Welcome to CHEOPS Low Power

This is the first Newsletter of the CHEOPS Low Power project!

CHEOPS Low Power is an EU Horizon 2020 project that focuses on the design of different elements of a Hall Effect Thruster (HET) within Low Power Electric Propulsion Systems (EPS).

Electric propulsion provides a relatively small thrust in a very efficient manner, compared to chemical propulsion. Electric Propulsion Systems are highly efficient, making them uniquely qualified to keep Low-Earth orbit (LEO) satellites circling the globe. LEO satellites are increasingly deployed in large constellations for applications including Earth observation, Navigation and Communications. As the demand for these constellations grows, there is a corresponding need for cost-effective Electric Propulsion Systems (EPS). These systems are crucial for maintaining satellite positions and minimizing operational costs. By integrating advanced Electric Propulsion Systems (EPS), LEO satellites are positioned to take a leadership role in this expanding market. EPS enhances the operational lifespan of satellites, providing a competitive edge in efficiency and cost-effectiveness.

CHEOPS Low Power project is developing the necessary technologies to achieve a low-power EPS manufactured by European suppliers in order to address the LEO satellite market.

Welcome onboard!

Activities of CHEOPS Low Power

CHEOPS Low Power is developing important elements of an EPS, including the PPS-X00 HET, PPU and FMS, and has the following characteristics:

- Compact size and low weight Low Power EPS
- Capable of operating for thousands of hours in Low Earth orbit (LEO)
- Investigate performances for propellants such as krypton and xenon obtained from alternative sources
- Make significant progress in diagnostic approaches to improve ground testing techniques and be usable in future In Orbit Demonstrations (IOD).

CHEOPS Low Power Objectives

At a subsystem level CHEOPS Low Power project aims at:

A TRL6-7 for Low Power Electric Propulsion System
HET: TRL7, FMS: TRL 7, PPU: TRL 6

Fast and efficient development approaches to meet short time to market

Digital Twins Approach

Throughout the project, an innovative approach for design analysis and optimisation, incorporating Digital Twins, was successfully adopted, aiming to meet short time-to-market and low production costs.

The Problem: Integrating

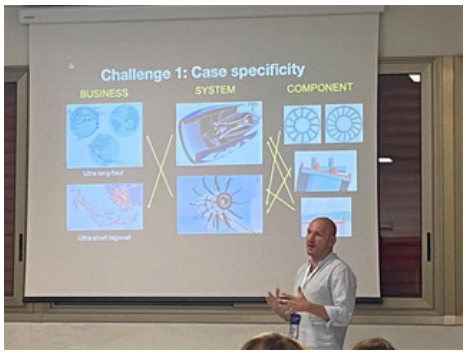
innovative technologies in complex space systems difficult. New ideas are often discarded due to uncertainties about cost, performance, and how they will behave with existing components. Additionally, these systems are sensitive to changes throughout their lifecycle.

The Solution: Imagine a

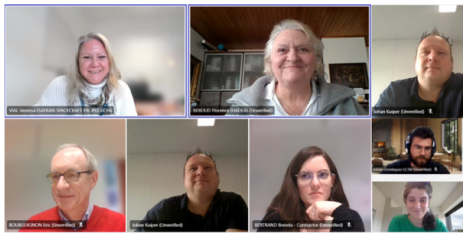
high-fidelity virtual replica of a spacecraft engine – that's a digital twin! Digital twins approach allow engineers to virtually test and optimise different configurations, reducing uncertainties and saving time and cost on development. This is particularly valuable for rapidly evolving technologies like electric propulsion systems for space.

News & other activities

Throughout the project's life, CHEOPS Low Power consortium has engaged in a variety of activities, including significant participation in conferences and workshops, contributing to the field of electric propulsion systems.



During the 13th EASN International Conference on Innovation and Space for Opening New Horizons, Massimo Panarotto presented an automating cost-benefit analysis for new designs using lifecycle standards. A web-based tool was introduced to demonstrate this capability, drawing on aerospace and space (CHEOPS Low Power project) applications.



On the left, you may find a group picture during the latest successful Milestone Meeting with the team members of CHEOPS Low Power. Let us see the real faces behind the project's activities!

Meet our team

CHEOPS Low Power is a collaborative project that involves a mixture of 8 industrial and academic partners across 6 European countries, each of them bringing specialised skills and experience to develop a Low Power Electric Propulsion System. As you can see below, the consortium includes leading organisations, all working together to push the boundaries and achieve significant results within the project's framework. Meet a glimpse of our team below and search for more detailed introductions in the "Partners" section of our website.

