

WHAT WE DO...

In the EARS project, we design a **reusable small satellite** and develop the related critical technologies. The reusable spacecraft is intended to de-orbit in a controlled manoeuvre to deliver its products and results back to the Earth after several months in orbit, thereby enabling innovative research that would benefit from the space environment, especially from microgravity conditions.

Thanks to its conceptual approach, EARS leverages on a SmallSat modular architecture in order to guarantee the **maximum flexibility** and the possibility of continuously upgrading the system over time.

The EARS satellite uses an inflatable/deployable heat shield and a precise landing parafoil, with the objective to reach unprecedented level of payload fraction for a reusable system.

The long-term vision of the EARS project is a family of small satellite platforms that can be launched and reused frequently at a very competitive price mitigating pollution the environment and wasting resources, both in space and on Earth.

KEY STRATEGIC ORIENTATIONS

- » Promoting an open strategic autonomy of Europe by leading the development of enabling and emerging technologies
- » Ensure a clean and healthy environment
- » Making Europe a sustainable economy through the transformation of its construction and production systems



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EARS

EUROPEAN ADVANCED REUSABLE SATELLITE

We want to introduce the disruptive concept of "re-usability" in the small satellite segment for a greener and sustainable Europe

CONSORTIUM



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KEY ENABLING AND EMERGING TECHNOLOGIES

Key enabling and emerging technologies we develop in the EARS project:

- » Innovative heatshield
- » Green propulsion
- » Controlled Re-entry
- » Compact Platform



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INNOVATIVE HEATSHIELD

Current state-of-the-art heatshields are rigid, often one-piece, systems. Their size is therefore limited by the launcher fairing volume.

In the EARS project, we want to investigate innovative Thermal Protection System (TPC) concepts such as flexible or inflatable heatshields. Selected advanced materials will be tested under a representative environment in a plasmatron facility, providing valuable data for future development of European advanced heatshields.



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CONTROLLED RE-ENTRY

Few systems currently have the operational capability to perform a **controlled and safe re-entry** from Low Earth Orbit (LEO), precisely targeting a specific landing (or splashdown) site, and all of these are heavy reusable capsules or space planes that rely on “classic” technological solutions as rigid heatshields.

In the EARS project, we aim to identify a complete and coherent guidance, navigation, and control (GNC) solution for the safe recovery of a reusable satellite, addressing the peculiarities of an inflatable/deployable heatshield and aiming for a robust, affordable, and reliable end-2-end solution.

COMPACT PLATFORM

The EARS satellite will be evolved from a platform with already a flight heritage.

Yet, the challenge will be **to integrate a powerful and flexible green propulsion system**, an innovative deployable/inflatable heat shield, and all the other subsystems in a very tight package inside a SmallSat, thus obtaining a small reusable system with top class payload volume fraction and versatility.

MAIN APPLICATIONS

- » In-space manufacturing
- » Commercial or scientific research in microgravity
- » IOD/IOV
- » Missions for space inspection, servicing, and active debris removal
- » Outreach and educational programs for public entities



GREEN PROPULSION

In the EARS project, we propose to use a liquid propulsion system that uses green, no-toxic and low-cost propellant.

The propulsion system will be affordable thanks to the additive manufacturing and will enjoy several capabilities, such as differential steering and multiple restart.

We aim at providing a small and green thruster featuring higher performances with respect to the current solutions available in the market. The propulsion system that will be developed can be considered a product on its own, that could be used for other programs or customers.



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