

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

Author: Mr. Patrick Hambloch

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, patrick@hambloch.name

Dr. Rainer Willnecker

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, rainer.willnecker@dlr.de

Mrs. Angelika Diefenbach

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, angelika.diefenbach@dlr.de

Ms. Julie Brisset

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, julie.brisset@dlr.de

Ms. Anna Nemirovski

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, anna.nemirovski@dlr.de

Dr. Sonja Steinbach

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, sonja.steinbach@dlr.de

Mr. Lars Uffmann

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, lars.uffmann@dlr.de

Dr. Thorsten Enz

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, thorsten.enz@dlr.de

Mr. Dejan Simicic

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, dejan.simicic@dlr.de

Mr. Peter Weiss

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, p.weiss@dlr.de

Mr. Jens Schiemann

European Space Agency (ESA), The Netherlands, jens.schiemann@esa.int

OPERATIONAL RESULTS OF THE MATERIALS SCIENCE LABORATORY AFTER ONE YEAR  
IN-ORBIT

**Abstract**

The ESA payload Materials Science Laboratory is designed for conducting research in the areas of solidification physics, crystal growth and the measurement of thermo-physical properties of materials. MSL was launched in August 2009 as part of NASA's Materials Science Research Rack and is being operated by the Microgravity User Support Center (MUSC) of DLR as part of a cooperation between ESA and NASA. Due to this international collaboration on this project the Principal Investigators come from Europe and the United States.

The facility is capable of housing one of several furnace-inserts for different types of experiments and can process samples of 8mm diameter and 245mm length at temperatures up to 1400 degrees centigrade, depending on the sample cartridge.

Since its launch MSL processed 2 samples during an extensive commissioning in late 2009 and after a thorough analysis of these, completing the first batch, another 11 experiments were performed in the first half of 2010. After this successful performance the first furnace insert, the Low Gradient Furnace, will be exchanged with the Solidification and Quenching Furnace at the end of 2010 to prepare MSL for the second batch of experiments, being in the pipeline for processing in 2011.

This paper gives a brief description of the overall project and describes the experiences of the first year of in-orbit operations. In addition some attention is paid on the fruitful cooperation between Europe and America and the resulting decentralized operations concept.