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## STATUS OF THE CURRENT AND FUTURE ESA EARTH OBSERVATION MISSIONS AND PROGRAMMES

CGMS is informed of the status of the European Space Agency's **Earth observation missions currently in-orbit**. Three of them – MSG, MTG and MetOp – are in cooperation with EUMETSAT, as are the future Aeolus-2 and EPS-Sterna programmes.

Meteosat Third Generation Imager 1 (MTG-I1) was launched successfully in December 2022, marking the advent of a new generation of meteorological satellites that will provide better monitoring and forecasting of severe weather events. ESA has recently reviewed the 2-Year in-orbit incentive report and confirmed the full achievement of this milestone. MTG-I2 is set to launch in mid-2026 on an Ariane 62 rocket with the satellite assembly, integration and test activities progressing as expected. MTG-S1 was launched in July 2025 carrying the Sentinel-4 instrument and in-orbit verification activities are largely on track. MetOp-SG-A1 launched in August 2025 carrying instruments including Sentinel-5 and the satellite In-Orbit Verification (SIOV) phase was successfully completed in December and satellite operations have been handed over from ESA to EUMETSAT for the calibration and validation phase.

Copernicus represents the major continuing initiative of European efforts in Earth Observation. The first Copernicus dedicated satellite (“Sentinel-1A”) was launched on 3 April 2014, followed by series of satellites until Sentinel-6 Michael Freilich in November 2020. Others will follow in the coming years from the next generation of Sentinels and the Copernicus expansion missions. Sentinel missions are developed, launched, and operated in partnership with the European Union and EUMETSAT. 2025 saw the launch of 4 Sentinel missions – Sentinel-1D, Sentinel-4, Sentinel-5, and Sentinel-6B.

The Earth Explorer missions – SMOS, CryoSat-2, Swarm, EarthCARE, and Biomass – currently in orbit are performing extremely well and the related data exploitation is based on continuous data of excellent quality. The five missions all feature strong elements of international collaboration and a growing synergy between them. For Aeolus, End-Of-Life Activities were conducted from 3 April to 5 July 2023, and it was successfully deorbited on 23 July 2023. Aeolus was the first satellite mission to successfully acquire wind profiles at a global scale, and a follow-on Aeolus-2 mission is in the planning, in collaboration with EUMETSAT.

The Proba-V CubeSat Companion (PV-CC) was launched on 9 October 2023 as part of the Small Satellites Mission Service (SSMS) rideshare mission, on board Vega flight VV23. The PV-CC successfully concluded its LEOP activities less than 24 hours after launch and its commissioning

activities began straight afterwards. Proba-V CubeSat hyperspectral companion (IperLite) was launched on 28 November 2025 and is in the commissioning phase.

CGMS is further informed of the status of the European Space Agency's **Earth observation future missions**. While ESA has a wealth of experience under its belt in observing Earth from space, the sector is changing rapidly – becoming increasingly competitive, but also offering new opportunities as Earth Observation data becomes increasingly essential for informed decision-making in the climate crisis, the digital revolution continues at pace, and topics such as resilience and security are at the forefront of global space conversations. Through its backbone research and development Future Earth Observation programme (FutureEO), ESA is committed to remaining ahead of the game, preparing the next generation of Earth Observation technologies, missions, and applications that will help Europe address environmental, social, and economic challenges.

Progress in the preparation of the forthcoming Explorer missions – FLEX, FORUM, and Harmony – is described in this report, as well as progress on WIVERN, the 11th Earth Explorer mission selected by Member States in September after meticulous preparation and rigorous evaluation. A call for ideas was issued for Earth Explorer 12 (EE12) proposals in February 2023, and 4 mission ideas were selected in March 2024 to proceed to Phase A assessment – CyroRad, ECO, Hyrdoterra+ and Keystone. Preparation is intensifying, with the candidates undergoing rigorous Phase 0 studies, culminating in the User Consultation Meeting on 7-8 July in Tallinn, Estonia.

Activities related to Aeolus-2, Arctic Weather Satellite (AWS), and EPS-Sterna in cooperation with EUMETSAT, as well as SCOUTs and ALTIUS are ongoing. Each of these missions are planned to contribute routine, operational monitoring data to improve our understanding of the Earth system and climate change. In 2025, ESA made the difficult decision to discontinue the TRUTHS programme.

Six Copernicus Expansion Missions – CHIME, CIMR, CO2M, CRISTAL, LSTM, and ROSE-L – are being studied to address EU policy and gaps in Copernicus user needs, and to expand the current capabilities of the Copernicus space component. The System Requirements Reviews for all 6 missions have been completed.

CGMS is also informed of the status of the Earth Watch Programme element, Global Monitoring of Essential Climate Variables (also known as the 'ESA Climate Change Initiative' or CCI). The CCI focuses on the exploitation of data records primarily, but not exclusively, from past ESA satellite missions, for the benefit of climate monitoring and climate research. Specifically, the CCI supports the study and monitoring of 27 essential climate variables (ECV) derived from satellite data, thereby helping to fulfil the objectives of the WMO Global Climate Observing System (GCOS).



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# STATUS OF THE CURRENT AND FUTURE ESA EARTH OBSERVATION MISSIONS AND PROGRAMMES

## 1. INTRODUCTION

This paper provides information on the status of the current and future European Space Agency Earth Observation missions as of April 2026. ESA's EO Programme comprises a science and research element, which includes the Earth Explorer missions, and an Earth Watch element, which is designed to facilitate the delivery of Earth observation data for use in operational services. Earth Watch includes the well-established meteorological missions developed in coordination with the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). These missions (MSG, MTG, MetOp and MetOp-SG) are not dealt with in this report.

Current in-flight missions include R&D satellites missions from the Earth Explorer series, small satellites of the Proba and Scout series, and Sentinel satellites. The Sentinels specifically respond to the needs of Copernicus, which is the Earth Observation component of the European Union's space programme. The status of these missions is presented, as well as the progress in the development of the ESA Climate Change Initiative (CCI).

Although there are past ESA missions that are no longer operating, thousands of users still access the large ESA on-line archives to get products generated from their respective instrument complements.

**Important note:** The status provided in this document reflects the situation as of April 2026. Dates for launches and all other activities in the future are indicative at the time of writing.

## 2. ESA COUNCIL MEETING AT MINISTERIAL LEVEL – 2025 (CM25)

With an historic total ESA budget of €22,3 billion, the ESA Council at Ministerial Level in 2025 recognised the strategic, scientific, economic, and societal value of space and ESA was given a clear mandate by its Member States.

ESA Member States allocated €3,46 billion to Earth observation programmes, the highest level of investment ever secured, reflecting a strong and shared conviction: Earth observation is indispensable to address climate change, sustainability, resilience, and security, while simultaneously fostering science, innovation, competitiveness, and policy implementation.

