ADFs) for launch preparation.
- S3C post-launch updates (ADFs) will be deployed in 2027 after commissioning.
- The OS upgrade to RHEL 9.10 will take place in 2027.

ID	Version	Planned operational release
SLSTR L2 NRT FRP IPF	FRP_NRT.003.02.00	Q3/2026
SLSTR L2 NRT FRP IPF	Spring 2026 - S3C pre-launch updates (ADFs)	2027
SLSTR L2 NRT FRP IPF	S3C post-launch updates (ADFs)	2027
SLSTR L2 NRT FRP IPF	OS update to RHEL 9.10	2027

6.1.3.3 Sentinel-3 SLSTR “Fast FRP”

The European Commission (EC) requested EUMETSAT via letter (received on 23 June 2025) to implement a regional early fire detection mission in order to achieve a timeliness of 30 minutes after sensing time (target 15 minutes). The current global mission delivers ~2h45 latency, mainly driven by the raw data dump in Svalbard ground station (happening every ~1h30) and the processing of SLSTR Level-1 data (~30mn).

A new IPF, called Sentinel-3 SLSTR “Fast FRP” is proposed to speed up substantially the processing chain from L0 to L2, by ingesting directly the raw data and generate this new L2 FRP product. This new IPF could help reduce the global mission latency to ~2h25. This processor would be also proposed for the regional mission processing, with the use of the EARS regional data services to achieve the global 30 minutes latency, requested by the EC. Besides a faster timeliness, science improvements are expected, thanks to the detection of hotspots directly in the native SLSTR detector grid, which is more appropriate for fire applications, comparable to what is done for FRP retrieval with MODIS, and in accordance with informal requests from NASA, NOAA or S3-NGO MAG.

A first prototype is under development and will be ready for offline testing in the first half of 2026, with operational deployment targeted for Fall 2027. The development represents a cross-divisional effort spanning algorithm development, processor engineering, and system integration.

6.1.3.4 SLSTR L2 NRT AOD Instrument Processing Facility

Changes and updates deployed in 2026:

- None

The next SLSTR L2 NRT AOD processing updates are as follows:

- AOD_NRT.003.02.00: update in the L2 NRT AOD processor to account for the evolutions in the L1 processor (vicarious calibration) and further improvements over the high latitude Oceans (Antarctic & Arctic).
- Summer 2026: release to account for S3C updates (ADFs) for launch preparation.
- S3C post-launch updates (ADFs) will be deployed in 2027 after commissioning.
- The OS upgrade to RHEL 9.10 will take place in 2027.

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ID	Version	Planned operational release
SLSTR L2 NTR AOD IPF	AOD_NRT.003.02.00	Q2/2026
SLSTR L2 NTR AOD IPF	Spring 2026 - S3C pre-launch updates (ADFs)	2027
SLSTR L2 NTR AOD IPF	S3C post-launch updates (ADFs)	2027
SLSTR L2 NTR AOD IPF	OS update to RHEL 9.10	2027

6.1.3.5 SLSTR L2 AMV Instrument Processing Facility

Changes and updates deployed in 2026:

- None

The next SLSTR L2 AMV processing updates are as follows:

- SL__AMV.001.01.05: minor release for anomaly fixing and to account for the S3C updates (ADFs) for launch preparation.
- S3C post-launch updates (ADFs) will be deployed in 2027 after commissioning.
- The OS upgrade to RHEL 9.10 and the updates to account for the GRIB2 migration related with the ECMWF IFS Cycle 50r2 will take place in 2027.

ID	Version	Planned operational release
SLSTR L2 AMV IPF	SL__AMV.001.01.05	Q2/2026
SLSTR L2 AMV IPF	TBC (Spring 2026) - S3C pre-launch updates (ADFs)	2027
SLSTR L2 AMV IPF	S3C post-launch updates (ADFs)	2027
SLSTR L2 AMV IPF	OS update to RHEL 9.10	2027

6.2 Sentinel-6

Sentinel-6 processing is split between RO-NTC (Non-Time Critical processing of Sentinel-6 RO data) and PDP (Payload Data Processing) for the altimetry products.

