Master Thesis

Modelling a photobioreactor as part of the life support system of an extraterrestrial habitat

Background:
One of the most important components of a habitat for long-term missions to Mars is the life support system (LSS). Unlike the LSS of the International Space Station (ISS), the LSS for a Martian habitat will not be a pure physico-chemical LSS, but will also contain bioregenerative elements based on microorganisms such as cyanobacteria.

Abbildung 1 The photobioreactor as part of a bioregenerative life support system (left) and the MaMBA habitat at ZARM (right).

As part of The Living Habitat project, a photobioreactor (PBR) will be integrated and operated as part of the air revitalization system of an LSS in the Moon and Mars Base Analog (MaMBA) module. In this context, a Master thesis is pending to characterize the PBR's system. We expect the project to be completed by **Summer 2024**.

Tasks:

- Research on cyanobacterial growth parameters
- Research on the simulation tool Virtual Habitat (V-HAB)
- Research on mathematical models to describe cyanobacterial growth
- Implement growth models in V-HAB
- Validate growth models with experimental data

We are looking for a motivated student with:

- Interest in human space exploration and biological systems
- Aerospace engineering, mechanical engineering or systems engineering background
- Good knowledge of MATLAB

- Ability to work independently

Not looking for a Master thesis but interested in the topic? Contact us anyway and we might be able to find a solution.

Contact:
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Please attach a current CV and Transcript of Records.