FutureEO, ESA's flagship research and development programme, received its highest ever subscription rate, allowing Europe to continue delivering innovative science and preparing both current and future operational missions through this backbone Earth observation programme. InCubed (an ESA Public Private Partnership co-funding programme investing in industrial innovation), DTE (Digital Twin Earth, ESA's contribution to Europe's DestinE programme) and the Copernicus Space Component (CSC) were all fully subscribed. The new ERS EO programme on security and resilience was also well subscribed.

With this excellent result, ESA's Earth observation programmes will simultaneously strengthen science activities, address climate, environmental and sustainability challenges, and support policy implementation on a global scale, as well as initiate new projects in resilience and security.

### 3. CURRENT ESA SATELLITE SYSTEMS

Satellites	Equator Crossing Time /Altitude	Launch date	Access to data or products	Instruments	Applications and other information
PROBA-1	7:30 (D) 615 km	22/10/2001	Earthnet on line	CHRIS, SREM	The orbit is drifting from the original 10:30 desc. ECT.
SMOS (with CNES and CDTI)	06:00 (A) 755 km	02/11/2009	SMOS data centres	MIRAS (Microwave Imaging Radiometer using Aperture Synthesis), GPS, STA	L-band radiometer for salinity & soil moisture observation
PROBA-2	06:00 (A) 730 km	02/11/2009	Earthnet on line	SWAP, LYRA, TPMU, DSLP	2nd flight unit of the PROBA programme. Main mission: space weather
CryoSat-2	717 km (92° incl.)	08/04/2010	Earthnet on line	SIRAL (SAR Interferometric Radar Altimeter), DORIS, LRR	Polar ice monitoring
EarthCARE (with JAXA)	14:00 (D) 393 km	29/05/2024	Earthnet on line	Cloud Profiling Radar, Atmospheric Lidar, Multispectral Imager, Broadband Radiometer	3D structure of cloud and aerosols
Biomass	06:00 (A) 98° 666 km	29/04/2025	Earthnet on line	P-band SAR	3D forest structure mapping and precise carbon stock measurements at 200 m resolution.
HydroGNSS (2 identical satellites 180° apart)	10:30 (A) 98.7° 550 km	28/11/2025	FTP	Space GNSS Receiver aka Delay doppler mapping receiver with 2 antennas: zenith and nadir.	Using GNSS reflectometry to 'scout for water', HydroGNSS will provide information on wetlands, freeze-thaw states over permafrost, soil moisture, and forest carbon stocks.
Swarm A & C (with CNES and CSA)	87.35° 460 km	22/11/2013	Earthnet on line	ACC, SM, EFI (SWARM), GPS (ESA), LRR (DLR), STR (SWARM), VFM	Earth magnetic field
Swarm B	87.75° 530 km	22/11/2013	Earthnet on line		
Proba-V Hyperspectral Companion (IperLite)	510 km	28/11/2025	Earthnet on line	Advanced hyperspectral sensor	Next-generation hyperspectral imaging system. The payload will be hosted on AerospaceLab's VSP-150 satellite platform.
Sentinel-1A (with EC)	06:00 (D) 693 km	03/04/2014	Copernicus Space component data access	SAR-C	Radar imagery
Sentinel-1C (with EC)	06:00 (D) 693 km	05/12/2024	Copernicus Space component data access	SAR-C	Radar imagery
Sentinel-1D (with EC)	06:00 (D) 693 km	04/11/2025	Copernicus Space component data access	SAR-C	Radar imagery
Sentinel-2A (with EC)	10:30 (D) 786 km	22/06/2015	Payload Data Ground Segment (PDGS) and at appointed X-band stations.	MSI (Multispectral imager)	Land and vegetation observation
Sentinel-2B (with EC)	10:30 (D) 786 km	06/03/2017	Payload Data Ground Segment (PDGS) and at appointed X-band stations.	MSI (Multispectral imager)	Land and vegetation observation
Sentinel-2C (with EC)	10:30 (D) 786 km	05/09/2024	Payload Data Ground Segment (PDGS) and at appointed X-band stations.	MSI (Multispectral imager)	Land and vegetation observation
Sentinel-3A (with EC)	10:00 (D) 814.5 km	16/02/2016	Payload Data Ground Segment (PDGS) and at appointed X-band stations.	DORIS, GPS, LRR, MWR, OLCI, SLSTR, SRAL	Primary mission: ocean observation. Secondary mission: atmosphere and land applications
Sentinel-3B (with EC)	10:00 (D) 814.5 km	25/04/2018	Payload Data Ground Segment (PDGS) and at appointed X-band stations.	DORIS, GPS, LRR, MWR, OLCI, SLSTR, SRAL	Primary mission: ocean observation. Secondary mission: atmosphere and land applications
Sentinel-4 (With EC and EUMETSAT)	35779 km Period: 1436 mins	01/07/2025	EUMETSAT	<a href="#">UVN (Sentinel-4)</a>	Monitor key air quality trace gases and aerosols over Europe at high spatial resolution and with a fast revisit time. The Sentinel-4A mission is carried on MTG S1.



Satellites	Equator Crossing Time /Altitude	Launch date	Access to data or products	Instruments	Applications and other information
Sentinel-5P (with EC and NSO)	13:30 (D) 824 km	13/10/2017	Payload Data Ground Segment (PDGS) and at appointed X-band stations.	TROPOMI	Atmospheric composition and air quality monitoring.
Sentinel-5 (With EC and EUMETSAT)	824 km Period: 101.4 mins	13/08/2025	EUMETSAT	<a href="#">UVNS (Sentinel-5)</a>	Monitor key air quality trace gases, aerosols and UV index at high spatial resolution and with a daily global revisit time. Sentinel-5 A is carried on MTG-SG-A1.
Sentinel-6 Michael Freilich	non-Sun- synchronous orbit 1336 km	21/11/2020	Payload Data Ground Segment (PDGS) and at appointed X-band stations.	AMR-C, DORIS-NG, GNSS POD Receiver, GNSS-RO Receiver, LRA (Sentinel-6), Poseidon-4 Altimeter	Continuity of the reference, high-precision ocean topography service after Jason-3
Sentinel-6B (with EUM, EC, NASA, NOAA)	1343 km Period: 112.4 mins	17/11/2025	Payload Data Ground Segment (PDGS) and at appointed X-band stations.	<a href="#">AMR-C</a> , <a href="#">DGXX-S</a> , <a href="#">GNSS POD Receiver</a> , <a href="#">GNSS-RO Receiver</a> , <a href="#">LRA (Sentinel-6)</a> , <a href="#">Poseidon-4 Altimeter</a>	Precision sea level, sea surface height, significant wave height, inland water heights and other products tailored to operational services in the ocean, climate, atmospheric and land Copernicus Services.

