

IAF SPACE SYSTEMS SYMPOSIUM (D1)
Cooperative and Robotic Space Systems (6)

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ORU-BOAS: DEVELOPING REUSABLE BUILDING BLOCKS FOR SATELLITE MODULARISATION

Abstract

In-Orbit Servicing (IOS) and In Space Manufacturing and Assembly (ISMA) present sustainable opportunities for the future of space exploration. In the past years, many efforts have been made to advance in the building blocks required for these missions. In this paper, SENER Aeroespacial presents the concept of the project ORU-BOAS, a new approach in IOS and ISMA for the future of robotic missions.

The project aims to develop a standard module called ORU-BOAS (Orbital Replacement Unit – Based on Building Blocks for Advanced Assembly of Space Systems) for European Robotic scenarios. This module will allow the assembly, repair, or upgrade of space infrastructures directly in orbit for a wide range of missions, including life extension, refuelling or de-orbiting, among others. The ORU-BOAS will be able to hold a variety of payloads for such scenarios, providing a Standard Interface as the mechanical link, as well as electrical, data and/or fluid transfer between modules. The Standard Interfaces will be based on previous developments made along the PERASPERA roadmap.

The purpose for the project is to define the most versatile ORU to bring a functional capacity to a bigger system. The ORU-BOAS is composed of an ORU platform, with all the common elements for integration of the payload; an ORU payload, depending on the mission of the module; and Standard Interfaces that allow interconnection of ORU-BOAS to other ORU-BOAS (to form larger space systems), satellites, space stations, or robotic arms among others.

ORU-BOAS provides the opportunity to address modularity and adaptability from the conception of the space system. It will allow customizable satellites while maintaining the standardization that allows robotic cooperation. SENER Aeroespacial leads the consortium including Thales Alenia Space, ISISpace, EASN and DLR. The roadmap of the project consists of developing a TRL 6 model including different payloads by the end of 2024, that will then continue towards an In-Orbit Demonstration along Horizon Europe to be launched as early as 2026.