MICROGRAVITY SCIENCES AND PROCESSES (A2)
Facilities and Operations of Microgravity Experiments (5)

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DEVELOPMENT OF SODI (INCLUDING OPERATIONS), IPE AND DIRSOL

Abstract

Abstract related to A2.5: Facilities and operations of Microgravity experiments

During the past years, Verhaert has been involved in the development and operation of several facilities and instruments on board the ISS (e.g. FOAMS, LESS, SODI) and other carriers (e.g. SCCO on FOTON). Besides these performed experiments, Verhaert is also developing new facilities / instrument for use in the ISS in the near future.

Verhaert would like to present SODI, IPE and DIRSOL.

• **SODI** stands for Selectable Optical Diagnostics Instrument and is a facility that has been integrated in the Microgravity Science Glovebox. The facility contains several types of interferometers (e.g. Digital Holography) to visualize the temperature and concentration variations in small liquid volumes subjected to a temperature gradient or external vibrations. The principles of the instrument will be explained as well as their implementation. During the operations, Verhaert interacted with E-USOC in Madrid to define the operational procedures and with MARS in Naples to analyze the downloaded data. This will be explained as well as the integration sequence in the MSG.

• **IPE** stands for ICAPS Precursor Experiment and intends to simulate and observe the collision of particles in conditions comparable to the ones in the period of the formation of planetary systems. The basic principles used to gather particles (based on thermophoretic forces) and to bring particles into the field of view of the optics (based on the use of high power laser beams) will be explained as well as the optical diagnostics used to observe the particles (interferometry, long distance microscopy, light scattering units). The resulting lay-out showing how the instrument will be configured inside the EPM (European Physiology Module) will be explained.

• **DIRSOL** stands for Directional Solidification and will investigate the phenomena that take place in the "solidification area" of materials. The principles of the optical diagnostics (e.g. microscopy) used to observe the solidification area will be explained as well as the resulting configuration which will be integrated inside the Microgravity Science Glovebox.