## 4. STATUS OF CURRENT EARTH EXPLORER SATELLITES

Five ESA Earth Explorer missions are currently in operation, namely SMOS (launched in 2009), CryoSat-2 (launched in 2010), the Swarm constellation of 3 satellites (launched in 2013), EarthCARE (launched in 2024), and Biomass (launched in 2025). All five missions, as well as Aeolus (which was deorbited in July 2023) and GOCE (which was retired in 2013), have provided outstanding results of interest to the meteorological and climate research communities at large. The overall performance of the SMOS, CryoSat, Swarm, EarthCARE, and Biomass missions remains excellent.

### 4.1. SMOS

Launched on 2 November 2009, ESA's Soil Moisture and Ocean Salinity (SMOS) mission is the second Earth Explorer Opportunity Mission to be developed as part of ESA's Living Planet Programme. SMOS carries a novel microwave sensor to capture images of brightness temperature, from which information on soil moisture and ocean salinity can be derived. By consistently mapping these two important components in the water cycle, SMOS is advancing our understanding of the exchange processes between Earth's surface and atmosphere and is helping to improve weather and climate models.

*Since the last reporting period:*

- The overall performance of the SMOS mission with an availability of 99.72% was excellent.
- A refined SMOS L3 v3.6 sea ice thickness product was deployed.
- The CNES/ESA SMOS REVEX review confirmed the excellent condition of all mission elements and the continued high impact on science. The potential to operate the mission for another three years has been confirmed.
- On 19<sup>th</sup> March 2026, SMOS overtook ERS-2 as ESA's longest operating EO mission.

### 4.2. CryoSat-2

ESA's Earth Explorer CryoSat-2 mission, launched on 8 April 2010, is dedicated to the precise monitoring of the changes in the thickness of marine ice floating in the polar oceans and variations in the thickness of the vast ice sheets that overlie Greenland and Antarctica.

*Since the last reporting period:*

- The overall performance of the mission (98.76%) has been outstanding and remains well above the design specifications. Since the start of the exploitation phase, the overall system availability

has been 99.26%.

- All ground segment activities and quality monitoring are progressing according to plan.
- The CMPR review with industry confirmed the very good status of CryoSat and extended its projected lifetime into the early 2030s. The end of life of the satellite is estimated to be between winter 2030 and summer 2032. CryoSat celebrated its 15<sup>th</sup> anniversary in space with a dedicated session at LPS25.
- The development of Baseline F ice has been completed and is under validation by the Quality Working Group. The operational release of the baseline is expected at the end of June 2026.

### 4.3. Swarm

Swarm is the fourth Earth Explorer Opportunity Mission of ESA's Earth Observation Envelope Programme. This constellation of three satellites is designed to measure the magnetic signals that stem from Earth's core, mantle, crust, oceans, ionosphere, and magnetosphere.

*Since the last reporting period:*

- The overall mission performance has remained nominal.
- May 2025 saw the first Swarm and MSS-1 Joint Scientific Conference in Macau, China. Senior leaders from ESA and Macau opened the conference, which saw new data and scientific studies presented.
- Completion of the 3<sup>rd</sup> L1B full mission reprocessing was endorsed by the cal/val community during the 15<sup>th</sup> Data Quality Workshop at which more than 140 participants discussed Swarm data and synergies with other "Magnetic" missions.

### 4.4. EarthCARE

Launched in May 2024, the Earth Cloud Aerosol and Radiation Explorer (EarthCARE) mission is a joint ESA/JAXA one that is now fully operational. EarthCARE is equipped with four instruments. JAXA provides the cloud profiling radar, which provides information on the vertical structure and internal dynamics of clouds. The other three instruments are provided by ESA: an atmospheric lidar, delivering cloud-top information and profiles of thin clouds and aerosols; a multispectral imager, offering a wide-scene overview in multiple wavelengths; and a broadband radiometer measuring reflected solar radiation and outgoing infrared radiation. Together these make a range of different measurements that will shed light on the role that clouds and aerosols play in regulating Earth's climate.

*Since the last reporting period:*

- The first EarthCARE in Orbit Performance Review was held in June 2025 with the lifetime estimate update showing a conservative mission lifetime of 10+ years.
- The first in orbit Science workshop was held at the Living Planet Symposium (LPS) with very good attendance and enthusiasm from scientists regarding the extended lifetime.
- EarthCARE's scope has exceeded expectations. In addition to cloud and aerosol observations, EarthCARE can also detect other phenomena such as large swarms of insects.
- An EarthCARE Science and Validation workshop was held in December 2025 in Tokyo with over 200 participants celebrating achievements so far and witnessing the public release of the remaining 3 and 4 sensor Level 2 products after the Level 1 products were released to the public in January 2025.

## 4.5. Biomass

Launched in April 2025, Biomass is ESA's seventh Earth Explorer. As the first satellite to carry a P-band synthetic aperture radar, Biomass delivers unprecedented insights into Earth's forests. The deployment of the 12-metre radar reflector was a major technical milestone, allowing the satellite to "look through" dense forest canopies to create the first 3D maps of global forest carbon.

Biomass successfully completed the In Orbit and Commissioning Review in the reporting period. The first Biomass images were revealed at the Living Planet Symposium in June 2025. Level-1A and 1B data are routinely available with Level-1C and Level-2A following in June 2026. The mission and all activities are on-going nominally since the start of Phase-E2 and the related Tomographic Phase.

In the first year since orbit the following Biomass activities have taken place:

- The LEOP and deployment of the Large Deployable Reflector were executed flawlessly.
- The antenna pattern characterisation, Targets of Opportunity characterisation, and selection activities were completed. The calibration transponder is regularly in use for commissioning activities, and its formal performance demonstration has been completed.
- The first PolInSAR/Biomass conference after the Biomass launch was organised in January 2026 in Ljubljana/Slovenia and was a great success.
- Biomass celebrated one year in orbit, already demonstrating its remarkable scientific potential. Beyond forests, BIOMASS's P-band radar is unlocking new possibilities by offering opportunities to explore other aspects of Earth, such as measuring ice sheet velocities and potentially sub-surface geology in arid regions.

## 5. STATUS OF CURRENT EARTH WATCH SATELLITES

The Earth Watch programme encompasses the development of the series of operational meteorological satellites of EUMETSAT including EPS-Sterna (**not covered in this report**). The satellites in the Earth Watch programme include the Arctic Weather Satellite (AWS) and the Proba series of small satellites for medium-resolution imagery.

### 5.1. Arctic Weather Satellite (AWS)

Approved at Space19+ (ESA's Council at Ministerial Level), this small satellite (~100 kg) is the prototype for the future constellation of small satellites, EPS-Sterna, carrying microwave sounder instruments. The AWS advanced sensors provide information about humidity, precipitation, and ice clouds in the atmosphere. This data offers meteorological institutes excellent opportunities to improve weather forecasts in Arctic and subarctic areas and helps improve the quality of global forecasts.

