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Microgravity Sciences Onboard the International Space Station and Beyond - Part 1 (6)

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DECLIC : A NEW AND PROMISING LIFE ABOARD THE ISS

Abstract

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DECLIC is a multi-user facility to characterize critical fluids behavior and directional solidification growth structures of transparent alloys.

As part of a joint NASA/CNES fundamental physics research program, the DECLIC mini-laboratory has been operated onboard the ISS since October 2009. Housed inside a NASA science rack, DECLIC operates three experiment inserts in turn for periods of 3 to 6 months: HTI (High Temperature Insert), ALI (Alice Like Insert) and DSI (Directional Solidification Insert). Experiments are monitored and controlled from CADMOS at CNES.,

After a 2-year period back on Earth for maintenance (due to a major anomaly on a communication board that occurred in September 2014), DECLIC was sent aloft and returned to the ISS on 17 October 2016 with Orbital's CRS-05.

Operations have successfully resumed, and promising scientific results are paving the way to new prospectives and horizons. In fact, the success and value of DECLIC have encouraged NASA and CNES to plan a successor to DECLIC (DECLIC Evolutions), with new scientific inserts, continuing to work with NASA, who is interested especially in waste disposal for its future long-duration crewed spaceflights, using 'supercritical' water to disassemble organic molecules (clean combustion).

This paper aims at presenting the post-refurbishment commissioning and operations, followed by an overview of the new prospective scientific objectives.