

22nd IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND  
DEVELOPMENT (D3)

Systems and Infrastructures to Implement Sustainable Space Development and Settlement - Systems (2A)

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DLR (German Aerospace Center), GermanyVALIDATION AND TESTING OF A EUROPEAN VERSATILE ORU FOR IN-ORBIT SERVICING  
MISSIONS: ORU-BOAS PROJECT**Abstract**

The project ORU-BOAS (Orbital Replacement Unit-Based on Building Blocks for Advanced Assembly of Space Systems) introduces the concept of a modular and adaptable plug-and-play module that, together with In-Orbit Servicing (IOS) and In-Space Manufacturing and Assembly (ISMA) operations, paves the way for a sustainable and standardized space ecosystem.

The versatility of the developed module lies in its capacity to accommodate a diverse range of payloads while simultaneously offering a Standard Interface for mechanical, electrical, data, and/or fluid transfer between modules.

This paper gives an overview of the final design of the ORU-BOAS platform and focuses on its models' validation. This validation aims to verify the functional compliance of the system. It starts at subsystem level with the testing of, among others, the Standard Interface (SIROM), power subsystem (IMEPS3), Data Handling System (MIA) and payload. Secondly, after components integration, the complete platform is tested, starting with physical properties check and ending up with rendezvous manoeuvres.

The rendezvous manoeuvring tests are performed on-ground in 0-g condition in DLR facilities. They also include the latching of the SIROM on the platform. To this end, a fixed-base Light-Weight-Robot is used. This robot is equipped with a force torque sensor at the end effector.

Finally, two ORU models are integrated into a laboratory set up for the on-ground demonstration of an In-Orbit Servicing scenario within the frame of the EROSS IOD project. The ORUs are transferred from the servicer to the client and stacked by a robotic arm with a Standard Interface on its end.

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