

Upcoming climate satellite missions

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Satellite	Launch schedule	Summary	Deliverers (TO BE FURTHER UPDATED)	Launch site (where known)	Link to more
AWS (Arctic Weather Satellite)	0Launched 16.08.2024	Will provide improved forecasts of weather over the Arctic. Its frequent coverage of Earth (orbiting every 97 minutes at 600km) will provide data for very short-term weather forecasts and nowcasts in the Arctic. Carrying a cross-track scanning microwave radiometer, the Arctic Weather Satellite mission provides measurements of atmospheric humidity and temperature. It is a forerunner of a potential constellation of 6 micro satellites, called EPS-Sterna, that ESA would build for Eumetsat if this first prototype Arctic Weather Satellite works well. They would sit in three orbital planes to supply an almost constant stream of temperature and humidity data from every location on Earth. This would, for the first time, allow for very short-range weather forecasting, or 'nowcasting', in the Arctic. The set of six microsattelites would be replenished three times. While the Arctic is the focus, meteorologists will also use the constellation to improve weather forecasts globally.	ESA, Thales, OHB Sweden, IABG Germany, AAC Omnisys (part of AAC Clyde Space)	SpSpaceX Falcon 9 California (ride share - with Phi Sat2)	https://www.esa.int/Applications/Observing_the_Earth/Meteorological_missions/Arctic_Weather_Satellite
φ-sat-2 (Phi Sat)	Launched 16.08.2024	A micro satellite that will further demonstrate the capabilities of artificial intelligence (AI) technology for Earth Observation. The use of these technologies will lead to new ways of collecting, distributing and analysing data about our planet.	SpaceX Falcon 9 California (ride share - with Phi Sat2)	SpaceX Falcon 9 (ride share with AWS? TBC)	https://www.esa.int/Applications/Observing_the_Earth/Phi-sat/Next_artificial_intelligence_mission_selected
Sentinel-2C	Launch due 05.09.2024	Will replace Sentinel-2A. Data gathered by Sentinel-2 satellites are used for monitoring land use and changes, soil sealing, land management, agriculture, forestry, natural disasters (floods, forest fires, landslides and erosion) and to assist humanitarian aid missions. Environmental observation in coastal areas likewise forms part of these activities, as does glacier, ice and snow monitoring. The telescope structure and the mirrors are made of silicon carbide, first pioneered by Airbus to provide very high optical stability and minimise thermo-elastic deformation, resulting in an excellent geometric image quality. This is unprecedented in this category of optical imagers.	ESA, Airbus, Thales	Vega, Guiana Space Centre, Kourou, French Guiana	https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Sentinel-2/Gearing_up_for_third_Sentinel-2_satellite https://sentiwiki.copernicus.eu/web/sentinel-2 https://www.airbus.com/en/newsroom/news/2023-03-three-sleeping-beauties-await-their-turn-in-orbit
Sentinel-1C	19.11.2024-19.12.2024 TBC	Will guarantee continuity from the first Sentinel generation, i.e. day-and-night monitoring of land, ice and oceans, and responding to Emergency Management services.	ESA	Vega, Guiana Space Centre, Kourou, French Guiana (or possibly Space X Q3 2025)	https://sentinels.copernicus.eu/web/sentinel/copernicus/sentinel-1 https://sentiwiki.copernicus.eu/web/sentinel-1

