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Interactive Presentations - 20th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (IPB)

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RECONFIGURABLE ROBOT FOR ON-ORBIT-SERVICING MODULAR SATELLITES.

Abstract

The ever-increasing amount of space debris caused by broken or disabled satellites has already become a problem for many space missions. Therefore, work is being done on modular satellite structures, which can be extended in their function or repaired due to their modularity. For this purpose, solutions are needed to enable On-Orbit-Servicing of these satellite structures. For this purpose ReCoBot was developed. A reconfigurable robot, which can move over the modular satellite structure. Using the standardized ISSI interface of iBOSS GmbH, the robot is able to communicate with the satellite, to exchange energy, and to grasp the components. The symmetrical design of the robot, with an interface at both ends, enables continuous locomotion. ReCoBot has seven degrees of freedom, consisting of kinovadrives. The interconnect structures are optimized for lightweight design to allow testing in the Earth's gravity field on the one hand, and to keep the robot's launch weight as low as possible on the other. Future research will add a gripper to the robot to expand serviceability. Force sensors will be used to improve the docking capability. Furthermore, different tests shall provide insight into the space suitability of the further developed ReCoBot as a proxy for a robotic manipulator based on conventional components.