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Capgemini develops the mission center to monitor global CO₂ sources

Paris, July 9, 2020 – The [CNES \(Centre National d'Etudes Spatiales\)](#) has commissioned [Capgemini](#) to develop, qualify, validate and maintain the **MicroCarb Mission Center¹. The purpose of the **MicroCarb** space mission, named after its satellite, is the continuous measurement of the atmospheric concentration of CO₂, the main greenhouse gas responsible for global warming. It will map the sources and sinks of CO₂ on a global scale.**

The MicroCarb mission is the first European mission resulting from a partnership between CNES, UKSA (United Kingdom Space Agency) and EUMETSAT (European Organization for the Exploitation of Meteorological Satellites located in Germany), through a contribution to the H2020 EU program². It will provide a better understanding of carbon exchanges on the earth's surface, thanks to an innovative measuring instrument: an array spectrometer capable of measuring, with great precision, the atmospheric concentration of CO₂ over the entire globe. The MicroCarb satellite, scheduled for launch before the end of 2021, will use sunlight for energy³.

Capgemini's Aerospace Industry teams mobilized

The mission requires flexibility in the definition of programming methods and data processing algorithms, but also responsiveness in terms of implementation. Capgemini proposed an innovative approach that optimizes existing tools used by EUMETSAT and CNES for cataloguing and data processing, while ensuring consistency in the overall architecture of the CNES IT system.

The integration and deployment of specific developments related to the programming of the satellite, the development of calculation models and the processing of spatial data, carried out by the project teams are all shared on a DevOps⁴ platform installed within the CNES IT environment. These activities will continue for one year during the flight acceptance⁵ phase after the satellite's launch. Capgemini's project team comprises fifteen experts with a deep understanding of the aerospace industry as well as the needs of the scientific community.

MicroCarb, at the forefront of CO₂ flow knowledge missions

This satellite is the first part of Europe's response to the creation of a system for monitoring the evolution of the concentration of CO₂ on a global scale. To date, the quantities absorbed and emitted in certain regions of the world remain unknown. This information is therefore crucial for understanding the origins and impact of climate change. The expected benefits of the MicroCarb mission are first and foremost scientific: to enrich

¹ A set of systems dedicated to the control and planning of satellite instruments or payloads, as well as the processing of their data.

² H2020 is the European Union's framework program for research and innovation. <https://ec.europa.eu/programmes/horizon2020/>

³ The measurement of CO₂ will be carried out by an instrument on board a low-orbit satellite. This instrument is a spectrometer that analyzes the short infrared of sunlight reflected on the Earth's surface. Algorithms will then determine the amount of CO₂ based on the proportion of reflected light. The less light is reflected, the more CO₂ is charged in the atmosphere.

⁴ Contraction of the terms "development" and "operations" referring to an IT engineering concept and technical practice aiming at the unification of software development (dev) and IT infrastructure administration (ops), including system administration.

⁵ Once in orbit, the satellite undergoes a final phase, known as the in-flight acceptance phase, in order to validate its position and check the correct operation of the instruments before being put into service.



information on CO₂ flows. It also aims to understand the way the carbon cycle works and the behavior of major ecosystems, such as that of the Amazon or the oceans, in the context of climate change.

Capgemini is already participating in the exploitation of data from the Biomass⁶ mission as part of the Living Planet program⁷ by developing a data analysis platform (MAAP⁸) for the international scientific community. Capgemini is committed to contributing to space and scientific missions in relation to the environment and climate.

Simon Baillarin, head of the department in charge of the development of Earth Observation mission centers at CNES states: *"Capgemini is a recognized partner for our satellite and big data processing activities in numerous scientific and environmental projects such as Sentinel, THEIA and Taranis."*

Jérôme Ponton, CNES Account Manager at Capgemini in France, said: *"We are very pleased that the CNES has renewed its confidence in us for this mission, which is of fundamental importance in the light of current concerns about climate change. Our teams are applying more than thirty years of experience in the most innovative Earth Observation and Scientific space projects."*

Under an agreement between the National Research Agency - [Agence Nationale de la Recherche](#) (ANR) - and the CNES, the MicroCarb project is funded by the Investment for the Future Program - [Programme d'investissements d'avenir](#) - launched by the French government. The CNES is in charge of IT Project Management Support.

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⁶ Biomass: European Space Agency (ESA) Earth Observation satellite scientific mission to determine the distribution and evolution of plant biomass on a global scale.

⁷ [The Living Planet programme](#) brings together all European Space Agency (ESA) space missions for Earth observation from space.

⁸ MAAP for "Multi Mission Algorithm and Analysis Platform" is a collaborative project between NASA and ESA.