αLPHA

ALPHA is an **Italian Space mission** involving a 1U CubeSat, a satellite as big as a box with a 10 cm edge, designed and developed to be launched on-board **VEGA-C maiden flight**.

Main goals are to perform scientific experiments to deepen the knowledge of our Solar System, and to demonstrate innovative technologies to enhance the quality of life on Earth.

ALPHA is a collaborative mission led by **ARCA Dynamics**, an Italian *innovative start-up*, in partnership with **NPC Spacemind**, **H4 Research**, **GP Advanced Projects** and the **National Research Council (Cnr)**. The value chain is completed thanks to **NEXT - Ingegneria dei Sistemi**, the Ground Segment partner with the **NCS suite**, and **Cybera**, the **Cyber Security** partner.

ARCA DYNAMICS
Advanced Research and Consulting for Aerospace

Consiglio Nazionale delle Ricerche

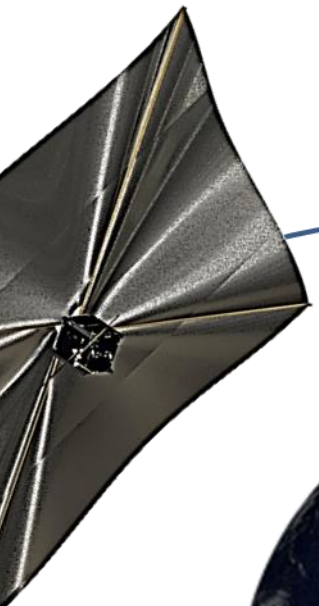
H4R
human for research

SPACEMIND

CYBERA

GP ADVANCED PROJECTS

NEXT
INGEGNERIA DEI SISTEMI



For further information please contact alpha@arcadynamics.com

The mission will take place in a **Medium Earth Orbit (MEO)**, at approximately 15 times the altitude of the International Space Station (ISS). At this altitude, 6.000 km circa, ALPHA will be in an **extremely harsh radiative environment**, called the inner Van Allen belt, where the Earth's magnetic field traps harmful solar wind and cosmic rays radiations.

Under these conditions, ALPHA will perform **scientific experiments** to better understand **magnetosphere related phenomena**, such as *Northern lights* and *southern aurora*, and the **demonstration of innovative technologies** designed and developed to **mitigate the effects of radiations**:

1. an experimental radiation sensor – *National Research Council (Cnr)*
2. innovative fluid-dynamics based devices – *ARCA Dynamics*
3. a radiation hardened Electrical Power System (EPS) board – *H4 Research*
4. an ultra-compact On-Board Computer (OBC) – *GP Advanced Projects*
5. a cutting-edge deployable solar sail – *NPC Spacemind*

On-board experiments and technologies have a direct impact on the well-being of society on Earth:

What can enable the development of biomedical machines that deal with radiations if not a radiation hardened technology demonstrated in Space?

How do we keep Space clean if not with deorbiting devices such as solar sails?

Moreover, green renewable energy can benefit from the exploitation of safe and reliable fluid-dynamics devices, whereas the novel OBC will contribute to the development of IOT infrastructures in harsh environments.

ARCA DYNAMICS
Advanced Research and Consulting for Aerospace

– https://www.arcadynamics.com

ARCA Dynamics is an *Innovative Start-up* active in the field of Space technology R&D. The company provides enabling technologies for Space proximity operations (collision avoidance, rendezvous, docking, undocking, berthing, capture, etc.) while increasing Space automation. ARCA Dynamics is participating in the European Space Agency (ESA) Business Incubation Centre Lazio

National Research Council of Italy

– https://www.cnr.it

The National Research Council (Cnr) is the largest public research institution in Italy, the only one under the Research Ministry performing multidisciplinary activities.

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– https://www.npcspacemind.com

NPC Spacemind is a branch of N.P.C. New Production Concept S.r.l. with the mission of designing, developing products and offering services for the Space Industry. The main focus of the division is on CubeSat, nanosatellite technologies and telescope tracking mounts. Thanks to its experience in the sector, NPC Spacemind has been involved in several CubeSat missions and ground test campaigns.

– https://www.h4-research.com

Rome based *start-up* company that combines sheer scientific lab pursuit with the development of innovative solutions for robotics, artificial intelligence, aerospace engineering and environmental engineering. The company's hallmark is the development of neural networks, applied in many fields such as robotics and control systems, alarm and security systems, land monitoring, resources management, social behaviour analysis.

– https://www.gpadvancedprojects.com

Innovative small company located in Brescia. The company is active in the development of nanosatellite system and subsystems for IOV/IOD and IOT activities within the CubeSat standards. In addition, it helps companies in entering the Space field, and provides support in designing and developing Space components and systems.

– https://www.next.it

NEXT Ingegneria dei Sistemi S.P.A. is a strategic company at national level with a strong experience in the Defence, Space, and Cybersecurity markets. NEXT was born in 1999 and in 2018 joined Defence Tech Industrial Group, a total Italian consortium that owns knowledge and skills of the IT companies qualified in the Defence and Cybersecurity area.

– https://www.cybera.it

Italian leader in Cyber Security and Digital Forensics services.

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