AWS was launched on 16 August 2024 and this prototype is serving as a demo for the future EPS-Sterna constellation.

In the reporting period:

- The satellite has maintained nominal operations, with the Direct Data Broadcast Service on. Data timeliness has been improved.
- The commissioning Results Review was successfully completed.
- The spacecraft characterisation database was updated to improve the L1B product quality to improve the scan dependent bias.
- The funding to cover a one-year extension of in-orbit operations was confirmed at CM25.
- Since January 2026, orbital maintenance manoeuvres have been carried out using a single electric propulsion thruster, rather than the nominal two thrusters, due to a malfunction in one of the two nominal thruster units. A recovery procedure for the thruster has been identified, which requires an update to the on-board software.

### 5.2. Proba-V and Proba-V CubeSat Companion

The operations of the Vegetation instrument on-board Proba-V ended as planned in October 2021 and the Proba-V CubeSat Companion (PV-CC) in September 2024. The Proba-V programme element remained in a period of minimal activities until the start of the activities for the tasking interface and data production of the Proba-V CubeSat hyperspectral companion (IperLite) which successfully launched on



28 November 2025 and is currently in the commissioning phase. The IperLite mission will demonstrate a next-generation hyperspectral imaging system, featuring compact, high-resolution sensors optimised for Earth observation. At the core of the mission is an advanced hyperspectral sensor, utilising thin-film interference filters directly deposited on a 2D detector.

The operations of the Vegetation instrument on-Board Proba-V have ended as planned in October 2021, followed by an experimental phase of 1 year, while the Proba-V secondary instruments (e.g. EPT instrument) are operated regularly and remain fully operational. Currently all the 3 cameras of the VGT instrument are in the dark, therefore only Moon and dark current calibrations are performed.

## 6. THE COPERNICUS SENTINEL PROGRAMME

The Copernicus programme of Sentinel satellites is designed to provide reliable, timely and accurate services to manage the environment, understand and mitigate the effects of climate change, and help respond to crises. Copernicus provides access on a full, free, and open basis to its Sentinel data and the Copernicus services information products. In addition to data provided by the Sentinel satellites, the missions contributing to Copernicus – the Copernicus Contributing Missions – play a crucial role, delivering complementary data to ensure that a whole range of observational requirements is satisfied.

This activity is operated by ESA as the entrusted entity on behalf of the European Commission (COM). The primary users of the Contributing Missions activity are the six Copernicus services, mainly the Land, Emergency, Security and Marine services, while other users, such as EU Public Authorities, are secondary users (currently over 3000 registered users). The existing or planned Contributing Missions include commercial missions from EU Member States or Copernicus Participating States, commercial Very High Resolution (VHR) optical and radar mission operators, and other emerging European mission operators that make some of their data available for Copernicus.

*Highlights from the Copernicus missions since the last reporting period include:*

- Sentinel-1C In-Orbit Commissioning Review was completed. Sentinel-1D was launched on 4 November 2025 and is currently in the commissioning phase.
- The Sentinel-2A temporary extension campaign has been underway since 13 March 2025 and is set to complete in May 2026.
- Preparations for Sentinel-3C have proceeded very well with the satellite due to launch after Q3 2026.
- The Sentinel-4 instrument was successfully launched onboard MTG-S1 on 1 July 2025.
- Sentinel-5A Launched successfully on 13 August 2025 as an instrument hosted on the MetOp Second Generation A-type weather satellite.
- Sentinel-6B was launched on 17 November 2025. Following a successful LEOP, the responsibility for the flight operations segment activities was transferred from ESA to EUMETSAT.

## 6.1. Sentinel-1

The Sentinel-1 mission is a polar-orbiting satellite system for the continuation of Synthetic Aperture Radar (SAR) operational applications. Sentinel-1 is a C-band imaging radar mission that provides all-weather day-and-night images for GMES user services. The SAR operates in two main modes: Interferometric Wide Swath (with a swath width of 250km and a ground resolution of 5×20m) and Wave. Sentinel-1A was successfully launched on 3 April 2014 and commissioned in September 2014. Sentinel-1B was launched on 25 April 2016 and commissioned in September of the same year. Sentinel-1C was launched on 5 December 2024 and the In-Orbit Commissioning Review (IOCR) successfully took place on 7 May 2025. Sentinel-1D successfully launched on 4 November 2025 and the Commissioning phase is proceeding according to plan.

Sentinel-1A operations continue to take place in very challenging conditions because of the propulsion system degradation. Sentinel-1A has completed 12 years in orbit, far exceeding its nominal lifetime. Sentinel-1 operations will continue with three satellites for a period of ten weeks to allow for a smooth phase-in/out between Sentinel 1-A and D. Nominal operations with two satellites are planned for the end of June 2026.

Sentinel-1B unavailability started on 23 December 2021 and on 3 August 2022, the end of exploitation was announced by ESA and COM.

After reaching the orbital node for cross-calibration at a 1-day interval with Sentinel-1A, Sentinel-1C entered its commissioning phase, which was completed in 7 May 2025. As per the Sentinel-1C IOC recommendation, the new Automatic Identification System (AIS) processor was rolled out in January 2026. This version significantly increases the Class A message-rate impacted by collision, while reducing the processing speed by two. This processor will also be the baseline for Sentinel-1D. The AIS data distribution is on hold pending final decision by COM on the way forward.

Sentinel-1D is in the commissioning phase after being placed into orbit very accurately from an Ariane 6 rocket 34 minutes after launch. The first images were released at CM25.

Sentinel-1 data has again contributed to several emergency events, in particular as a response to activations from the Copernicus Emergency Management Service (CEMS) and from the International Charter: Space and Major Disasters.

The Sentinel-1 Next Generation (NG) mission is designed to provide enhanced C-band Synthetic Aperture Radar imaging continuity, with a primary objective of achieving data quality that is equal to, or better than, the current Sentinel-1. This ensures compatibility with all current products and facilitates a seamless transition for users from the first-generation mission. Key advancements identified for the

Sentinel-1 NG include improved spatial resolution of 25 m<sup>2</sup> for dual polarisation at wider swaths exceeding 400 km; the current Sentinel-1 generation operates at 250 km and 100 m<sup>2</sup> in the main Interferometric Wide Swath mode. The Sentinel-1NG orbit will remain consistent with that of the first generation, shared with ROSE-L, featuring a repeat cycle of 6 days and an average local revisit time of 4 days. In line with COM's guidelines on hybrid constellation within the Copernicus Space Component (CSC), the Sentinel-1NG Mission is intended to complement small-sat commercial constellations.

