



PROGRAMME OF
THE EUROPEAN UNION



#EUSpace

COPERNICUS: EUROPE'S EYES ON EARTH

Copernicus is the Earth Observation component of the European Union's Space Programme, which monitors our planet and its environment for the ultimate benefit of European and global citizens. It delivers data, information and services based on satellite Earth Observation data and in situ (non-space) data. Copernicus is funded, coordinated and managed by the European Commission in cooperation with partners such as ESA and EUMETSAT.

The Copernicus component of the EU Space Programme is served by a set of **dedicated satellites** (the Sentinel family) and **contributing missions** (existing commercial and public satellites). The Sentinel satellites are specifically designed to meet the needs of the Copernicus information services and their users. Since the launch of Sentinel-1A in 2014, the European Union has initiated a process to place a complete constellation of almost **20 satellites** in orbit before 2030. Today, there are seven Sentinel satellites in orbit, of five different types. Copernicus satellites, along with ground-based, airborne, and seaborne measurement sensors, are providing vast amounts of global data.

The Copernicus services transform the wealth of satellite and in situ data into timely and actionable information by processing and analysing it. The services deliver datasets and time series that are comparable and searchable, ensuring that trends and changes are monitored. Patterns are analysed and used to create better forecasts of, for example, the ocean and the atmosphere. Maps and/or geospatial data sets are derived from imagery, features and anomalies are identified and statistical information is extracted. These value-adding activities are streamlined through **six thematic streams** of Copernicus services:

- the Copernicus Atmosphere Monitoring Service (CAMS)
- the Copernicus Marine Environment Monitoring Service (CMEMS)
- the Copernicus Land Monitoring Service (CLMS)
- the Copernicus Climate Change Service (C3S)
- the Copernicus Emergency Management Service (CEMS)
- the Copernicus Security Service

The vast majority of the information services, as well as the data from which they are derived, are accessible on a **free, full and open basis** by anyone. This data and information are used by service providers, public authorities and international organisations to improve the quality of life for citizens of Europe and around the world, to monitor and mitigate climate change, and to preserve our fragile environment.



Climate
Change



Emergency
Management



Land
Monitoring



Atmosphere
Monitoring



Security



Marine
Monitoring



ATMOSPHERE MONITORING SERVICE – CAMS

IMPLEMENTED BY
ECMWF

The Copernicus Atmosphere Monitoring Service (CAMS) provides continuous data and information on atmospheric composition by monitoring and forecasting constituents such as greenhouse gases, reactive gases, ozone and aerosols. CAMS delivers consistent and quality-controlled information useful to develop applications for air pollution, health, solar energy, greenhouse gases and climate change-related topics to help policymakers, businesses and citizens address environmental concerns.

- More information on <https://atmosphere.copernicus.eu/>



MARINE ENVIRONMENT MONITORING SERVICE – CMEMS

IMPLEMENTED BY
MERCATOR OCEAN

The Copernicus Marine Environment Monitoring Service (CMEMS) provides regular and systematic reference information on the physical and biogeochemical state, variability and dynamics of the ocean and marine ecosystems for the global ocean and the European regional seas. The observations and forecasts produced by the service support all marine applications, including:

- Coastal and marine environment
- Sustainable use and conservation of marine resources
- Weather, seasonal forecasting and climate
- Marine safety and navigation

CMEMS supports the implementation of EU policies such as the Green Deal by contributing to increased resilience to climate change, sustainable management of marine resources and development of the blue economy with green industries. CMEMS delivers monthly ocean monitoring indicators and an annual Ocean State Report describing the main trends in terms of climate change for the oceans.

