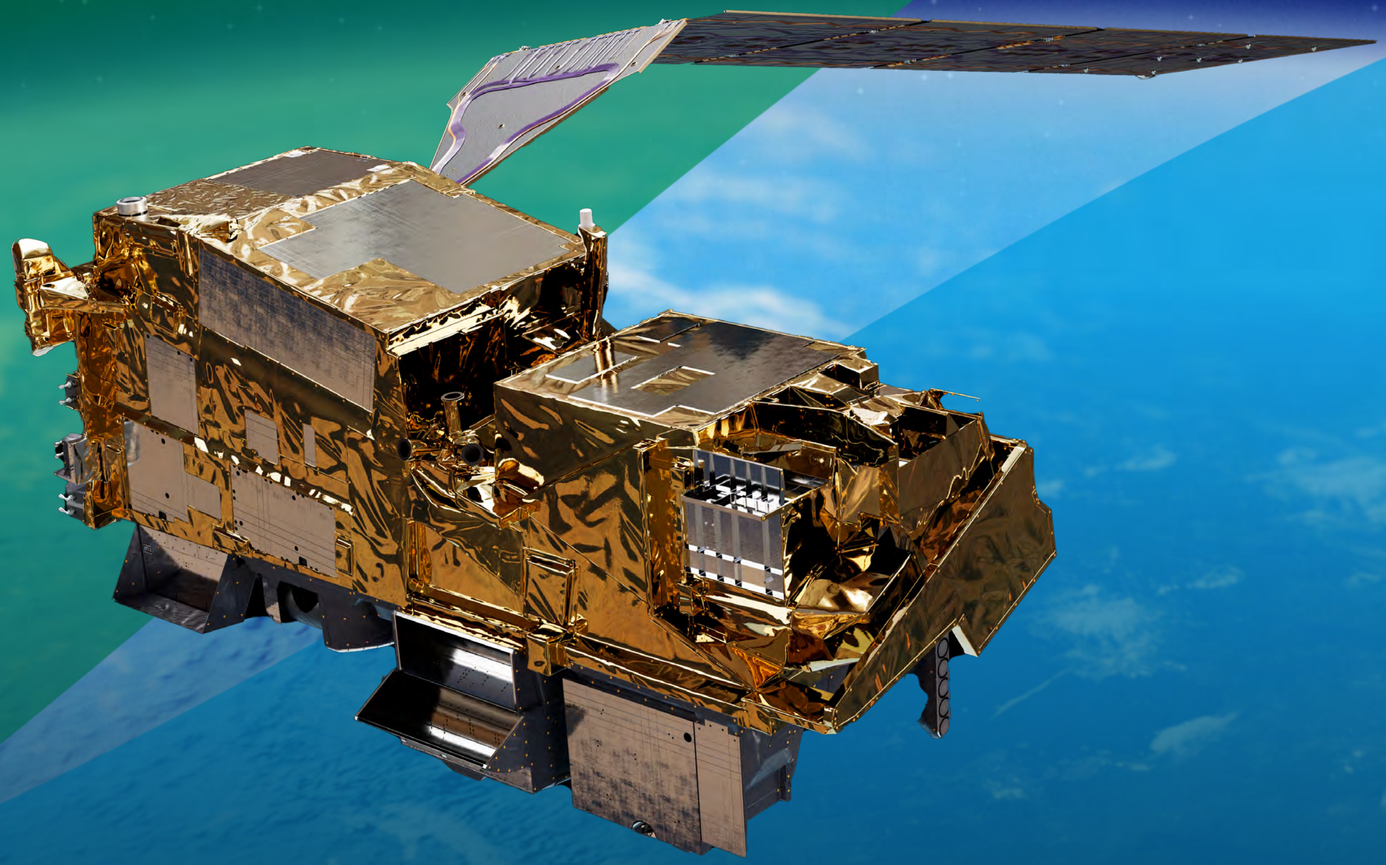
PROGRAMME OF THE EUROPEAN UNION

opernicus
Europe's eyes on Earth

EUMETSAT

co-funded with esa



SENTINEL-5

ATMOSPHERIC COMPOSITION MONITORING FOR COPERNICUS

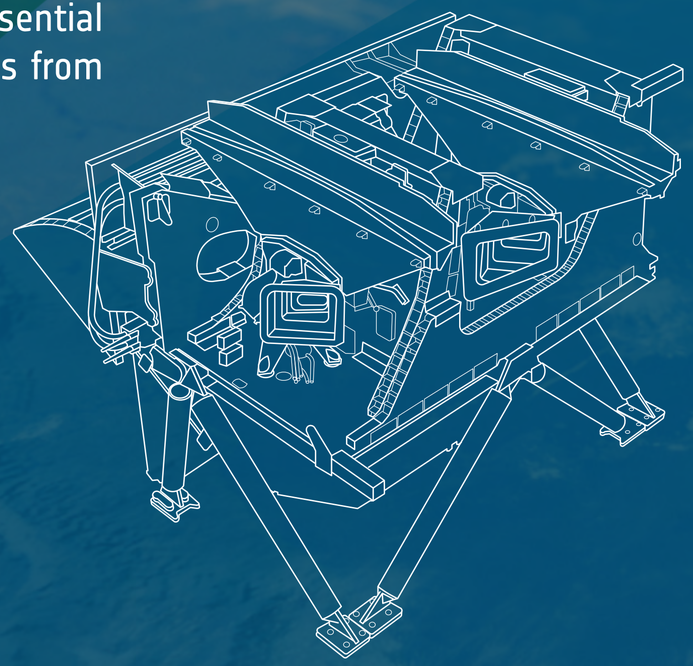
EU | ESA | EUMETSAT
sentinel-5
COPERNICUS

COPERNICUS SENTINEL-5 MISSION

Copernicus Sentinel-5, developed by the European Space Agency (ESA), builds on the success of the Sentinel-5 Precursor mission. It consists of an advanced imaging spectrometer hosted on the MetOp Second Generation A-type weather satellite.

Sentinel-5 delivers global data on air quality, climate, the ozone layer and ultraviolet radiation, on a long-term, operational basis.

The mission will improve our understanding of the composition of our atmosphere, including levels of air pollutants, essential climate variables, and stratospheric ozone that protects us from ultraviolet radiation.



LAUNCH DATE

August 2025 (on MetOp-SG-A1)

LAUNCH SITE

Kourou, French Guiana

ROCKET

Ariane 62

SATELLITES IN SERVICE

Sentinel-5 is part of the Copernicus family of Sentinel satellites, which are all developed by ESA. Copernicus is the Earth observation component of the European Union's Space Programme and is the largest environmental monitoring programme in the world. The data provided by the Sentinel missions form the basis of the operational Copernicus information services, helping to manage the environment, monitor and react to climate change, and safeguard lives. Copernicus data are used worldwide and are available free of charge.

Sentinel-5 data are exploited by the Copernicus Atmosphere Monitoring Service and the Copernicus Climate Change Service (C3S), as well as the scientific community.

It provides data to monitor and forecast air pollution, to issue health warnings, and to monitor compliance with the European Union's Directive on ambient air quality.

The mission will measure a range of trace gases impacting our climate. For example, it supports the monitoring and detection of emissions of the potent greenhouse gas methane.

And by monitoring the ozone layer, it supports health warning services with data on UV levels, which are a risk to human health.

***Copernicus** Sentinel missions: the current suite of Sentinel missions are at the heart of the Copernicus Programme.*

SENTINEL-5 OVERVIEW