6.2.1 RO NTC Level 1

Current operational version: v4.2.1

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Changes and updates deployed in 2026:

- None

The next RO NTC Level 1 processing updates are as follows:

- Version v4.2.x – Data format update to align with other RO missions
- Version v4.3 – Sentinel-6B end-of-commissioning and processing of ionospheric data
- Version v5.0 – Transition to MME/PI, empirical error estimates (TBC)
- Version v6.0 – Transition to centralised RO facility

ID	Version	Planned operational release
RO NTC Level 1	v4.2	05/2026
RO NTC Level 1	v4.3	Q4/2026
RO NTC Level 1	v5.0	Q2/2027
RO NTC Level 1	v6.0	TBC

6.2.2 PDP

Current operational version: v4.1.1

Changes and updates deployed in 2026:

- None

The next Sentinel-6 PDP updates are as follows:

- Version 4.2.0 – Adjustments to auxiliary files for Sentinel-6B (as established during commissioning) and will add more quality flags and 20-Hz corrections to the Level 2 products, allowing the elimination of the Level 2P products.
- Version 4.3.0 – Planned major evolution based on the Road Map to be defined during 2026 through coordination with the Partners, leading to studies to be conducted in 2027. Roll-out will be followed by a full-mission reprocessing of both S6MF and S6B.

ID	Version	Planned operational release
Sentinel-6 PDP	v4.2.0	Q1/2027
Sentinel-6 PDP	v4.3.0	Q1/2028

6.3 Third-party data

In most cases, third-party data handling consists of passing on products generated outside of EUMETSAT without significant processing. A notable exception is the processing of commercial radio occultation data where EUMETSAT procures raw data from a commercial provider and implements the full processing chain and monitoring in NRT in-house. In addition, commercial data procured by partner organisations like NOAA are processed and monitored in Near-Real Time.

6.3.1 Commercial RO

The current operational version is v3.0.

Changes and updates deployed in 2026:

- None.

The next Commercial RO Level 1 processing updates are as follows:

- Version v4.0 – Processing of Spire data from level0
- Version v4.1 – Updates required due to NOAA procurement updates
- Version v4.2 – Updates required due to NOAA procurement updates
- Version v5.0 – Transition to central RO facility; empirical uncertainty estimates
- Version v5.1 – Updates due to EUMETSAT procurement updates
- Version v5.2 – Updates due to NOAA procurement updates

ID	Version	Planned operational release
CRO Level 1	v4.0	Q3/2026
CRO Level 1	v4.1	Q3/2026
CRO Level 1	v4.2	Q1/2027
CRO Level 1	v5.0	Q1/2027
CRO Level 1	v5.1	Q3/2027
CRO Level 1	v5.2	Q3/2027

Note that CRO release dates often need to be aligned with the start dates of Delivery Orders set by EUMETSAT or NOAA, which are not known in advance. Shifting of release dates might thus be required on relatively short notice. Note that Delivery Orders issued by NOAA are outside EUMETSAT's control but may still require processor updates; therefore, some flexibility in planning is required.

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7 RESOURCES

The team resources to coordinate all of the in-progress and planned studies are summarised in the tables below.

Roadmap	2023	2024	2025	2026	2027	Grand Total
Aerosol	0.4 FTE(s)	1.0 FTE(s)	1.1 FTE(s)	1.1 FTE(s)	1.1 FTE(s)	4.7 FTE(s)
Atmospheric Chemistry	0.7 FTE(s)	0.7 FTE(s)	0.7 FTE(s)	0.4 FTE(s)	0.0 FTE(s)	2.3 FTE(s)
Wind	0.3 FTE(s)	0.2 FTE(s)	0.3 FTE(s)	0.2 FTE(s)	0.2 FTE(s)	1.2 FTE(s)
Cloud	0.2 FTE(s)	0.0 FTE(s)	0.1 FTE(s)	0.1 FTE(s)	0.2 FTE(s)	0.6 FTE(s)
Fiducial Reference Measurements	0.1 FTE(s)	0.1 FTE(s)	1.3 FTE(s)	1.8 FTE(s)	2.2 FTE(s)	5.5 FTE(s)
Hyperspectral Infrared	0.9 FTE(s)	0.9 FTE(s)	0.9 FTE(s)	0.8 FTE(s)	0.6 FTE(s)	4.1 FTE(s)
Image Navigation, Registration and Calibration	0.6 FTE(s)	1.0 FTE(s)	0.6 FTE(s)	0.6 FTE(s)	0.6 FTE(s)	3.4 FTE(s)
Marine	0.8 FTE(s)	0.5 FTE(s)	0.9 FTE(s)	0.8 FTE(s)	0.8 FTE(s)	3.8 FTE(s)
Marine and Meteorology Pathfinders	1.0 FTE(s)	1.5 FTE(s)	1.5 FTE(s)	1.6 FTE(s)	1.2 FTE(s)	6.7 FTE(s)
Microwave	0.9 FTE(s)	0.8 FTE(s)	0.8 FTE(s)	0.1 FTE(s)	0.6 FTE(s)	3.2 FTE(s)
Radio Occultation	0.6 FTE(s)	0.6 FTE(s)	0.7 FTE(s)	0.8 FTE(s)	0.8 FTE(s)	3.5 FTE(s)
Grand Total	6.5 FTE(s)	7.3 FTE(s)	8.9 FTE(s)	8.3 FTE(s)	8.3 FTE(s)	39.0 FTE(s)