- More information on <http://marine.copernicus.eu/>



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|----------------------------------|-----------------------|
| 1 SEA ICE MONITORING | 6 COSTAL MONITORING |
| 2 MARINE CONSERVATION & POLICIES | 7 SOCIETY & EDUCATION |
| 3 SCIENCE & CLIMATE | 8 MARINE FOOD |
| 4 NATURAL RESSOURCES & ENERGY | 9 MARINE NAVIGATION |
| 5 WATER QUALITY | 10 SAFETY DISASTER |

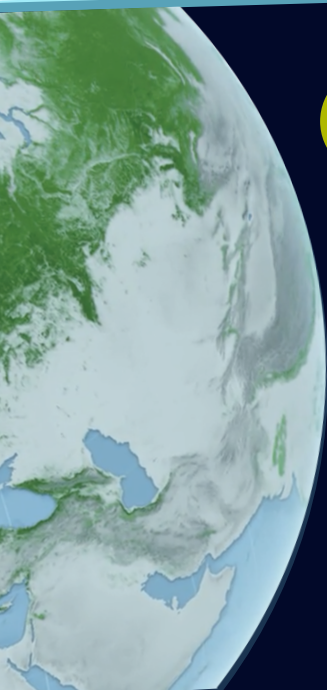


LAND MONITORING SERVICE – CLMS

IMPLEMENTED BY
European Environment Agency
JRC

The Copernicus Land Monitoring Service (CLMS) provides geospatial information on land cover and its changes, land use, vegetation and agriculture state, water cycle, cryosphere and incoming solar radiation, to a broad range of users in Europe and across the World for environmental applications. The service is based on Earth Observation data combined and modelled with data from other sources. It supports environmental and development policies, as well as applications in domains such as spatial and urban planning, forest monitoring and sustainable management, water management, agriculture and food security, nature protection and restoration, rural development, ecosystem accounting and mitigation/adaptation to climate change.

- More information on <https://land.copernicus.eu/>





CLIMATE CHANGE SERVICE – C3S

IMPLEMENTED BY
 ECMWF

The Copernicus Climate Change Service (C3S) supports the European Union's effort towards a climate smart society by providing consistent and authoritative information about the past, present and future climate in Europe and in the rest of the world. C3S provides free and open access to state-of-the-art quality-assured climate information, relevant to European Union sectoral policies. It delivers climate data records to monitor major climate drivers and document climate change fingerprints (e.g. surface air temperature) as well as climate predictions and projections for relevant variable, alongside the tools required to transform this data into actionable insights.

- More information on <https://climate.copernicus.eu/>



EMERGENCY MANAGEMENT SERVICE – CEMS

IMPLEMENTED BY
 JRC

Natural disasters affect thousands of people every year in the world. The Copernicus Emergency Management Service (CEMS) supports all actors involved in the management of disasters caused by meteorological (e.g., floods or hurricanes) or geophysical phenomena (e.g., earthquakes or volcanic eruptions), or man-made by providing geospatial information to inform decision making.

CEMS constantly monitors Europe and the world to forecast, analyse, and provide information for disaster risk reduction strategies. For events for which forecasts can be produced, such as floods, droughts or forest fires, the service provides early warnings and notifications to its users. CEMS can be activated on-demand and offers to provide them with maps, time series or other relevant information to better manage disaster risk. CEMS maps assist the organisation of the safe evacuation and sheltering of people affected by disasters such. CEMS products can also be used to monitor recovery and reconstruction after a disaster has occurred.

- More information on <http://emergency.copernicus.eu/>



SECURITY SERVICE

IMPLEMENTED BY
 FRONTEX
 EMSA
 SatCen

The Copernicus Security Service applications aim to support European Union policies by providing information in response to Europe's security challenges. The applications focus on three key areas:

- Copernicus Maritime Surveillance** provides satellite image products for monitoring activities at sea by European maritime authorities.
- Copernicus Border Surveillance Service** improves the situational awareness at the EU's external borders, contributing to saving lives at sea and tackling cross-border crime.
- Copernicus Service in Support to European Security and External Actions (SESA)** provides geospatial intelligence which assists the EU and its Member States in its operations and interests, where security issues are at stake. The service delivers various product types in several application areas including crisis and conflict, rule of law, climate security, environmental compliance, humanitarian aid, international trade and economic diplomacy, and security of citizens.