Copernicus Sentinel-5 is a European Earth observation mission developed by ESA. It monitors the composition of our atmosphere globally, daily, on a long-term operational basis.

The mission's science instrument consists of a set of ultraviolet, visible, near-infrared and shortwave infrared (UVNS) imaging spectrometers mounted on three consecutive MetOp-SG-A-type weather satellites, which fly in a polar, Sun-synchronous orbit.

Orbiting at an altitude of 832 km, Sentinel-5 gathers global data and provides daily observations of atmospheric gases and aerosols, which drive climate, air quality, and UV radiation.

Sentinel-5 is a successor to the Sentinel-5 Precursor mission, launched in 2017 with the Tropomi instrument on board. Its data and coverage complement the Sentinel-4 mission, launched in July 2025 in a geostationary orbit.

The Sentinel-5 mission consists of three instruments each designed to operate for seven-and-a-half years and will be launched successively on board the respective MetOp-SG-A satellites, to ensure a minimum mission lifetime of 21 years. The MetOp-SG satellites, including the Sentinel-5 instruments, are operated by Eumetsat.

Sentinel-5 *will orbit at 832 km in a polar orbit, complementing the geostationary Sentinel-4.*

THE ATMOSPHERIC SENTINELS

The combined health and environmental risks of air pollution, UV radiation and climate change are all addressed by data captured by the Copernicus Sentinel-5 mission.

Poor air quality causes more than four million premature deaths annually and exposure to excessive UV radiation is a primary cause of skin cancer. The effects of climate change, such as more frequent heat waves, floods and storms, are a direct and indirect risk to human lives, property, biodiversity and livelihoods. Data from the Sentinel-5 mission will improve our understanding of each of these factors.

Sentinel-5's global observations deliver a wide range of atmospheric measurements that provide data every 24 hours, covering the whole globe and complementing data from the Sentinel-4 mission.

The daily observations are crucial for providing health alert warnings for UV radiation and poor air quality.

The data also support compliance with environmental regulations and form a scientific basis for strategies to reduce emissions.

