

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Microgravity Experiments from Sub-Orbital to Orbital Platforms (3)

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IOSLAB – IN ORBIT SERVICING LABORATORY FOR MICROGRAVITY EXPERIMENTS ON
SPACE RIDER. USE CASES FOR SPACE BIOLOGY, NANOTECHNOLOGY AND TECHNOLOGY
DEMONSTRATION.

Abstract

IOSLAB (In-Orbit Servicing LABORatory) is a universal space laboratory facility within optimised design compatible with Space Rider (SR) interfaces. The lab can accommodate various types of microgravity experiments. IOSLAB is developed in such a way to require a minimal number of changes between flights. It consists of both pressurised and unpressurized slots for experiments, and it will have a very simple internal firmware and active thermal control to keep everything at the required operational conditions.

Three experiments to be embarked on the SR maiden flight will be presented as a use cases. Two experiments will be accommodated in the pressured part of the lab and one IOD (In-Orbit Demonstration) outside. MaiO – a biology experiment – is focused on the research of microalgae in microgravity and radiation environment, as microalgae have a big potential for human space exploration, production of cellular meat etc. The purpose of the experiment is to obtain basic information about the systems biology of microalgae exposed to microgravity conditions and cosmic radiation. The aim is to ensure the cultivation, survival and reproduction of microalgae and, after SR landing, to remove microalgae and perform a comprehensive analysis. The second experiment – Nanobots – is biochemical, of nature and it will be looking at how microgravity affects nanorobots that can be used for medical applications and for environmental remediation. Microrobots are structures in the microscale range that are able to convert an external energy source into mechanical motion. In the contextual experiments two different structures for microrobots are proposed, a tubular shaped platinum nanotube and a Janus particle structure based on platinum and another component. The third experiment - VESNA - will be in the "open-space" section of the lab; it concerns in flight testing of a multispectral camera, developed for the scientific mission for analysing the meteor ablation plasma and for recording the trajectories of meteoroids through the Earth's atmosphere. The VESNA camera is planned to record meteor spectra in the range from 200 to 700 nm, with the main scientific interest in the UV region that cannot be observed with ground-based spectrographs due to the absorption of UV rays by the Earth's atmosphere.

The sister company SAB Launch Services will act as a sub-aggregator to enlarge its portfolio of services to flight experiments for customers specialized in the area of biology, pharmaceuticals, electronics, IOD and many more on Space Rider's future missions.