

ORU-BOAS

newsletter

VOLUME 2
SECOND SEMESTER



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"Welcome, Readers!"

We are thrilled to present the second edition of the ORU-BOAS Newsletter, **Issue 2#**. Embark on an exciting journey with us into the realm of the ORU-BOAS project, where we are revolutionizing space systems with an innovative concept: **the Orbital Replacement Unit, based on Building Blocks for Advanced Assembly of Space Systems.**

Our dedicated researchers are focused on an ambitious goal: enabling the assembly, repair, and deployment of space infrastructures **right in orbit**. With a strong focus on in-orbit services, we're striving to develop an advanced ORU-BOAS standard module, taking it up to an impressive **TRL5/6 level**.

This versatile plug-in module will be compatible with a wide range of payloads and will feature standard interfaces to seamlessly **interact with other ORUs, satellite platforms, robotics elements, and the elements** outlined in the "Plan European Roadmap and Activities for Space Exploitation of Robotics and Autonomy" (PERASPERA) roadmap.

Our vision encompasses a multitude of services, from life extension and refueling to repairs and station-keeping missions, all working towards bolstering European strategic autonomy and enhancing robotic missions.

As we mark the ORU-BOAS project's first anniversary, both WP2 and WP3 have been finalized, and WP4 is in progress, meaning that the technologies review and the system's preliminary design have both been successfully finalized, showcased in the present issue. It's an exciting peek into the progress we've made so far.

We'd like to invite you to delve into this newsletter's articles, insights, and discoveries. Please stay connected with us through our website and join our lively social media community to stay updated on the latest developments of the ORU-BOAS project.

Enjoy your reading, and may the unfolding future of space systems bring excitement!

WP3 – *Preliminary Design*

Unfolding Preliminary Design

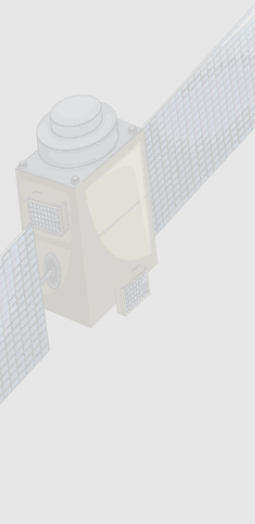
In the SRR that we already presented in our first newsletter, we consolidated project requirements and presented a first system concept after gathering valuable insights for market analysis and examining both short- and long-term perspectives on potential application cases.

After that, our focus was on arriving at a complete **preliminary design of the system through WP3 Preliminary Design**. This was consolidated on this year's most important milestone, the Preliminary Design Review (PDR) held in Brussels in September, where we received valuable feedback from external experts.

We have developed an updated system and mission concept that has served as a baseline for the definition of the design. The ORU-BOAS has been designed to be **compatible with both On-Orbit Servicing (OOS) and In-Space Manufacturing and Assembly (ISMA) scenarios** for the assembly, repair, or upgrade of space infrastructures directly in orbit. Due to the variety of payloads that the platform can hold, a wide range of missions are possible, for instance, life extension, refuelling, or de-orbiting.

For PDR we presented the design of the different components of the platform.

Firstly, we have the ORU platform, with all the common elements for integration of the payload. For example, the structure has been specifically designed to be as compatible as possible with **CubeSat philosophy** and be able to withstand the required mechanical loads while supporting the rest of the components.

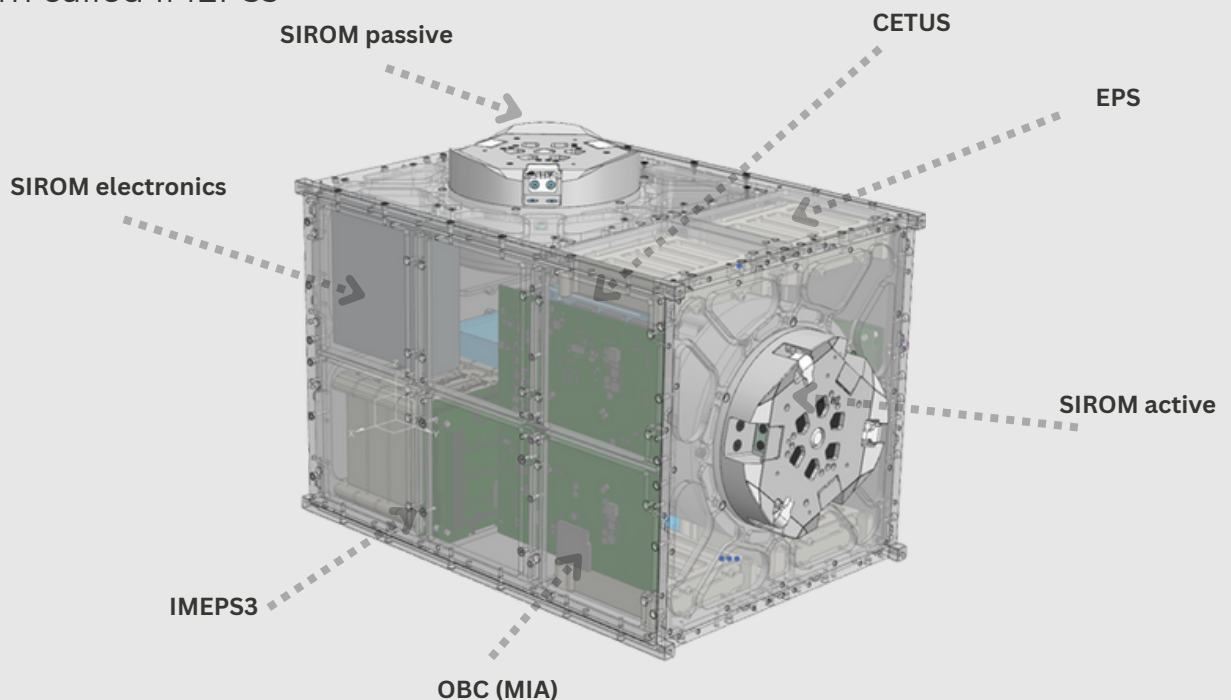


WP3 – Preliminary Design

Unfolding Preliminary Design

Another subsystem that has been widely developed is the **sMart Integrated Avionics (MIA)**, a custom execution platform developed by SENER that provides a common framework for all the platform elements to send data to each other.

Secondly, we have the SIROM as a standard interface to allow interconnection between the ORU and other ORUs, satellites, space stations, robotic arms, etc. And **lastly**, we have the payload that for ORU-BOAS will consist of a modular electrical power system called IMEPS3



In the PDR we also presented the first analyses performed regarding mechanical loads and docking capabilities that served us to preliminary validate our design. In addition, the first Test Plan was presented, consisting of component, subsystem, and system-level tests to arrive at the objective TRLs.

WP3 – *Preliminary Design*

Looking at next steps

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WP3 – Preliminary Design

Progress so far to the overall ORU-BOAS scope

To date, critical decisions have been made regarding ORU designs, key components are identified, and progress is underway to achieve the required Technology Readiness Levels (TRLs).

This initial phase lays the foundation for the successful conclusion of the project foreseen for December 2024.

In October we attended the International Astronautical Congress (IAC) in Azerbaijan, where we presented all the work done on the project until the moment. Having concluded WP3 at PDR, right now we are in the middle of WP4 working on the Detailed Design of ORU-BOAS as a whole and all its subsystems.



Revealing the Journey Toward an Autonomous European Mission: An Adventure Awaits



Our Team



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