

Bachelor Thesis

Scale-up of 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 Bachelor thesis is pending to extend the PBR's system. We expect the project to be completed by **Summer 2024**.

Tasks (based on an existing PBR prototype):

- Research on closed (large-scale) photobioreactors
- Develop a modular concept to increase the culture medium volume
- Develop a concept for sterilization and sterile assembly of the PBR
- Determine necessary amount and location of sensors and actuators
- Build up a prototype and test it in regards to liquid and gas management

We are looking for a motivated student with:

- Interest in human space exploration and biological systems
- Aerospace engineering, mechanical engineering or process engineering background

- Good knowledge of Autodesk Inventor
- German language skills on level B2
- Hands-on experience (Laboratory, Workshop)

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

Contact:

If you are interested, please contact us is by e-mail:

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Please attach a current CV and Transcript of Records.