

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Life Support, habitats and EVA Systems (7)

Author: Dr. Gisela Detrell

Institute of Space Systems, University of Stuttgart, Germany, detrell@irs.uni-stuttgart.de

Mr. Harald Helisch

University of Stuttgart, Germany, helisch@irs.uni-stuttgart.de

Mr. Jochen Keppler

Institute of Space Systems, University of Stuttgart, Germany, keppler@irs.uni-stuttgart.de

Mr. Johannes Martin

Institute of Space Systems, University of Stuttgart, Germany, martin@irs.uni-stuttgart.de

Mr. Norbert Henn

Germany, norbert.henn@space-exploration-henn.com

Dr. Oliver Angerer

DLR (German Aerospace Center), Germany, Oliver.Angerer@dlr.de

Prof. Reinhold Ewald

Institute of Space Systems, University of Stuttgart, Germany, ewald@irs.uni-stuttgart.de

Prof. Stefanos Fasoulas

University of Stuttgart, Germany, fasoulas@irs.uni-stuttgart.de

Mrs. Susanne Peters

Airbus Defence and Space, Germany, susanne.s.peters@airbus.com

PBR@LSR: THE ALGAE-BASED PHOTOBIOREACTOR EXPERIMENT AT THE ISS –
OPERATIONS PHASE**Abstract**

The experiment Photobioreactor at the Life Support Rack (PBR@LSR) is ready to be launched to the International Space Station (ISS) in 2019. The experiment objective is to demonstrate for the first time the technology and performance of a hybrid life support system (combining physico-chemical and biotechnological components) in space and to prove the feasibility of xenic long-term cultivation of microalgae (*Chlorella vulgaris*) for up to 180 days under space conditions. The Photobioreactor (PBR) experiment will be connected to the European Life Support Rack (LSR, previously known as ACLS - Advanced Closed Loop System), which is already on board the ISS and uses physico-chemical technologies. It collects and processes the carbon dioxide produced by the astronauts, by using a solid-amine absorber and a Sabatier reactor, producing water. The oxygen required by the astronauts is produced by water electrolysis. The PBR will use a surplus of the highly concentrated CO₂ air of the LSR to produce oxygen and biomass. The experiment and development of the PBR was initiated in 2015 by the German Aerospace Center (DLR) and the Institute of Space Systems (IRS) of the University of Stuttgart with Airbus Defence and Space as prime for the flight hardware. The experiment on the ISS, as well as a parallel experiment at IRS are planned to start middle 2019. This paper will explain the first observations and results of the operational phase of the PBR@LSR experiment.