Sentinel-5 data provide vital information on air pollution, public health, solar energy, greenhouse gases, and climate for the benefit of both citizens and the economy.

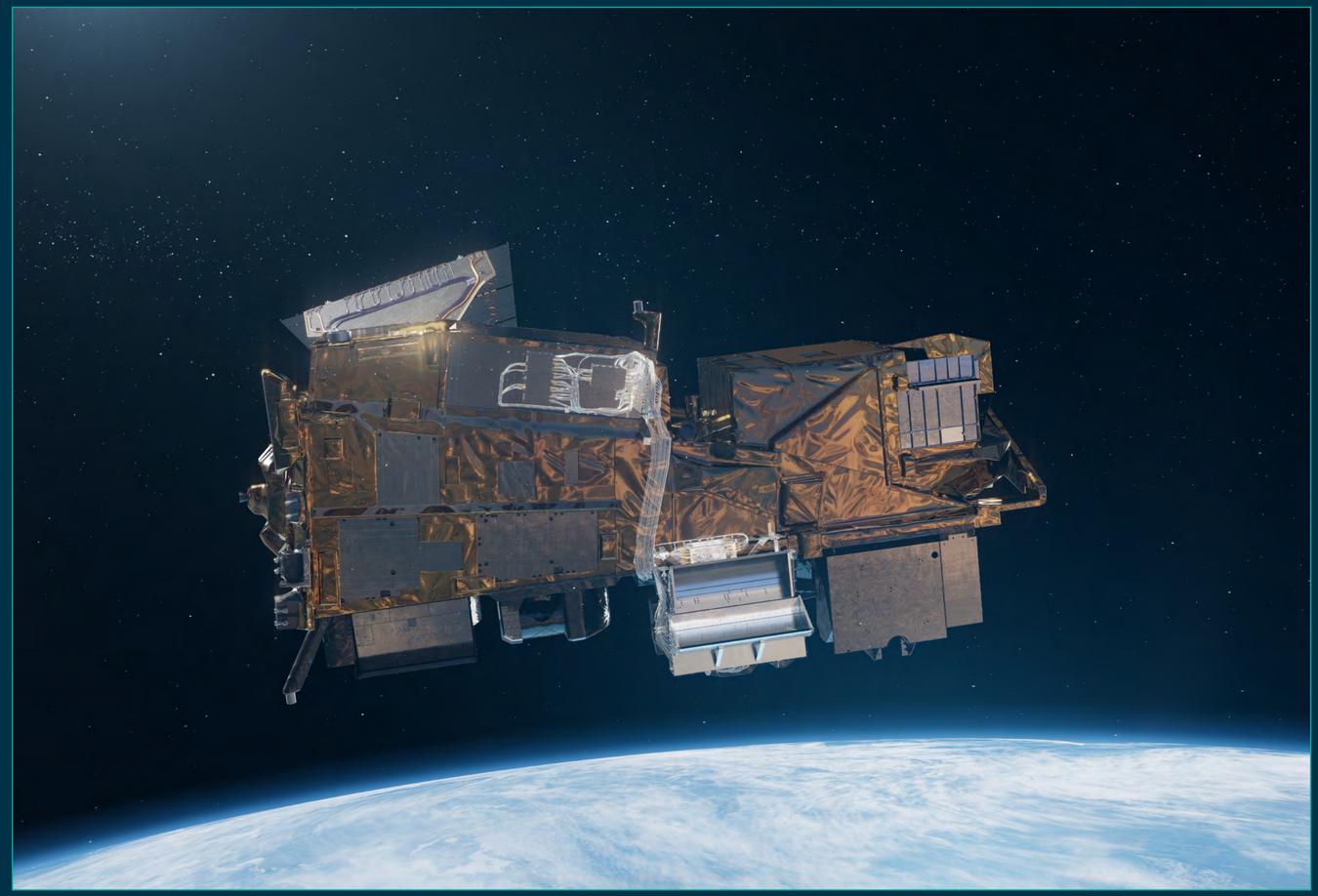
A THOUSAND MORE COLOURS

Copernicus Sentinel-5's high-resolution imaging spectrometer can see much more than humans can. By detecting lightwaves across seven spectral bands, from the ultraviolet, visible, near-infrared and shortwave infrared ranges, the instrument can differentiate 1000 times more colours than the human eye.

This enables Sentinel-5 to detect pollution and harmful components of the atmosphere that we cannot see. And it does this all over the world. The mission provides data on the composition of Earth's atmosphere – and how it changes on a daily basis.

The spectrometer observes ozone, nitrogen dioxide, sulphur dioxide, formaldehyde, glyoxal, carbon monoxide, and methane, as well as aerosols and measures the UV index. The mission will also provide data on the vertical distribution of several of these components, providing a three-dimensional view.

