SCARBO

SPACE CARBON OBSERVATORY

INNOVATIVE SOLUTIONS TO MONITOR ANTHROPOGENIC GREENHOUSE GASES FROM SPACE

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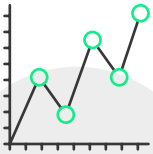
The EU policy guidelines for anthropogenic greenhouse gases (GHG) monitoring from space call for frequent observations, as well as high accuracy and spatial resolution. These requirements are currently unmet.

If funded, a new Copernicus Sentinel mission dedicated to Global CO_2 emissions **CO2M** should be operational after 2025. Nevertheless, there is room for complementary and supporting measurements helping solve key challenges such as temporal revisit times on specific sites and high spatial resolution.

The Horizon 2020 **Space CARBon Observatory** (SCARBO) project, implemented by a consortium of 8 European organisations, including scientific institutes and SMEs and led by Airbus Defence and Space, proposes a solution to the problem by implementing a novel miniaturised static spectrometer concept on a constellation of Small Satellites coupled with an aerosol sensor. SCARBO will address both CO_2 and CH_4.

CONCEPT

Small Satellites constellation
Novel miniaturised sensors
Aerosol sensors



SCOPE

Technical feasibility study
Assessment of mission performances
Proof of concept demonstration
Exploitation plan and use cases

CHALLENGES

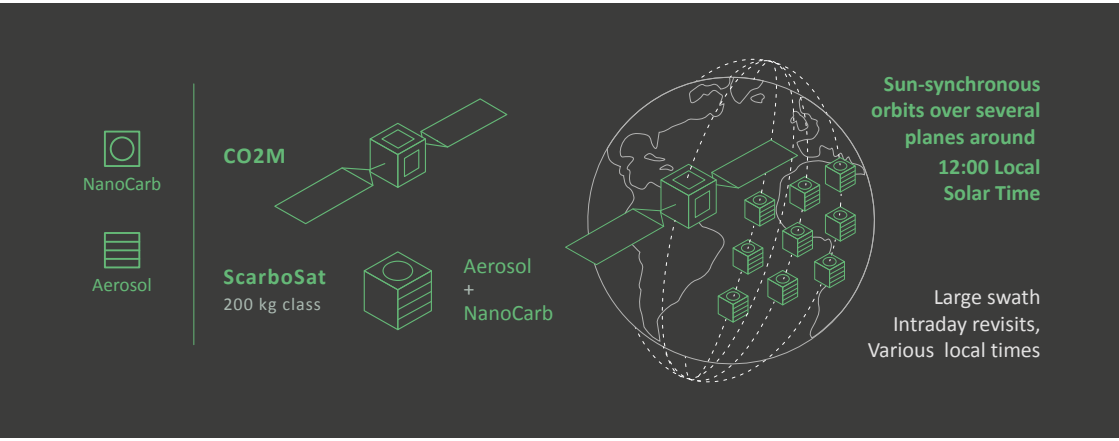
High observation frequency
High spatial resolution
Mission cost optimisation
Required accuracy measurements

200 kg class spacecraft, embarking:

NanoCarb - CO_2 and CH_4 sensor
SPEXone - aerosol sensor

The project foresees the detailed design, analysis and modelling of a miniaturised GHG-monitoring spectro-imaging instrument, called NanoCarb, together with a mission architecture study based on specific user requirements as well as on the identification of synergies with the potential new CO2M Sentinel mission.

The miniaturised sensors together with the use of Small Satellites platforms can lead to a significant cost reduction in terms manufacturing and launch with respect to standard large monolithic spacecraft.



The overall measurement concept will be experimentally validated through a dedicated airborne campaign planned in May 2020 with three instrument prototypes embarked on a Falcon 20 from SAFIRE. During this campaign large CO_2 emitters will be monitored over Europe using ground-based stations, such as AERONET (for aerosol optical depth measurements) and TCCON (for CO2 columns) as reference points.

The SCARBO consortium, led by Airbus Defence and Space, is composed of 8 European organisations, including scientific institutions and SMEs.

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www.scarbo-h2020.eu