

IAF SPACE SYSTEMS SYMPOSIUM (D1)  
Interactive Presentations - IAF SPACE SYSTEMS SYMPOSIUM (IP)

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FACILITATORS – FACILITIES FOR TESTING ORBITAL AND SURFACE ROBOTICS BUILDING  
BLOCKS

**Abstract**

The European Commission has initiated in 2014 a Strategic Research Cluster on Space Robotics (<http://www.h2020-peraspera.eu>), being steered by the PERASPERA grant Programme Support Activity (PSA), aiming at advancing key space robotic technologies for future on-orbit satellite servicing and for planetary surface exploration in the time frame of 2020-2030. The roadmap proposed has identified five building blocks that will be the base of future space robotics missions, being implemented through a system of interconnected H2020 operational grants (OG), started in 2016. The facilitators project (OG-6) aims at providing the physical test environments in which all the building blocks can be installed and validated by adapting and using the best available facilities, which are able to provide the relevant environment and conditions for testing each building block in two different scenarios, the orbital (in orbit servicing and maintenance activities) and the planetary (surface operation for planetary exploration). The project team is coordinated by GMV, and is composed by DLR, DFKI and Airbus DS UK. The facilities being used for the orbital scenario are: a) the platform-art© laboratory (GMV, Spain), a hardware-in-the-loop facility which is able to reproduce on-ground the relative dynamics between satellites and therefore representative conditions for testing space systems/sensors; b) the OOS-SIM and LWR robotic arm (DLR, Germany), which are hardware-in-the-loop simulation facilities used to simulate orbital robotic systems engaged in close proximity operations. For what concerns the planetary scenario the following facilities are used: a) the Planetary Exploration Lab (DLR, Germany), which consists of an indoor soil bin used for testing planetary locomotion systems; b) the Mars Yard (Airbus DS, UK), a large indoor facility that represents a mock-up of a Martian-like environment for testing robotic rovers; c) Mars analogue outdoor field tests will be performed in Morocco (DFKI responsibility). The rovers being used in this scenario are: a) the ExoMars phase B2 breadboard (DLR), a 6 wheels rover with several sensors; b) the SherpaTT (DFKI),

an hybrid wheeled-leg rover with an actively articulated suspension system; c) the ExoMars Breadboard Phase B1 - Bridget rover - (Airbus DS). In the first phase of the project the validation needs of each building block have been analysed and the validation responsibilities within the team have been assigned trying to identify the facilities which best fit each building block. The activity aims at organizing these facilities in a federation, and providing regulated services to the space robotics community also beyond this project.