

July 28 2025

The MicroCarb satellite

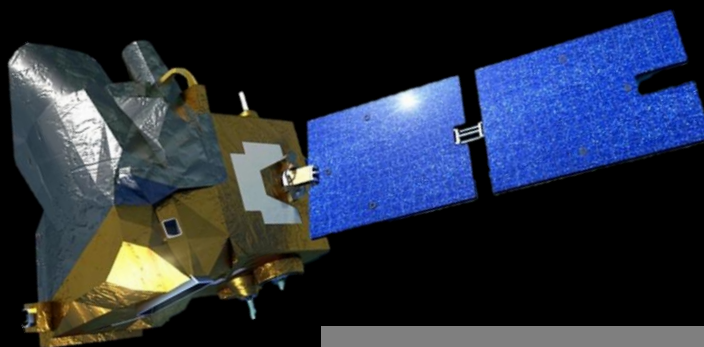


Image credit: CNES

A joint venture by the UK and French space agencies, MicroCarb is the first European satellite dedicated to measuring atmospheric Carbon Dioxide (CO₂), determining emissions of carbon across the globe with extreme precision. Launch took place July 25, (July 26 BST) 2025.

Opportunities the MicroCarb mission will offer

Following on from other CO₂ monitoring missions, MicroCarb will become part of the international greenhouse gas virtual constellation of satellites, collecting data to enable higher resolution estimates of CO₂ emissions than ever before. This will fundamentally improve understanding of the carbon cycle and facilitate a measurement verification system to monitor carbon emissions from human activities and natural processes.

MicroCarb will monitor international progress towards meeting the Paris Agreement to limit global surface warming.

It will enable continuity of CO₂ data to determine how much carbon is being absorbed and emitted by natural processes and how much is emitted by human activities - data essential for the global stocktake.

The city-scan observing mode will map out atmospheric CO₂ over cities the size of London and Paris (or larger), providing key new information to help cities implement strategies that support sustainable urban development.

Mission Partners

- [Centre National D'Etudes Spatiales \(CNES\)](#)
- [UK Space Agency](#)

UK Expertise

The UK Space Agency invested £15million in the mission, securing the following UK expertise.

- [Prof Paul Palmer](#) of the [National Centre for Earth Observation \(NCEO\)](#) and the [University of Edinburgh](#) is the UK lead for MicroCarb. He will translate MicroCarb's CO₂ observations into maps that show carbon absorption and emissions.
- [Dr Rob Parker](#) is part of the NCEO team delivering the mission's Solar Induced Fluorescence retrieval algorithm, based on expertise from the [University of Leicester](#).
- The [National Physical Laboratory \(NPL\)](#) has provided the SI-traceable ground calibration facility, to test its performance pre-launch. Paul Green of NPL is developing algorithms and quality metrics with the MicroCarb team.
- [Thales Alenia Space](#) completed the assembly, integration and test campaign at STFC RAL Space in Harwell, Oxfordshire.
- [STFC RAL Space](#) developed the pointing and calibration system, enabling MicroCarb to take measurements at specific locations.
- [GMV UK](#) are designing, implementing and quality assuring algorithms and operational processors for several CO₂ data products.

"Achieving Net Zero is one of the most pressing challenges we currently face, and a vital part in reaching our collective goal is to develop systems that can accurately and reliably monitor carbon emissions" – *Dr Sarah Beardsley, Director of STFC RAL Space, UK*

Mission Timeline

Dec 2015

French Government announce MicroCarb mission

April 2016

CNES award contract to Airbus DS to design and build the optical instrument.

April 2017

UK Space Agency & CNES sign MicroCarb Cooperation Agreement

Nov 2017

Thales Alenia Space selected to Undertake Assembly Integration and Test (AIT)

Dec 2022

MicroCarb arrives at Harwell, UK, for Thales Alenia Space will complete assembly integration and testing

Feb 2024

MicroCarb returns to France for storage until launch date.

July 25 (July 26 BST) 2025

Launch of MicroCarb on an Arianespace-operated Vega-C rocket from Europe's spaceport in French Guiana

Launch + 12 months

Data from MicroCarb will be openly available around 12 months after launch.

Instrumentation

- MicroCarb was launched into a 650km altitude orbit. Measurements will be taken at the same time every day, repeating every 21 days over the same site.
- MicroCarb carries one instrument: an infrared spectrometer, which measures oxygen and carbon dioxide concentrations at four different spectral bands (0.76µm and 1.27µm and 1.6µm and 2µm respectively) in sunlight reflected off the Earth.
- The MicroCarb instrument offers an extremely high degree of precision of carbon dioxide concentrations, in the order of one part per million, with a pixel size of 4.5x9km².
- A city-scanning observing mode will allow the creation of CO₂ emissions maps across cities, with a resolution of 2x2km².
- MicroCarb will also retrieve Solar Induced Fluorescence, which is a proxy for photosynthetic activity and can provide key information on the carbon cycle, complementing that from CO₂ observations.



Further Information

- Arianespace, Jan 2022: [Arianespace to launch MicroCarb on Vega C](#).
- CNES, accessed Mar 2025: [MicroCarb](#).
- ESA, Apr 2023: [eoPortal: MicroCarb](#).
- NPL, Nov 2021: [The next phase in the UK/France partnership in ...](#)
- UK Space Agency and The Rt Hon Jo Johnson, Nov 2017: [Thales ...](#)
- UK Space Agency, May 2021: [Case Study: MicroCarb](#).
- UK Space Agency, Dec 2022: [Climate change instrument arrives ...](#)
- UK Space Agency, Feb 2024: [MicroCarb leaves UK ready for launch](#)
- [NCEO MicroCarb Mission Page](#), July 2025

"Data from MicroCarb will play a crucial role in extending our current ability to verify reductions in global and national emissions of CO₂ in response to the demands of the Paris Agreement" – Prof Paul Palmer, Lead UK MicroCarb Scientist and NCEO Science Director

Watch the MicroCarb video



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