Safran Spacecraft Propulsion, a subsidiary of Safran Electronics & Defense, is the European leader in plasma propulsion. Safran Spacecraft Propulsion offers a complete range of electric motors and propulsion subsystems for more sustainable satellites and spacecraft.
Role within project: Consortium coordinator, in charge of thruster development and Low Power Electric Propulsion System Qualification.

AEROSPAZIO Tecnologie was founded in the year 2000 with the aim of providing high qualified testing and engineering services in the fields of vacuum technology and Electric Propulsion for spacecraft.
Role within project: In charge of TU endurance and system coupling test.

Bradford Engineering is a Netherlands based supplier of Attitude and Orbit Control Systems (AOCS), Propulsion systems as well as, Avionics and Thermal solutions for spacecraft. Bradford manufactures components such as pressure transducers, flow meters, cold gas systems, xenon feed systems, sun sensors and reaction wheels for major European satellite prime manufacturers. Bradford furthermore delivers turn-key solutions for propulsion subsystems, including the complete design, manufacturing, testing and launch preparation.
Role within project: In charge of Fluid Management System (FMS) development and testing.

Chalmers University of Technology has developed leading research in the areas of life sciences, materials science, information technology, micro-and nanotechnology, environmental sciences and energy. The university offers PhD and Licentiate programmes as well as MScEng, MArch, BEng and nautical programmes.
Role within project: In charge of Digital Twins approach, Value creation strategies and ECSS standards tailoring.

The Institute of Combustion, Aerothermics, Reactivity and Environment – ICARE, was created on 2007 by the merger of the Combustion and Reactive Systems Laboratory and the Aerothermics Laboratory. ICARE is located on the CNRS campus at La Source. ICARE's two fields of intervention, namely "Energy & Environment" and "Propulsion & Space", are divided into 3 Thematic Groups: "Combustion and Reactive Systems", "Atmosphere and Environment" and "Space Propulsion and High-Speed Flows".
Role within project: In charge of in ground and in flight diagnostics standardization.

Thales Alenia Space is the largest Belgian manufacturer of Space electronics and, as Thales Alenia Space Power lead center, the European leader of power supplies for satellites and control units for the Ariane 5 launcher. It is also specialised in electronic power conditioning for travelling wave tube amplifiers. TAS-B also develops its own range of custom Hybrid microelectronics and digital ASICs.
Role within project: In charge of the Power Propulsion Unit (PPU) development and testing.

Universidad Carlos III de Madrid (UC3M) is a public university with around 20,000 students, characterised by its strong international focus, the quality of its faculty, excellence in research and commitment to society. UC3M is listed in the QS World University ranking among the top 400 universities in the world and the top 50 universities under 50 year-old.
Role within project: The Plasma & Space Propulsion Team (EP2) is in charge of the modeling and the ground/ flight.

SME4SPACE, the representative organisation of SMEs in Europe's space industry, is a private not-for-profit organisation, dedicated to advocating for SME interests to public authorities such as the ESA, the European Union and its related agencies. S4S presently gathers cumulatively more than 800 SMEs active in space.
Role within project: In charge of project's Communication and Dissemination.

2024 Space Propulsion Calendar

Below there is a list of key conferences in 2024 focusing on the topic of Electric Propulsion Systems:

Space Propulsion Conference 2024: Happening from May 20 to May 23 in Glasgow, Scotland, this event is organized by the Association Aéronautique et Astronautique de France along with agencies such as ESA, CNES, and UK SA. It's a gathering for discussing technical and programmatic aspects of space propulsion technologies. Link: here

International Electric Propulsion Conference (IEPC) 2024: This conference will be held from June 23 to June 28 in Toulouse, France, and focuses on the latest advancements in electric propulsion. The IEPC is known for bringing together experts from around the world to discuss the future of electric propulsion. Link: here

International Astronautical Congress (IAC) 2024: Although broader in scope, the IAC (taking place from October 14 to October 18 in Milan, Italy) features significant content on space propulsion among its wide range of topics related to the space industry. It's one of the largest gatherings in the space sector, attracting thousands of professionals. Link: here.

SpaceOps 2024 Workshop: Hosted by CNES in Toulouse, France, from June 18-20, 2024. This workshop will explore new subjects and paradigms in space systems operations, including discussions on new operations paradigms, solutions for operations, challenges for exploration, a zero-debris approach, and the operations of in-orbit services missions . Link: here.

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Our mailing address is:
contact@cheops-2020.eu