

20th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)Systems and Infrastructures to Implement Sustainable Space Development and Settlement - Technologies
(2B)

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ON-ORBIT SERVICING: INTERNATIONAL CONSENSUS ABOUT STANDARDIZATION OF
INTERFACES**Abstract**

The NESTS Study initiated by ESA in 2020 has identified gaps to be solved to improve access to space and space operations from 2030 to 2050. Most of these gaps will be covered by Europe through projects within companies. However, some of them can not be solved by industry but require the support of institutions to find a sustainable solution on an international level.

With the increasing number of constellations and service providers, the reduction of costs, and space safety and sustainability awareness comes an increasing need for On-Orbit Servicing (OOS) to extend the life of spacecraft or handle them at the end of their mission. This rising number of new players will need a frame to cooperate together and optimize their resources. The NSR report from 2021 estimates the market of OOS missions at more than 6.2 billion USD. Despite the advanced projects of already existing OOS missions initiated in specific domains, institutional adoption of a range of modular interfaces needs to be considered enabling access to on-orbit servicing to everyone. In the wake of the previous investigation made by the Space Generation Advisory Council's Space Safety and Sustainability Initiative, technical solutions within the legal frame are proposed in this study.

The first section of this study focuses on the analysis of potential types of OOS missions for the next 15 years, i.e., what kind of services need to be performed, what satellite' subsystems could be targeted for OOS, and the specifications for the servicing vehicle. The second section focuses on technical engineering solutions in order to establish the common trends in the industry for the incoming decade. This will lead to a panel of technical challenges, and depending on the mission, a conceptual design will be proposed to answer them as modular interfaces. The final section of this paper suggests standards that must be created to allow companies to adopt the technologies to their own mission.

This study aims at proposing a range of standards for modular interfaces for OOS suitable to the needs of the industry. With the support of industry and space policy, an In-Orbit demonstration mission is targeted within three years.

Keywords: Interfaces, Standardization, On-Orbit Servicing