## 6.2. Sentinel-2

A pair of Sentinel-2 satellites routinely deliver high-resolution optical images globally, with 5-day revisit, providing enhanced continuity of SPOT- and Landsat-type data. Sentinel-2 carries an optical payload with visible, near infrared and shortwave infrared sensors comprising 13 spectral bands: 4 bands at 10m, 6 bands at 20m and 3 bands at 60m spatial resolution (the latter is dedicated to atmospheric corrections and cloud screening), with a swath width of 290 km.

The Sentinel-2A satellite was successfully launched on 22 June 2015, Sentinel-2B on 6 March 2017 and Sentinel-2C on 5 September 2024. In accordance with the Copernicus data policy, Sentinel-2 data products are made available systematically and free of charge to all data users including the general public, scientific and commercial users.

Sentinel-2 operations are proceeding nominally, with a good overall performance for all mission/system operational domains. The exceptional Sentinel-2A temporary extension campaign has been underway since 13 March 2025 and is set to complete in May 2026. The data acquired with Sentinel-2A will temporally complement the nominal two-satellite mission constellation (with Sentinel-2B and Sentinel-2C).

## 6.3. Sentinel-3

The main objective of the Sentinel-3 mission is to measure sea surface topography, sea and land surface temperature, and ocean and land surface colour with high accuracy and reliability to support ocean forecasting systems, environmental monitoring, and climate monitoring. The mission definition is driven by the need for continuity in provision of ERS, Envisat and SPOT-Vegetation data, with improvements in instrument performance and coverage.

Sentinel-3A was launched on 16 February 2016 and Sentinel-3B on 25 April 2018. Sentinel-3C is scheduled to launch after Q3 2026. The ESA-EUMETSAT Joint Steering Group (JSG) meeting reaffirmed recommendations related to the Sentinel-3 tandem-phase strategy and Sentinel-3A extended campaign scenarios, considering user priorities, programmatic constraints and preparations

for Sentinel-3C routine operations.

Both Sentinel-3A and Sentinel-3B are operating nominally and the overall performance is good. Sentinel-3 played a central role in tracking the extreme European heatwave of summer 2025, delivering high quality sea and land-surface temperature maps, vegetation stress indicators, and detecting widespread wildfires and smoke plums. Discussions between ESA, EUMETSAT, and COM continue regarding Sentinel-3C tandem phase and in-orbit standby scenarios.

## 6.4. Sentinel-4

The Sentinel-4 instrument successfully launched onboard MTG-S1 on 1 July 2025. The Sentinel-4 instrument data, jointly with other data from future meteorological missions, covers the need for continuous monitoring of atmospheric composition and air quality over Europe with a revisit time of about one hour. From geostationary orbit, Sentinel-4 provides information on a wide range of trace gases and pollutants to forecast and monitor air quality over Europe. The main data products will be O<sub>3</sub> (Ozone), NO<sub>2</sub> (Nitrogen dioxide), SO<sub>2</sub> (Sulphur dioxide), HCHO (Formaldehyde), CHOCHO (Glyoxal), and the aerosol optical depth.

Two Sentinel-4 instruments will be delivered to the Meteosat Third Generation (MTG) programme to be embarked on the two sounder satellites (MTG-S1 and MTG-S2), as customer-furnished Items, fully verified, qualified and calibrated together with the necessary ground support equipment, test models and system deliverable inputs. The main elements of the Sentinel-4 system are:

- The Proto-Flight Model (PFM) and the Flight Model (FM2) instruments, consisting of three main components: the Optical Instrument Module (OIM), the Instrument Control Unit (ICU) and the Scan Drive Electronic (SDE) unit.
- The Level 0 to Level 1b processor (L1OP) and the Level 1b to Level 2 Processor (L2OP), both hosted by the MTG Ground Segment. They include the interfaces to the users, the mission performance functions and the performance analyses, related, for example, to the instrument monitoring and trending together with the algorithms' maintenance and validation.

Following launch, LEOP and contamination avoidance, the instrument was successfully activated, all launch lock devices released, and in-orbit commissioning activities executed, including planned in-flight commissioning activities. The first images were released publicly on 21 October 2026. Since then, the instrument has been in nominal mode with the day-time earth scans and daily/weekly/monthly calibrations.

## 6.5. Sentinel-5

Sentinel-5A Launched successfully on Ariane 6 on 13 August 2025 as an instrument hosted on the MetOp Second Generation A-type weather satellite. The Sentinel-5 mission, jointly with data from other future meteorological missions, covers the need for continuous global monitoring of atmospheric composition and air quality. The main data products will be O<sub>3</sub> (Ozone), NO<sub>2</sub> (Nitrogen dioxide), SO<sub>2</sub> (Sulphur dioxide), HCHO (Formaldehyde), CHOCHO (Glyoxal), aerosol optical depth and layer height, CH<sub>4</sub> (Methane), CO (Carbon monoxide), UV index, and vegetation fluorescence (through the NIR channel extension).

The Sentinel-5 project comprises the development and production of three instruments to be embarked on subsequent MetOp-SG satellites (type A):

- The Sentinel-5A Proto-Flight Model (PFM) unit development, including the Level 1b and Level 2 ground processor prototypes, covered by the GMES Space Component Programme; and
- The Sentinel-5B and -5C units' development up to the pre-storage review covered by the Copernicus programme, and including the long-term storage of both instruments subject to approval by COM.

Sentinel-5A released its first images at CM25, instrument commissioning activities have been completed and the PFM instrument has been operated using the routine operations for Earth measurements and daily/weekly/monthly calibrations. Some issues appeared in orbit, causing the instrument to switch to safe mode on some occasions. Investigations into the root causes are ongoing, however the recovery procedures are well defined and in place.

The Sentinel-5 Precursor mission (Sentinel-5P) is a gap-filler between the end-of-life of the current atmospheric chemistry mission (OMI on EOS/Aura) and the operational availability of Sentinel-5. As a joint initiative between ESA and the Netherlands, the mission comprises a satellite and a UVNS instrument called TROPOMI (TROPOspheric Monitoring Instrument). Since April 2018, Sentinel-5P has been in routine operations, having reached full operational capacity in early March 2019. Sentinel-5 Precursor operations continued nominally during the reporting period. In November 2025, Sentinel-5P reached an important milestone with the successful deployment of upgraded L1B and L2 processors.

## 6.6. Sentinel-6

The Jason-CS satellites form the space component of the Jason Continuity of Service mission, within the Copernicus Space Component Segment 3. Jason-CS will extend high-accuracy ocean topography measurements, thanks to the participation of all partners (EUMETSAT, ESA, CNES, NOAA and



NASA/JPL).

Sentinel-6A Michael Freilich (Sentinel-6MF / Jason-CS) was launched on 21 November 2020. NASA and NOAA jointly act as the US party responsible for providing the launch services for both Sentinel-6 A and B satellites, US payload instruments and ground segment support, and contribute to the operations. Sentinel-6 MF satellite was handed over to Mission Operations (Phase E2) after its successful In-Orbit Commissioning Review on 16 November 2021. EUMETSAT is responsible for the mission's operations.