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HydroGNSS 1&2 (Global Navigation Satellite System) A small sat mission	03.2025	ESA Scout mission of two identical satellites to halve the time it takes to revisit the same place on Earth's surface and re-measure various climate variables such as soil moisture. Orbiting Earth 180 degrees apart, the two satellites will use a technique called Global Navigation Satellite System (GNSS) reflectometry to measure important climate variables such as soil moisture, freeze-thaw state over permafrost, inundation and biomass – all of which are linked to Earth's water cycle. The satellites will also measure wind speed over the ocean and sea-ice extent as secondary products. The two satellites will each measure just 50x50x70 cm, and each weigh about 65kg. HydroGNSS will deliver valuable information on global soil moisture. Understanding more about this variable is vital for climate monitoring, agriculture, meteorology and mitigation planning for drought and floods. HydroGNSS is expected to complement ESA's upcoming Biomass mission by taking measurements outside the larger satellite's operational area, and its faster acquisition could play a new role in forest fire disturbance monitoring.	ESA, SSTL - UK prime contractor (Martin Unwin), NCEO, University of Leicester, University of Nottingham, National Oceanography Centre, UK, Sapienza University of Rome, Italy, Tor Vergata University of Rome, Italy, Institute of Space Sciences (IEEC/ICE-CSIC), Spain, Institute of Applied Physics (IFAC-CNR), Italy, Finnish Meteorological Institute, Finland, Vienna University of Technology, Austria.	Vega C, Guiana Space Centre, Kourou, French Guiana	https://www.esa.int/Applications/Observing_the_Earth/FutureEO/HydroGNSS_twice_as_good https://www.sstl.co.uk/space-portfolio/missions-in-build/2024/hydrognss https://www.hydrognss.org/ https://space4climate.com/hydrognss-two-small-satellites-measuring-soil-moisture-over-the-globe/
Sentinel-4	2025 (TBC)	European mission for Copernicus. The Sentinel-4 instrument (on board MTG-S payload) is a UVN imaging spectrometer. It has 3 main units, to monitor key atmosphere constituents with a spatial resolution of 8x8km ² . It will cover Europe and North Africa monitoring in particular key air quality trace gases such as O ₃ (Ozone), NO ₂ (Nitrogen dioxide), SO ₂ (Sulfur dioxide), HCHO (Formaldehyde), CHOCHO (glyoxal), as well as aerosol and cloud properties. Its expected lifetime of 8.5 years. Its data will support air quality applications of the Copernicus Atmosphere Monitoring Services.	Copernicus, European Space Agency, EC, Airbus, RAL Space, NCEO, EUMETSAT		https://sentinels.copernicus.eu/web/sentinel/missions/sentinel-4
Sentinel-5	2025 (TBC)	European mission for Copernicus. Focused on air quality and composition-climate interaction, main data products will be O ₃ , NO ₂ , SO ₂ , HCHO, CHOCHO and aerosols. It will also deliver quality parameters for CO, CH ₄ , and stratospheric O ₃ with daily global coverage for climate, air quality, and ozone/surface UV applications. Its high resolution spectrometer system will operate in the ultraviolet to shortwave infrared range, with 7 different spectral bands: UV-1 (270-300nm), UV-2 (300-370nm), VIS (370-500nm), NIR-1 (685-710nm), NIR-2 (745-773nm), SWIR-1 (1590-1675nm) and SWIR-3 (2305-2385nm). The instrument will be carried on the MetOp-SG A satellite.	Copernicus, European Space Agency, EC, Airbus, RAL Space, NCEO, EUMETSAT		https://sentinels.copernicus.eu/web/sentinel/missions/sentinel-5/

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Biomass	11.2025 (possible advance)	Carrying a novel P-band synthetic aperture radar, the Biomass mission is designed to deliver crucial information about the state of our forests and how they are changing, and to further our knowledge of the role forests play in the carbon cycle.	ESA, UKSA, Airbus, GMV (Poland), ABSL, Astrotech, Nammo Cheltenham, NCEO, University of Sheffield, Airbus, University of Edinburgh, plus European contributors.	Vega C, Guiana Space Centre, Kourou, French Guiana	https://www.esa.int/Applications/Observing_the_Earth/FutureEO/Biomass https://space4climate.com/biomass/
MicroCarb	03.2025 or 11.2025	The first European space mission designed to monitor carbon fluxes on Earth by precisely measuring carbon dioxide in the atmosphere has completed assembly and qualification in the UK.	UKSA, CNES, NPL, TAS, STFC RAL Space, GMV UK, Airbus (UK & Fr), ANR (France), EU, EUMETSAT (Germany), LSCE (Fr), LMD (Fr), LERMA (Fr), LATMOS (Fr), GMSA (Fr), IPSL (Fr), LOA (Fr), LIPHY (Fr), NCEO, University of Edinburgh, University of Leicester	Vega C, Guiana Space Centre, Kourou, French Guiana	https://www.esa.int/Applications/Observing_the_Earth/FutureEO/FORUM/Contract_secures_design_for_ESA_s_FORUM_satellite https://space4climate.com/microcarb-carbon-dioxide-data-for-the-global-stocktake/ https://space4climate.com/microcarb-satellite/
FLEX (Fluorescence Explorer)	Q4 2025 (subject to change)	For global monitoring of steady-state chlorophyll fluorescence in terrestrial vegetation. Leaf photosynthesis releases energy not required in the biochemical process in the form of light in wavelength between 640 and 800 nanometres. FLEX will encompass a three-instrument array for measurement of the interrelated features of fluorescence, hyperspectral reflectance, and canopy temperature.	ESA Earth Explorer, TAS	Vega C, Guiana Space Centre, Kourou, French Guiana	https://earth.esa.int/eogateway/missions/flex https://en.wikipedia.org/wiki/FLEX_(satellite)
Sentinel-6B	11.2025	The Jason Continuity of Service (Jason-CS) mission on the Sentinel-6 spacecraft is an international partnership between the US and Europe. It includes two identical satellites, the first of which was launched in November 2020 (Sentinel-6 Michael Freilich). It will ensure continuity of sea level observations into a fourth decade, measuring global sea level rise, supporting operational oceanography through improved forecasts of ocean currents, wind and wave conditions. This data will allow improvements in both short-term forecasting for weather predictions in the two- to four-week range (e.g. hurricane intensity predictions), and long-term forecasting for seasonal conditions (e.g. El Niño, La Niña).	NASA, ESA, CNES, EUMETSAT, NOAA	Vega C, Guiana Space Centre, Kourou, French Guiana	https://eosps.nasa.gov/missions/sentinel-6b https://sealevel.jpl.nasa.gov/missions/jason-cs-sentinel-6/summary/

