

MICROGRAVITY SCIENCES AND PROCESSES (A2)
Microgravity Sciences onboard the International Space Station and Beyond (6)

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MELFI POOL COMPLETE ON BOARD THE ISS WITH THIRD FREEZER TESTED IN 2010

Abstract

On board the Space Shuttle Discovery in STS-131 / ISS 19A mission, the third Flight Unit of the Minus Eighty degrees freezer MELFI will have joined by April 2010 the two first units inside the ISS. Just after docking, this third unit will be installed inside the Japanese KIBO module and its on orbit commissioning will follow by July. The pool of three MELFI units will continue providing the scientific community with robust and permanent available refrigeration capabilities for life science experiments in ISS, allowing in addition to cope with the foreseen lack of down transportation of the samples during up to two years. By summer 2010, the first unit will be completing 4 years of continuous operations in ISS, and the second unit will have completed one year in orbit. Those two units have demonstrated outstanding performance on orbit and proved the adequate technical choices during the development program, which are expected to be confirmed by the on-orbit commissioning of the third unit. Together with the MELFI rack, newly developed hardware for extending the MELFI in orbit life will be uploaded. This includes in particular the Nitrogen Cleaning Purging System, which will use the nitrogen available from the ISS to clean-up and restore the needed conditions of the cooling loop gas, allowing for the extended lifetime. The paper will present and compare the results of the in orbit tests for the third unit, the on orbit operations performance for the first unit during four years and for the second unit during the first year. Information on the foreseen operational modes for the pool, as well as the preventive and corrective maintenance foreseen on all the units in the extended ISS lifetime, will also be presented.