Sentinel-6B was launched 17 November 2025. Following successful LEOP on 19 November, the responsibility for the flight operations segment activities was transferred from ESA to EUMETSAT and the satellite in-orbit verification started.

## 7. FUTURE ESA SATELLITE SYSTEMS

### 7.1. Future Earth Explorer and Earth Watch missions

The Earth Explorers are research missions designed to address key scientific challenges identified by the science community while demonstrating breakthrough technology in observing techniques. Involving the science community right from the beginning in the definition of new missions and a peer-reviewed selection process ensures that a resulting mission is developed efficiently and provides the exact data required by the user.

#### **7.1.1. FLEX: Earth Explorer 8**

In November 2015, ESA's Member States selected FLEX as the 8th Earth Explorer mission upon recommendation from the Earth Science Advisory Committee. The Fluorescence Explorer (FLEX) mission will map vegetation fluorescence to quantify photosynthetic activity.

The conversion of atmospheric carbon dioxide and sunlight into energy-rich carbohydrates through photosynthesis is one of the most fundamental processes on Earth – and one on which we all depend. Information from FLEX will improve our understanding of the way carbon moves between plants and the atmosphere and how photosynthesis affects the carbon and water cycles. In addition, information from FLEX will lead to better insight into plant health and stress. This is of relevance since the growing global population is placing increasing demands on the production of food and animal feed.

So far, it has not been possible to measure photosynthetic activity from space, but FLEX's novel fluorescence imaging spectrometer will observe this faint glow, which serves as an indicator of photosynthesis. The FLEX satellite will orbit in tandem with one of the Copernicus Sentinel-3 satellites, taking advantage of its optical and thermal sensors to provide an integrated package of measurements.

FLEX is set launch with Copernicus Sentinel-3C on the same Vega-C flight, due to be launched after Q3 2026. Satellite AIT is ongoing and nominal, and the mechanical Launch Environment test campaign has been completed successfully. The remaining tests and activities, mainly radiated EMC, will be completed by the end of April 2026. After an anomaly was detected during satellite-level functional tests, the FLORIS ICU has been repaired and re-integrated into the satellite platform and has successfully passed all functional tests.

#### **7.1.2. FORUM: Earth Explorer 9**

FORUM was selected in September 2019 as Earth Explorer 9 and has an expected launch date of Q4 2027. The Far-infrared Outgoing Radiation Understanding and Monitoring (FORUM) mission will

provide new insight into the planet's radiation budget and how it is controlled and therefore improve climate models. More than half of Earth's outgoing longwave energy is in the far-infrared part of the electromagnetic spectrum, which has not been measured. FORUM will fill this gap.

Thanks to new technical developments, the FORUM mission would measure radiation emitted from Earth across the entire far-infrared part of the electromagnetic spectrum. Significantly, it measures in the 15–100-micron range, which has never been done from space before. These observations are important because Earth emits infrared radiation to space, which is affected by water vapour and cirrus clouds, which, in turn, play key roles in Earth's temperature.

FORUM's benchmark measurements would improve our understanding of the greenhouse effect and, importantly, contribute to the accuracy of climate change assessments that form the basis for policy decisions.

### ***7.1.3. HARMONY: Earth Explorer 10***

Harmony was selected in September 2022 as Earth Explorer 10 and has an expected launch date of 2029. Harmony will provide a wealth of new information about our oceans, ice, earthquakes, and volcanoes and will help to address societal issues, such as those laid out in the World Climate Research Programme's Grand Challenges and several of the UN's Sustainable Development Goals.

The mission will comprise two identical satellites orbiting Earth in convoy with a Copernicus Sentinel-1 satellite. Each Harmony satellite will carry a receive-only synthetic aperture radar and a multiview thermal-infrared instrument. Together with observations from Sentinel-1, Harmony will deliver a wide range of unique high-resolution observations of motion occurring at or near Earth's surface.

### ***7.1.4. WIVERN: Earth Explorer 11***

Following approval in 2025 at ESA's Programme Board for Earth Observation (PB EO) and Industrial Policy Committee (IPC), WIVERN (Wind Velocity Radar Nephoscope) was selected as the 11<sup>th</sup> Earth Explorer to be implemented through the agency's prestigious FutureEO programme. WIVERN aims to fill a notable gap providing the first measurements of wind within clouds together with information on the internal structure of clouds. The mission will also deliver profiles of rain, snow, and ice water. Carrying a dual polarisation, conically scanning, 94 GHz Doppler radar with an 800 km swath, the mission will improve forecasts of hazardous weather and provide new insights into severe storms, also contributing to the climate record of cloud and precipitation profiling.

Whilst the CAIRT (Changing Atmosphere Infrared Tomography) mission was not selected, its initial activities were completed, and steps have been taken to preserve the scientific maturity, legacy,

expertise, and advances achieved over the course of the Phase 0 and Phase A studies and previous years of work.

### **7.1.5. Earth Explorer 12**

The call for ideas for the next Earth Explorer 12 research mission opened in 2023. The motivation behind this call for mission ideas is ESA's wish to engage the scientific community as far as possible in determining and advancing the research mission activities within FutureEO-1 Segment 2. Through the call the Agency gathered the science community's views on which mission ideas could maximise scientific impact and innovation whilst responding to scientific and societal challenges, within the guidelines and constraints established within the call. Considering the experience from previous calls, and in line with the spirit of the FutureEO programme, the call solicited innovative and scientifically excellent ideas to be implemented as ESA-led Earth Explorer research missions.

In March 2024, the Advisory Committee for Earth Observation (ACEO) recommended the following four Mission Ideas to be selected for Phase 0 assessment studies:

**CryoRad** - A Low frequency wideband radiometer for the study of the cryosphere

**ECO** - The Earth Climate Observatory

**Hydroterra+** - A mission to observe rapid processes of the water cycle

**Keystone** - Unlocking the Upper Atmosphere.

To note, each of the four recommended mission ideas are variants/improvements of previously submitted Earth Explorer proposals.

All four candidate missions are undergoing rigorous Phase 0 studies. Across all four candidates, ESA has challenged initial cost estimates, prompting industry partners and the respective Mission Advisory Groups to investigate cost-reduction options through the potential relaxation of certain requirements. This careful balancing of scientific ambition and budgetary reality will culminate in the User Consultation Meeting on 7–8 July 2026 in Tallinn, Estonia. The formal selection of the two missions to proceed to feasibility studies (Phase A activities) is expected to be made by the ESA Programme Board on Earth Observation (PB-EO) in September 2026.