Table 2: Resources for Coordination of Studies for Mandatory Missions

Roadmap	2023	2024	2025	2026	2027	Grand Total
Aerosol	0.3 FTE(s)	0.3 FTE(s)	0.6 FTE(s)	0.4 FTE(s)	0.4 FTE(s)	2.2 FTE(s)
Atmospheric Chemistry	0.6 FTE(s)	0.9 FTE(s)	1.2 FTE(s)	1.6 FTE(s)	2.3 FTE(s)	6.8 FTE(s)
Cloud	0.2 FTE(s)	0.2 FTE(s)	0.2 FTE(s)	0.2 FTE(s)	0.2 FTE(s)	1.1 FTE(s)
Fiducial Reference Measurements	0.7 FTE(s)	1.3 FTE(s)	1.7 FTE(s)	2.2 FTE(s)	2.5 FTE(s)	8.4 FTE(s)
Greenhouse Gas	3.7 FTE(s)	3.4 FTE(s)	1.8 FTE(s)	1.5 FTE(s)	1.1 FTE(s)	11.5 FTE(s)
Image Navigation, Registration and Calibration	0.0 FTE(s)	0.0 FTE(s)	0.0 FTE(s)	0.3 FTE	0.1 FTE	0.4 FTE(s)
Marine	2.0 FTE(s)	1.7 FTE(s)	1.6 FTE(s)	2.4 FTE(s)	2.7 FTE(s)	10.4 FTE(s)
Marine and Meteorology Pathfinders	0.3 FTE(s)	0.2 FTE(s)	0.2 FTE(s)	0.4 FTE(s)	0.3 FTE(s)	1.5 FTE(s)
Microwave	0.1 FTE(s)	0.2 FTE(s)	0.2 FTE(s)	0.2 FTE(s)	0.1 FTE(s)	0.8 FTE(s)
Grand Total	7.9 FTE(s)	8.2 FTE(s)	7.5 FTE(s)	9.2 FTE(s)	9.7 FTE(s)	43.1 FTE(s)

Table 3: Resources for Coordination of Studies for Copernicus Missions

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APPENDIX A ACRONYM LIST

Scientific product development roadmap acronyms:

Acronym	Meaning
AER	Aerosol
ACh	Atmospheric Chemistry
AMV	Atmospheric Motion Vectors
CL	Cloud
FRM	Fiducial Reference Measurements
GHG	Greenhouse Gas
HSIR	Hyperspectral Infrared
INRC	Image Navigation, Registration and Calibration
MA	Marine
MMP	Marine and Meteorology Pathfinders
MW	Microwave
RO	Radio Occultation

Other acronyms:

Acronym	Meaning
3MI	Multi-Directional, Multi-Polarisation and Multi-Spectral Instrument
AAPP	ATOVS and AVHRR Pre-processing Package
ACSAF	Atmospheric Composition monitoring Satellite Application Facility
AOD	Aerosol Optical Depth
AVACS	A-train validation of Aerosol and Cloud Properties from SEVIRI
C3S	Copernicus Climate Change Service
CAMS	Copernicus Atmosphere Monitoring Service
CDR	Climate Data Records
CGMS	Coordination Group for Meteorological Satellites
CGS	Core Ground Segment
CNR	National Research Council (Italy)
CMEMS	Copernicus – Marine Environment Monitoring Service
EARS	EUMETSAT Advanced Retransmission Service
ECMWF	European Centre for Medium-range Weather Forecasting
EMORP	EPS and MSG Obsolescence Removal Project
EPIUG	EPS Processing Infrastructure Upgrade Project
EPS	EUMETSAT Polar System – First Generation
EPS-SG	EUMETSAT Polar System – Second Generation
ESA	European Space Agency
EUCLID	EUropean Cooperation for LIghtning Detection
FBF	File Buffer Facility
FCI	Flexible Combined Imager
FRESCO	Fast Retrieval Scheme for Clouds from the Oxygen A-band
FRP	Fire Radiative Power
GLD360	Global Lightning Detection 360 (proprietary name)

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Acronym	Meaning
GLM	Geostationary Lightning Mapper
GOME-2	Global Ozone Monitoring Experiment-2
GQA	Geometric Quality Assessment
GRUAN	GCOS Reference Upper Air Network
HLOS	Horizontal Line-Of-Sight
GNSS	Global Navigation Satellite System
GRAS	GNSS Receiver for Atmospheric Sounding
HSIR	Hyperspectral Infrared
IASI	Infrared Atmospheric Sounding Interferometer
ICI	Ice Cloud Imager
IDPF	Instrument Data Processing Facility
IMPF	IMage Processing Facility
IOCCG	International Ocean-Colour Coordinating Group
IPF	Instrument Processing Facility
IRASS	IRS Radiometric And Spectral Suite
ISS-LIS	International Space Station - Lightning Imaging Sensor
ITCZ	Inter-Tropical Convergence Zone
ITT	Invitation To Tender
IWP	Ice Water Path
JASON	Joint Altimetry Satellite Oceanography Network
KNMI	Koninklijk Nederlands Meteorologisch Instituut/ Royal Netherlands Meteorological Institute
L2PF	Level-2 Processing Facility
LER	Lambertian Equivalent Reflectance
LINET	Lightning Network (proprietary name)
LMA	Lightning Mapping Array
LMD	Laboratoire de météorologie dynamique
LSE	Land Surface Emissivity
LWP	Liquid Water Path
METImage	Multispectral imaging radiometer
Metop	Meteorological operational satellite
MSG	Meteosat Second Generation
MPEF	Meteorological Products Extraction Facility
MPMF	Sentinel-3 ground-segment Mission Performance Monitoring Facility
MTG	Meteosat Third Generation
MWI	Micro-Wave Imager
NTC	Non-Time Critical
NRT	Near Real Time
OEM	Optimal Estimation Method
OMSZ	Hungarian Meteorological Service
PDP	Payload Data Processing
PMAp	Polar Multi-sensor Aerosol product
POD	Precise Orbit Determination
PPG	Pixel-to-Pixel Gain

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Acronym	Meaning
PPF	Product Processing Facility
PSC	Principal Component Scores
PWLR3	Piece-Wise Linear Regression-cube
RFQ	Request for Quotation
RO	Radio Occultation
RTM	Radiative Transfer Model
SSP	Sub-Satellite Point
TBC	To Be Confirmed
TCE	Technical Computing Environment
TEC	Total Electron Content
TM-NRT	Near Real Time processor for Jason-2 and Jason-3
UV	UltraViolet
VS	Visiting Scientist

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APPENDIX B STUDIES COMPLETED DURING 2025 FOR MANDATORY MISSIONS

ID	Title	Link to study webpage
CL-18-004	3MI Cloud Algorithm Development Study Follow-on	https://www.eumetsat.int/framework-development-cloud-products-s2clap
CL-25-002-S	Support to the development of machine learning approaches for the improvement of cloud retrievals	https://www.eumetsat.int/framework-development-cloud-products-s2clap
MA-19-005	Geostationary products and MTG FCI potential for Ocean Colour	https://www.eumetsat.int/OC-GEO
MMP-23-003-S	Miscellaneous AI/ML studies for algorithms	N/A, placeholder for use of AI/ML budget for studies which have been created as separate entries
MMP-23-014-S	Methane detection from FCI	Webpage not required