It can tell us when we are most at risk of sunburn from ultraviolet radiation and can detect emissions of greenhouse gases such as methane.



SENTINEL-5: TANGIBLE BENEFITS FOR SOCIETY

esa

PEOPLE

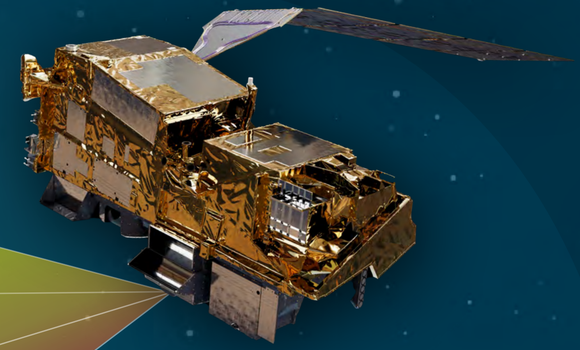
Air pollution and exposure to UV radiation pose risks to human health

PLANET

Data on essential climate variables are crucial for tracking the health of our planet

PRODUCTIVITY

Greenhouse gases and aerosols indirectly have negative economic impacts

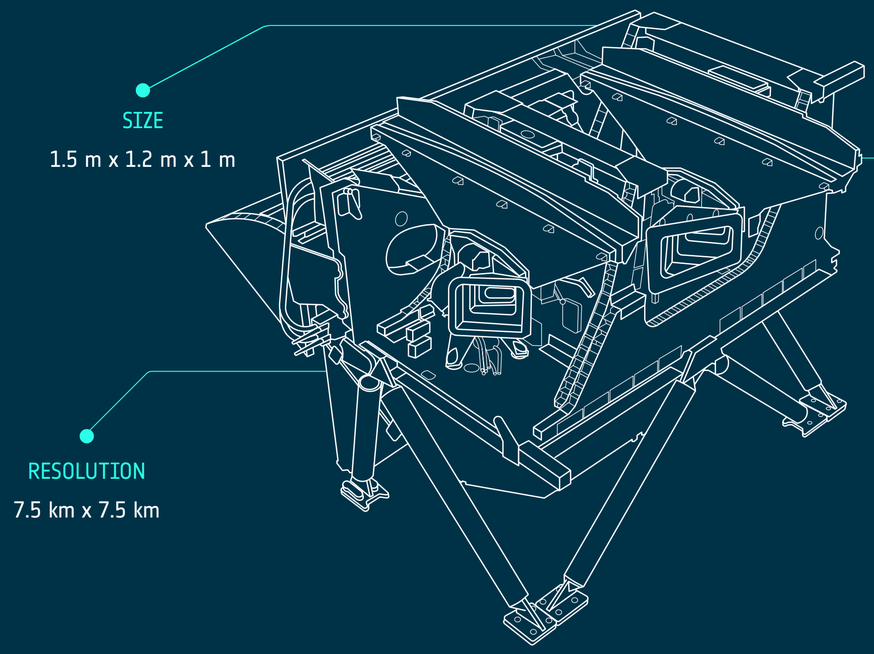


TEAMWORK

Copernicus Sentinel-5 – and its host the MetOp Second Generation A-type satellite – are both world-class Earth observation missions developed with European partners. The mission addresses the need for accurate atmospheric composition information, specifically related to UV radiation and the ozone layer, climate change, and air pollution. These data, delivered daily, will be used in forecasts and health warnings, as well as for scientific research and to form the basis of policy decisions, for the benefit of society.

The mission, together with its host satellite, is the culmination of more than a decade of European partnership and dedication, underlining the strength of European cooperation. ESA plays a central role in developing these missions.

Airbus Defence and Space is the prime contractor for Sentinel-5's UVNS instrument as well as for the MetOp Second Generation satellite. Sentinel-5 is operated by Eumetsat.



OBJECTIVE

- Globally monitor key air quality trace gases and aerosols

LAUNCH

- August 2025
- The first Sentinel-5 instrument will be followed by two further instruments to extend the mission beyond 2045

ORBIT

- Polar, Sun-synchronous orbit at altitude of approximately 832 km
- Global coverage every 24 hours

DEVELOPMENT

- Project: Managed at ESA's European Space Research and Technology Centre (NL)
- Prime contractors: Airbus Defence & Space (DE)

MISSION CONTROL AND DATA DISTRIBUTION

- Eumetsat

MEET THE ESA EXPERTS

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MULTIMEDIA

SENTINEL-5

- IMAGES LINK
- VIDEOS LINK
- DOCUMENTS AND PUBLICATIONS LINK

Youtube.com/ESA

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THE EUROPEAN SPACE AGENCY

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These countries are home to more than 500 million European citizens. If you're one of them, then we're working for you.

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