### **7.1.6. NGGM Gravity Mission**

In orbit from March 2009 to November 2013, the Gravity field and steady-state Ocean Explorer (GOCE) measured the Earth's gravity field with unprecedented detail to advance our understanding of ocean circulation, sea-level change and Earth- interior processes. GOCE successfully completed its last

measurement cycle at an altitude of 223.88 km on 19 October 2013. The satellite re-entered Earth's atmosphere on 11 November 2013.

In the frame of Missions of Opportunity made possible by international cooperation, ESA and NASA have coordinated studies of optimal gravity monitoring constellations formed by two or more pairs of satellites to observe mass changes in the Earth system. In 2016, the ESA-NASA Science Working Group issued the document "Towards a sustained observing system for mass transport to understand global change and to benefit society".

Programmatic discussions were also held in March 2020 between ESA and NASA, based on a series of meetings and teleconferences held in 2019, to identify the most suitable scenario for implementation of a joint mass change mission based on a joint constellation of 2 pairs of satellites in an optimum orbit configuration, leveraging on technology developments, and technical and scientific expertise available both in Europe and in the US. The proposed mission architecture responds to user requirements previously established by the Interagency Gravity Science Working Group and builds upon the heritage from CHAMP, GOCE, GRACE, and GRACE-FO.

The global science and user requirements were consolidated in a uniform traceable manner together with NASA. These requirements and a corresponding traceability matrix have been used to establish the mission requirements. The first issue of the Mission Requirements Document (Next Generation Gravity Mission as a Mass-change And Geosciences International Constellation (MAGIC) - A joint ESA/NASA double-pair mission based on NASA's MCDO and ESA's NGGM studies) - was released on 18 December 2020, following signatures of ESA and NASA. The MRD was distributed to Delegations in early 2021. In close coordination with NASA the Joint Mass Change Mission Expert Group (JMCMEG), consisting of 9 European members and 9 US members, was established to support the Phase A.

An ESA/NASA Joint Engineering Team (JET) has been set up with the goal to support and coordinate the technical interaction between ESA and NASA to enable the implementation of an affordable, technically feasible and scientifically valuable observing architecture for MAGIC. The JET was kicked off on 20 May 2021 with the scope to technically assess the conditions of delivery to ESA of the potential NASA contribution items (i.e., the cavity, Scale Factor Unit and the LRP with no adaptations from GRACE-C) on the P2 Laser Tracking Instrument (LTI). JET is also working on the evaluation of the environmental requirements applicable to US units and the discrepancies with the ESA requirements, and the high level interfaces between the ESA and NASA science data systems for the exchange of P1 and P2 Level-0 and Level-1 products.

NGGM has progressed well this year, completing key intermediate reviews as part of its ongoing joint

development with NASA, as well as continued excellent collaboration across the agencies. As part of the remarkable results at CM25 for FutureEO, NGGM's future was strongly supported by Member States. NGGM is currently in B1-B2 bridging phase planned to launch no later than 2032, with a minimum lifetime of 5.25 years and target lifetime of 7.25 years.

### **7.1.7. Aeolus-2**

Aeolus-2 is a Doppler Wind Lidar designed to measure atmospheric winds through measurement of doppler shifts in the backscatter of emitted laser light from molecules, water droplets and aerosols in the atmosphere. The measurement principle was successfully demonstrated with the first Aeolus mission, and the Aeolus Doppler Wind Lidar instrument has been ranked by ECMWF as having the second highest impact on the accuracy of Numerical Weather Prediction of any single Satellite instrument.

Aeolus-2 development is based on an evolution of the Aeolus heritage, considering the lessons learned from Aeolus as well as from other similar spaceborne laser projects. The objective of the Aeolus-2 mission is to provide the international community with the unique capability to measure atmospheric winds for the support of Numerical Weather Prediction and to improve the understanding of atmospheric dynamics and associated processes.

Launch of the first Aeolus-2 Satellite is foreseen in 2034, with a series of two Satellites providing over ten years of operations. The Aeolus-2 Space Segment consists of a series of two Satellites. The primary payload is a Doppler Wind Lidar instrument operating in the ultra-violet spectrum (355 nm). In addition, provided the accommodation is confirmed to be feasible, a Radio Occultation sounder (to provide high vertical resolution, all-weather atmospheric sounding by tracking Galileo, GPS and Beidou satellites) will also be embarked. The Aeolus-2 satellites will fly in a “dawn-dusk”, sun-synchronous orbit, with the satellite orbiting above the day-night terminator and the Doppler Wind Lidar instrument pointing 35° off-nadir, perpendicular to the ground track, to the night side of the Earth.

The Programme will be implemented in co-operation with EUMETSAT. In the reporting period, Aeolus-2 moved through Phase B2 preparations with an ESA–EUMETSAT joint roadmap under development.

### **7.1.8. TRUTHS**

Approved at the Space19+, TRUTHS aimed to provide benchmark measurements that improve our ability to estimate the radiative imbalances underlying climate change. Reference datasets from TRUTHS were to be used to calibrate other satellite sensors, such as those carried on the Copernicus missions and the emerging constellations of small satellites.

At the end of 2025, the difficult decision was taken to discontinue the TRUTHS programme due to affordability issues.

### **7.1.9. ALTIUS**

ALTIUS (Atmospheric Limb Tracker for Investigation of the Upcoming Stratosphere) is a satellite mission proposed by the Belgian Institute for Space Aeronomy and currently under development by ESA. Its main objective is to monitor the distribution and evolution of stratospheric ozone in the Earth's atmosphere. The satellite design is based on the PROBA small satellite bus. The payload is an innovative UV, visible and NIR instrument.

ALTIUS development has progressed steadily, with platform system tests largely completed and key optical elements successfully qualified. Following the resolution of an issue with the focal plane assembly, instrument integration has resumed, with the near-infrared (NIR) channel now fully integrated and in final alignment. Launch readiness is currently foreseen for Q1 2028.

## **7.2. Copernicus Expansion Missions**

Data from the Copernicus Sentinels developed by ESA, feeds into the Copernicus Services, which help address challenges such as urbanisation, food security, rising sea levels, diminishing polar ice, natural disasters and climate change. Looking to the future, six Copernicus Expansion missions are being studied to address EU policy and gaps in Copernicus user needs, and to expand the current capabilities of the Copernicus Space Component (CSC).

### **7.2.1. CHIME: Copernicus Hyperspectral Imaging Mission**

The CHIME mission, which includes a constellation of two satellites, aims at augmenting the CSC with precise spectroscopic measurements to derive quantitative surface characteristics supporting the monitoring, implementation, and improvement of a range of policies in the domain of raw materials, agriculture, soils, food security, biodiversity, environmental degradation and hazards, inland and coastal waters, snow, forestry, and the urban environment. The mission would complement Copernicus Sentinel-2 for applications such as land- cover mapping.

