OBJECTIVES

1

1. Formalize the technical demonstration needs of the Quantum Space Gravimetry Pathfinder Mission: The Quantum Space Gravimetry Pathfinder Mission will test an atom accelerometer on board a satellite for subsequent use in the context of space geodesy. Many technical aspects are specific to this mission and have never been demonstrated together before. The exhaustive list of the requirements, their accurate description and the possible trade-offs between them represents a main driver for selecting between competing system architectures.

2

2. Study system and operations concepts in line with technology demonstration needs and evaluate their technical feasibility: Once a set of preliminary requirements is available, system architectures can be elaborated under these constraints, using elements and technologies either readily available or expected to be available through existing development plans or through specific maturing actions defined by the project itself.

3

3. Confirm the feasibility of the Quantum Space Gravimetry Pathfinder Mission within the decade: The feasibility of the different components of the system will be assessed while taking into account the required time-frame. The study will focus on the instrument, the satellite and the system. For each technology lacking the required maturity, a path to maturity compatible with the overall project schedule will be established. For existing technologies not fully available within the EU, a similar approach using resources available in the EU will be proposed whenever possible.

CARIOQA-PHA

START DATE
January 2024

DURATION
12 months

BUDGET
1.5 millions €

CONSORTIUM
5 European partners

FUNDED UNDER THE PROGRAMME
HorizonEurope

PARTNERS

cnes CENTRE NATIONAL D'ÉTUDES SPATIALES

DLR

AIRBUS

gmv INNOVATING SOLUTIONS

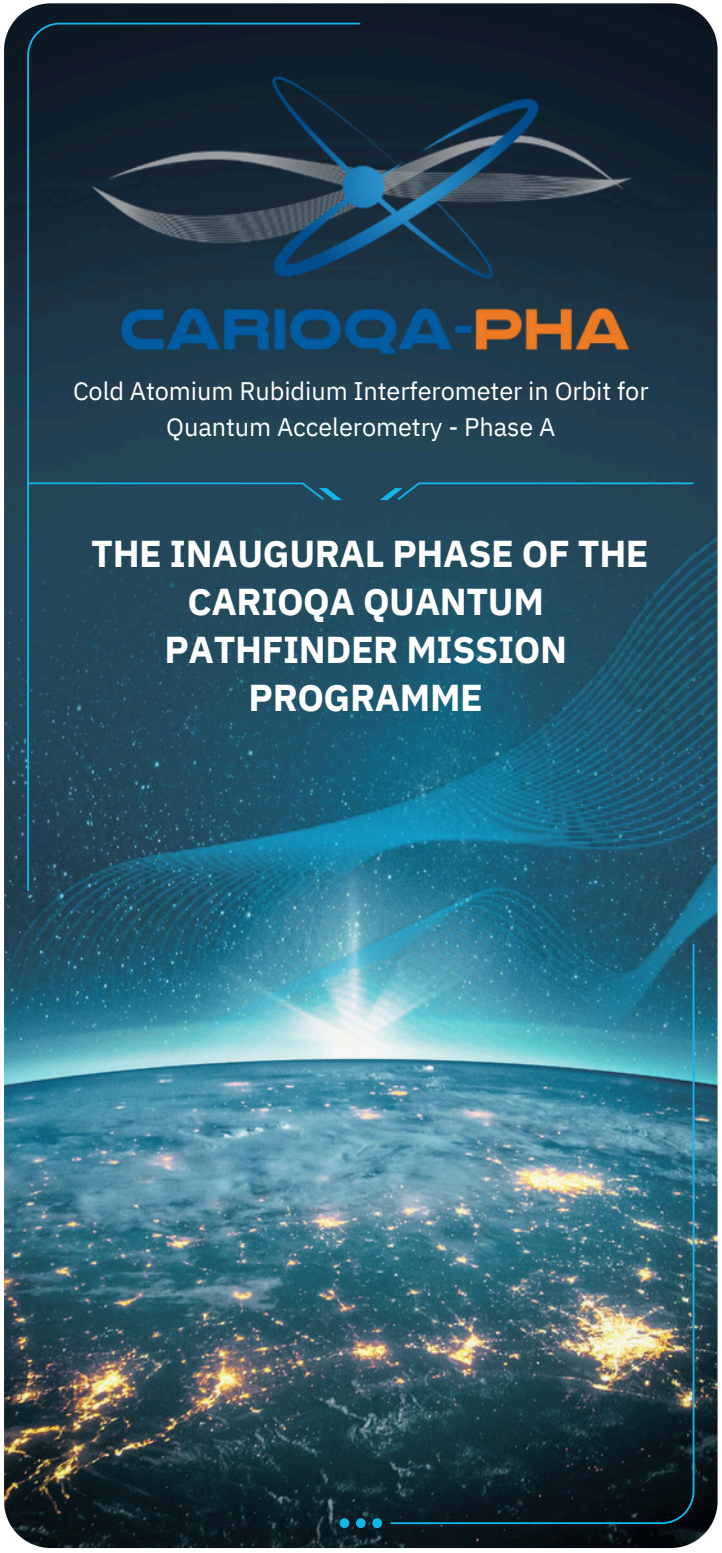
FORTH FOUNDATION FOR RESEARCH AND TECHNOLOGY - HELLAS

Funded by the European Union

CARIOQA-PHA

Cold Atomium Rubidium Interferometer in Orbit for Quantum Accelerometry - Phase A

THE INAUGURAL PHASE OF THE CARIOQA QUANTUM PATHFINDER MISSION PROGRAMME



CHALLENGE

Major challenges such as climate change may be better tackled through the improvement of space gravity data.

The last generation of quantum sensors represents a technological breakthrough while offering new opportunities of application in the field of climate and environmental sciences.

Satellite-based observation through quantum sensors allows to collect and monitor climate data that will further improve our understanding of complex climate phenomena such as climate change.

Satellite Gravimetry is a unique tool for monitoring climate change.

CONCEPT

CARIOQA-PHA project marks a significant step of the CARIOQA project that focuses on quantum technologies for space gravimetry.

Its overarching goal is to showcase the feasibility of a Quantum Space Gravimetry Pathfinder Mission for testing an atom accelerometer on board a satellite for subsequent use in the context of space geodesy.

EXPECTED OUTCOMES & IMPACT

- Respond to **environmental** and **societal** challenges of **climate change** through the improvement of **Space Gravimetry data.**
- Pave the way for flying a **Quantum Pathfinder Mission** for **Space Gravimetry** within the decade.
- Ensure **EU leadership** and non-dependence of **quantum sensors** in Space.

HOW DOES THE CONSORTIUM MAKE A DIFFERENCE

The **consortium** behind **CARIOQA-PHA** consists of **esteemed partners**, including **CNES**, **DLR**, **AIRBUS** and **FORTH**, who are also part of the **CARIOQA-PMP consortium**. Additionally, a new **industrial partner**, **GMV**, joins the project for **mission analysis**.

CARIOQA PROGRAMMATIC PLANNING