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SIROM FUNCTIONAL VALIDATION CAMPAIGN: TOWARDS THE IN-ORBIT DEMONSTRATION

Abstract

The necessary technologies for the European robotics ecosystem are evolving towards the future concept of modular, re-usable and sustainable missions. In this scope, the Standard Interfaces (SI) are one of the key building blocks needed to enable such missions, providing mechanical and electrical coupling, along with data and fluidic transfer if needed. From 2016, Sener has been developing SIROM (Standard Interface for Robotic Manipulation) in the frame of European Union's H2020 and has been developing the functionality since then in collaboration with many European projects. In the two past years, the focus of the work has been on the design of the SIROM families E and G, both of them redesigned to add the necessary requirements for a flight demonstration. Past versions of SIROM had already been used in ground demonstrations with European partners; however, modifications were made to adapt the design to withstand the space environment. The two families made for flight applications are:

- SIROM E: includes mechanical, electrical, and data interface. Best suited for high-power transfer and high-speed data transmission.
- SIROM G: includes mechanical, electrical, data, and fluidic interface.

This paper presents the validation of the first assembled model of both SIROM families (E and G) from a functional perspective. Each model is validated individually to evaluate basic performance and demonstrate the desired operation of the interface. After that, the capture range is tested to extract the maximum limits. Both families include a vision-aid system based on hall effect sensors; these tests are used to correlate the simulation results to the actual behavior of the system. For SIROM G, sub-system level tests are also performed to validate the performance in terms of maximum pressure, leakage, and maximum flow rate.