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Sentinel-1D	01.01.2026-31.03.2026	Will provide continuity of C-band SAR data for operational applications e.g. monitoring of sea ice zones and the Arctic environment, surveillance of marine environment, monitoring of land surface motion risks and mapping in support of humanitarian aid in crisis situations. A request for a launch period in June to August 2025 is expected	ESA, European Commission, TAS	Vega C, Guiana Space Centre, Kourou, French Guiana	https://sentiwiki.copernicus.eu/web/sentinel-1 https://database.eohandbook.com/database/missionssummary.aspx?missionID=814
Sentinel-3C	01.06.2026-31.08.2026 TBC	Will support global land and ocean monitoring services, in particular: sea/land colour data and surface temperature; sea surface and land ice topography; coastal zones, inland water and sea ice topography; vegetation products.	ESA, European Commission, EUMETSAT	Vega C, Guiana Space Centre, Kourou, French Guiana	https://sentiwiki.copernicus.eu/web/sentinel-3 https://database.eohandbook.com/database/missionssummary.aspx?missionID=579
FORUM	2027/30 TBC	Short for Far-infrared Outgoing Radiation Understanding and Monitoring, designed to give unique insight into the planet's radiation budget and how it is controlled – thereby filling in a critical missing piece of the climate jigsaw. Measurements will improve confidence in the accuracy of climate change assessments that form the basis for future policy decisions.	ESA Earth Explorer, UKSA, Airbus, NCEO, Imperial College London, University of Reading (Richard Allan Prof of Meteorology), Met Office & Uni of Hertfordshire (Anthony Baran), Imperial College London, University of Leicester. Meteo France, AER (US), Research Center Jülich GmbH (Germany), KIT-IMK (Germany), EUMETSAT, NASA	Vega C, Guiana Space Centre, Kourou, French Guiana	https://www.esa.int/Applications/Observing_the_Earth/FutureEO/FORUM/Contract_secures_design_for_ESA_s_FORUM_satellite https://www.forum-ee9.eu/scientific-team/ https://www.nceo.ac.uk/article/forum-a-new-satellite-to-understand-how-earth-is-losing-its-cool/

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Harmony	10.2029	Constellation of two SAR (Synthetic Aperture Radar) equipped satellites operated by the European Space Agency (ESA) as an Earth Explorer mission, which will run in tandem with a Sentinel-1 satellite. Until their design life of five years comes to an end, they will monitor changes in the Earth's surface, as well as monitor ocean surface conditions such as wind, currents, and temperature. 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. It will also be used to study deformation and flow dynamics at the rapidly changing ice-sheet edges for a better understanding of sea-level rise.	ESA, TAS (build SAR instruments)		https://www.esa.int/Applications/Observing_the_Earth/FutureEO/ESA_selects_Harmony_as_tenth_Earth_Explorer_mission
TRUTHS	2030	Traceable Radiometry Underpinning Terrestrial- and Helio-Studies, TRUTHS, mission will be a 'standards laboratory in space', setting the 'gold standard' reference for climate measurements. Carrying a cryogenic solar absolute radiometer and a hyperspectral imaging spectrometer as well as a novel onboard calibration system, TRUTHS will make continuous measurements of incoming solar radiation and reflected radiation to evaluate Earth's energy-in to energy-out ratio.	ESA, UKSA, Germany, Czech Republic, Romania, Sweden, Telespazio, TAS, Airbus, SSTL, Teledyne e2v, NCEO, University of Leicester, Imperial College London, Goonhilly, RAL Space, AVS, GMV, plus European contributors		https://www.esa.int/Applications/Observing_the_Earth/TRUTHS https://www.npl.co.uk/earth-observation/truths/next-stage
Aeolus-2	2030+	Will deliver systematic data for environmental or weather services. In this case, the development of a new wind Lidar system will be carried out in cooperation with European Organisation for the Exploitation of Meteorological Satellites, EUMETSAT.	ESA, EUMETSAT		https://www.esa.int/ESA_Multimedia/Images/2022/10/Aeolus-2_Value_of_Information
CAIRT (Changing-Atmosphere Infrared Tomography)	Not known	Will provide the measurements needed to make a necessary step change in understanding the links between climate change, atmospheric chemistry and dynamics in the altitude range of about 5-115km.	ESA Earth Explorer		https://www.esa.int/Applications/Observing_the_Earth/FutureEO/Cairt_and_Wivern_Earth_Explorer_candidates_go_forward
WIVERN (Wind Velocity Radar Nephoscope)	Not known	Will provide the first measurements of wind within clouds and precipitation. There is a notable gap in global observations of wind in cloudy regions. The mission would also deliver profiles of rain, snow and ice water. It would also contribute to the climate record of cloud and precipitation profiling.	ESA Earth Explorer University of Reading - mission conceived by Prof Anthony Illingworth		https://www.esa.int/Applications/Observing_the_Earth/FutureEO/Cairt_and_Wivern_Earth_Explorer_candidates_go_forward