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FLUID SCIENCE LABORATORY ON BOARD ISS: FASES EXPERIMENT OPERATIONS AND FUTURE UTILIZATION OF FSL

Abstract

The Fluid Science Laboratory (FSL) is an European (ESA's) science payload designed for use in the Columbus module of the International Space Station. One of the European USOC's (User Support Operation Center), named as MARS (Microgravity Advanced Research and Support) Center , and located at Telespazio premises in Napoli, has got the role of FSL Responsible Center. MARS has been carrying out FSL operation since early stage of Columbus era. FSL is a multi-user laboratory 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 ground MARS cadre. The laboratory allows scientist to execute fluid dynamic experiments using complex optical diagnostics. This paper reports on operations carried out during the ISS Increment 35-36, to support the FASES experiment, also with considerations on how the operations are planned and then executed on a 24/6 days basis, on the amount of data generated on FSL hard disks, and on how data are downlinked to ground eventually. A description of the interaction among the automatic onboard automatic experiment Procedures (EPs), the MARS USOC ground team, and the Science Team located at their User Home Basis (UHB) is also provided. Based on the lessons leaned during the FASES runs execution, the paper provides indication for the continuation of the experiment and also for the future utilization of FSL.