

MICROGRAVITY SCIENCES AND PROCESSES (A2)  
Microgravity Processes onboard the International Space Station and Beyond (7)

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A COMPLEX OPERATIONAL SCENARIO FOR THE EXECUTION OF EUROPEAN FLUID  
PHYSICS EXPERIMENTS ON THE ISS: ACHIEVEMENTS AND LESSONS LEARNED.

**Abstract**

MARS (Microgravity Advanced Research and Support) Center of Telespazio is the ESA FSL Responsible Center, it is located in Napoli in southern part of Italy. FSL is a multi-user facility for conducting fluid physics research in microgravity conditions. It can be operated in fully- or in semi-automatic mode and can be controlled on board by the ISS astronauts, or from the ground in the so-called telescience mode. The Laboratory allows scientist to execute experiments using complex optical diagnostics and to record microgravity data for an accurate characterization of the experimental environment. In parallel the execution of experiments on class 2 payloads using the NASA ground infrastructure and processes allowed us to develop, also in this case, operation concepts with strong NASA-ESA interrelations, and with the opportunity to have a complete involvement in the payloads operations on the ISS. This paper reports on the fully implemented operational scenario starting from the Increment 16, FSL commissioning, and Increments 17-18, execution of the Geoflow experiment, up to the execution of operations on class 2 payloads, SODI and Altea Shield, also with considerations on the management of off-nominal situations and on-orbit troubleshooting. Proposals for upgrading the applied processes and interactions during the preparatory phases and operations execution are reported, based on the lessons learned up to now