- More information on <https://www.copernicus.eu/en/services/security>

→ SPACE COMPONENT

IMPLEMENTED BY
 ESA
 European Environment Agency
 EUMETSAT

Planned and Ordered

SENTINEL-4
Atmospheric Chemistry sensor

SENTINEL-5
Atmospheric Chemistry sensor

- EXPANSION MISSIONS**
- Hyperspectral Imaging Mission
 - Imaging Microwave Radiometer
 - Anthropogenic Carbon Dioxide Monitoring
 - Polar Ice and Snow Topography Altimeter
 - Land Surface Temperature Monitoring
 - L-Band Synthetic Aperture Radar

Current

SENTINEL-1A
Synthetic Aperture radar

SENTINEL-2A
Multi-spectral optical sensor

SENTINEL-2B
Multi-spectral optical sensor

SENTINEL-3A
Medium resolution optical sensor and Altimeter

SENTINEL-3B
Medium resolution optical sensor and Altimeter

SENTINEL-5P
Atmospheric Chemistry sensor

SENTINEL-6
Radar Altimeter

The Copernicus Sentinel satellites are the dedicated Earth Observation satellites. They ensure an independent and autonomous Earth Observation capacity for Europe. The Sentinel types cover a broad range of Copernicus observation needs, ranging from day-and-night all-weather observations to land and ocean surfaces, sea-surface topography, and air quality, measuring trace gases in the atmosphere. In addition to these dedicated satellites, Copernicus is making use of satellite data from contributing missions, either from private companies or from institutional partners through dedicated agreements.

- More information on <https://spacedata.copernicus.eu/>

The **Copernicus component** of the EU Space Programme provides **accurate, high-quality data and information**. It also relies on in situ observations from ground, sea, and air-borne sensors, as well as geospatial ancillary or reference data, for calibrating, validating and complementing satellite products. The in situ component is responsible for identifying data access gaps and bottlenecks, supporting the provision of cross-cutting data, managing partnerships with data providers to improve access and use conditions, and brokering innovative solutions with services, providers or national authorities.

More information on <https://insitu.copernicus.eu/>

DATA ACCESS

Copernicus data and services are available under **a free, full and open data policy**, and is facilitated through a variety of hubs. Data delivered by ESA can be accessed in the cloud through the new **Copernicus Data Space Ecosystem**, which replaces the Copernicus Open Access Hub, and the Copernicus Contributing Missions Online Gateway. Data delivered by EUMETSAT can be accessed through the Data Store and also through near real-time broadcasts on EUMETCast. Data from the Copernicus services is made available through dedicated websites. In addition, the **WEkEO Data and Information Access Services (DIAS)** allow users to process and analyse Copernicus data and service information in the cloud.

More information on <https://www.copernicus.eu/en/access-data>

The Copernicus ecosystem:
Rapidly growing user uptake

Millions of users and citizens of Copernicus data and services, and of the applications they enable and power

COPERNICUS THEMATIC HUBS

The Copernicus Thematic Hubs, launched in 2023, are new and innovative platforms within the Copernicus component of the EU Space Programme, designed to centralise and provide access to specific types of data and products generated by Copernicus services. The launch and development of these hubs represent a significant step towards making Copernicus data more accessible and useful for a wide range of stakeholders, thereby supporting the EU's goals for sustainable development and climate action. There are currently **four Thematic Hubs: Health, Coastal, Energy, and Arctic**.

USER UPTAKE ACTIVITIES

The European Commission has developed actions to **support users** of Copernicus and maximise the benefits of the component. **Hundreds of members from the EU Space Networks Copernicus Relays and Copernicus Academy** act as local ambassadors and support a myriad of awareness events every year. Copernicus information sessions and webinars are organised regularly to offer networking and engagement opportunities for all members, including an annual General Assembly. Dedicated training and course materials have also been developed in the context of the Copernicus Skills programme. Copernicus now has **millions of users**, largely exceeding original expectations.

INTERNATIONAL COOPERATION

During its term as Chair of the international Committee on Earth Observation (CEOS), the European Commission with Copernicus laid the foundations for an **international carbon and Greenhouse gas monitoring system** in support of the Paris Climate Agreement, which is now being implemented. Cooperation Arrangements with third countries provide additional value to the European Union in a reciprocal manner (e.g. access to satellite data and in situ data, cooperation on data processing, data assimilation into models and products of the Copernicus services). It creates enabling conditions for European industry and service providers in the partner country markets to foster the uptake of European-developed services and products.

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