CHIME-A has a working launch date of Q3 2029, while CHIME-B is planned to be launched around 2 years later. Both satellites have a design life of seven years.

### **7.2.2. CIMR: Copernicus Imaging Microwave Radiometer**

The aim of the Copernicus Imaging Microwave Radiometer (CIMR) mission is to provide high-spatial

resolution microwave imaging radiometry measurements and derived products with continuous global coverage (~95% daily, no gap at the poles) and sub-daily (6 hours average) revisit in the polar regions and adjacent seas, to address Copernicus user needs. The primary mission requirements are to acquire global observations to address Sea Ice Concentration (SIC) and Sea Surface Temperature (SST) with secondary requirements covering a very wide number of parameters related to COM Arctic Policy including: ice-type, sea-ice drift, thin sea-ice thickness, terrestrial snow extent, sea surface salinity, ice surface temperature, wind speed over the ocean, soil moisture, and vegetation indices. CIMR satellites will operate in synergy with MetOp-SG(B), providing collocated and contemporaneous measurements in the polar regions with MWI/ICI and SCA instruments.

CIMR-A is anticipated to be launched after Q3 2029, and CIMR-B about six years later.

### ***7.2.3. CO2M: Copernicus Anthropogenic Carbon Dioxide Monitoring***

The Copernicus Anthropogenic Carbon Dioxide Monitoring (CO2M) mission includes a constellation of three satellites and aims to provide Copernicus with a CO<sub>2</sub> monitoring and verification support capacity that can estimate anthropogenic CO<sub>2</sub> emissions at country and megacity scales. This operational capacity shall support the evaluation of the implementation and effectiveness of the CO<sub>2</sub> emission reduction strategies proposed in the Paris Agreement. Such a system needs to provide accurate and consistent quantification of anthropogenic CO<sub>2</sub> emissions and their trends. As part of the product portfolio and in support of the main mission objective, CH<sub>4</sub>, NO<sub>2</sub>, aerosol and solar-induced fluorescence of vegetation will operationally be retrieved at a similarly high spatial resolution.

The first satellite in the series, CO2M-A, is planned to be launched after Q4 2027, followed by CO2M-B about 6 months later, and CO2M-C is expected about one year after CO2M-B.

### ***7.2.4. CRISTAL: Copernicus Polar Ice and Snow Topography Altimeter***

The Copernicus polaR Ice and Snow Topography ALtimeter (CRISTAL) Mission shall provide enhanced retrieval of land ice sheet/glacier elevation, sea ice thickness and freeboard and ocean surface elevation, wave-height and wind speed by measurements implementing higher spatial resolution. The primary high-level objectives are to monitor critical climate signals: ice sheet, ice cap melting and sea level, as well as to monitor variability of Arctic and Southern Ocean sea-ice and its snow loading to support Copernicus operational products and services concerning the polar regions. Other objectives are to support applications related to coastal and inland waters and contribute to the observation of ocean topography. CRISTAL will carry a multi-frequency radar altimeter and a microwave radiometer.

CRISTAL has a planned launch date of 2027.

### **7.2.5. LSTM: Copernicus Land Surface Temperature Monitoring**

Surface temperature is already being observed from space with thermal infrared (TIR) sensors, although at spatio-temporal resolutions insufficient for many applications and services, including agriculture. The LSTM mission, which includes a constellation of two satellites, will increase the spatial resolution of the TIR observations currently provided by Copernicus by a factor 400, bringing them to field scale. This mission shall be able to complement the current visible (VIS) and near-infrared (NIR) Copernicus observations with high spatio-temporal resolution TIR observations over land and coastal regions in support of agriculture management services and possibly a range of additional services.

The LSTM mission will consist of two satellites, with the first targeted for launch after Q4 2028. The expected lifetime of the mission is 7.5 years.

### **7.2.6. ROSE-L: L-band Synthetic Aperture Radar**

ESA has undertaken the development of the L-band Synthetic Aperture Radar (SAR) Mission, referred to as Radar Observing System for Europe (ROSE-L). This mission, which includes a constellation of two satellites, will acquire systematically and provide routinely data and information products for the Copernicus Marine, Land, Climate Change and Emergency services, as well as to the recently proposed Copernicus Land European Ground Motion service (EGMS).

ROSE-L's target applications are the measurement of surface deformation of vegetated and faster moving terrain, soil moisture, land cover classification, crop type discrimination and its temporal analysis. Furthermore, the mission will monitor Polar ice sheets and ice caps, and the sea-ice conditions (i.e. type, drift, deformation, concentration, lead fraction), as well as contribute to the European maritime situational awareness. Applications will be further enhanced through the combined use of ROSE-L and Sentinel-1. The ROSE-L mission will provide repeat-pass SAR interferometry (InSAR).

Launch of ROSE-L A is targeted for 2029 with ROSE-L B following around 2 years later.

## **7.3. ESA Climate Change Initiative (CCI)**

Combined satellite and *in situ* data archives can be used to produce data products for climate monitoring, modelling, and prediction. To this end, the ESA Climate Change Initiative (CCI) was launched in 2009. The CCI was created to address the GCOS Essential Climate Variable (ECV) requirements for satellite datasets and derived products. Its principal objective is to realise the full potential of the long-term global Earth observation archives that ESA, together with its Member States, have established over the last thirty years, as a significant and timely contribution to the ECV databases required by the UNFCCC. The CCI focuses primarily (but not exclusively) on the exploitation of data



records from past ESA satellite missions for the benefit of climate monitoring and climate research. It complements existing efforts in Europe (e.g. those led by EUMETSAT through the CM SAF) and internationally, with a focus on datasets that characterise meteorological aspects of the climate system. Following CM25, programmatic changes saw CCI / Climate-Space and the Global Development Assistance initiatives move to the Earth Action pillar of the FutureEO Programme.

ESA, largely through the CCI, participates in the joint CEOS/CGMS Working Group on Climate (WGClimate). CEOS/CGMS WGClimate also has a dedicated Greenhouse Gas Task Team (GHG-TT), which is led by ESA. The groups jointly organised a meeting together with GCOS on 09–12 February 2026 at ECSAT in the UK.

The ESA funded CMIP International Project Office continues to implement activities in preparation for the World Climate Research Programme's Coupled Model Intercomparison Project-7 (CMIP-7), hosted at ECSAT. The establishment of the CORDEX (Coordinated Regional Downscaling Experiment) international project office, also hosted at ECSAT, has also supported this effort. ESA was involved in several events and sessions at Climate COP 30 in Brazil sharing the latest advances in Earth observation to progress the mitigation and adaptation goals of the Paris Agreement.

ESA Earth observation activities will continue to evolve to anticipate and address the challenges of tomorrow, with the Earth Action pillar of our FutureEO programme turning observations into impact by enhancing uptake of data and the development of and solutions in support of climate and environmental policies and goals.