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APPENDIX C ROLL-OUTS OF 2025 FOR MANDATORY MISSIONS

ID	Version	Short description
ASCAT PPF	11.6	Minor bug fixes
PPF-ATOVS1	5.10.4	Fix calibration coefficients in presence of moon contamination
PPF-ATOVS1	5.10.5	Fix AMSU radiances set to -inf in channel 3
PPF-ATOVS1	5.10.6	Lack of records in the sliding window
PPF-ATOVS1	5.10.7	Fix AMSU Ch. 3 radiances not available
AVHRR AMV PPF	3.4.1-2	Update the selection policy for forecast file
GOME-2 L1 PPF	7.1.1	Fix DEM reading functionality of PPF-GOME
GOME-2 L1 PPF	7.1.2	Update solar model activation in Metop-B
IASI L2 CAF	6.7.5	Fix AVHR AMV gaps of Metop-B data
IASI L2 CAF	6.7.6	Fix AMSU channel degradation on MW-IR synergistic all-sky processing
IASI 3DW	1.1	Implement the parallax correction
PMAp PPF	2.2.7	Fixes an anomaly related to the use of GOME-2 LER impacting the quality of AOD for pixels over land
PMAp PPF	2.2.8	Account for the L1 updated degradation correction from GOME-2
IMPF	1.4.0	EMORP migration to new MIC infrastructure and the migration to RHEL 9.2
IDPF-I	5.13	<u>LI STC Filter Optimization, IQT V4P2 integration (Q2-2025)</u>
IDPF-I	5.14	<u>IQT V4P3(last Space segment delivery) integration into IDPF-I</u>

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APPENDIX D STUDIES COMPLETED DURING 2025 FOR COPERNICUS MISSIONS

ID	Title	Link to study webpage
AER-20-002	Aerosol Height assessment from Sentinel-3	https://www.eumetsat.int/sentinel-3-olci-o2-aerosol-layer-height-olcoah
GHG-21-021-S	Pre-development of operational GHG level-2 processor based on FOCAL/UoL-FP proto-type	N/A
GHG-21-023-S	Pre-development of operational GHG level-2 processor based on RemoTec proto-type	N/A
GHG-21-024-S	Pre-development of operational Aerosol level-2 processor based on GRASp-CO2M proto-type	N/A
GHG-24-005-S	Update of the top-of-atmosphere test-data for the CO2 instrument	CO2M CO2I/NO2I Top-Of-Atmosphere simulations EUMETSAT
MA-19-014C	Improvement of Sea Level Estimations into the leads (Polar Ocean) part 1	https://www.eumetsat.int/cope-rnicus-altimetry-services-copas
MA-20-019-F	Sentinel-3 L2P/L3 Service	https://www.eumetsat.int/new-S3-sral-wave-products ; https://www.eumetsat.int/update-sentinel-3-sral-level-2-wave-product ; https://www.eumetsat.int/corrected-S3b-sea-surface-heights-products
MA-21-017-S	Advanced capabilities of Sentinel 3 Altimeter	https://www.eumetsat.int/cope-rnicus-altimetry-services-copas

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APPENDIX E ROLL-OUTS OF 2025 FOR COPERNICUS MISSIONS

ID	Version	Short description
OLCI L1 IPF	OL_L1_.004.01.00	Routine calibration geometric and radiometric ADF updates provided by ESA
SLSTR L2 NRT FRP IPF	FRP_NRT.003.01.00	Corrective maintenance
SLSTR L2 AMV IPF	SL__AMV.001.01.00	First operational implementation
SLSTR L2 AMV IPF	SL__AMV.001.01.01	Anomaly fixes
SLSTR L2 AMV IPF	SL__AMV.001.01.02	Anomaly fixes
SLSTR L2 AMV IPF	SL__AMV.001.01.03	Anomaly fixes
SLSTR L2 AMV IPF	SL__AMV.001.01.04	Anomaly fixes
SYNERGY L1C	3.0.1	First pre-operational release
SYNERGY L1C	3.0.2	Update handling of resampling, masking and viewing angle
SYNERGY L1C	3.2.0	Improved resampling methods, removal of cosmetic pixels, support for orphan pixels
RO NTC Level 1	4.1	Galileo capability
Sentinel-6 PDP	4.1.0	Incorporate multi-mission GDR-G standards
Sentinel-6 PDP	4.1.1	Anomaly fixes