Master project or thesis

Dynamic Simulation of Performance and Mass, Power, and Volume prediction of a Life Support System for the Moon and Mars Base Analog (MaMBA)

Background:
The use of state-of-the-art physicochemical life support systems will be a limiting factor on future long-duration human spaceflight missions due to the lack of frequent resupply capability. Cultivation of cyanobacteria in a photobioreactor is a promising bioregenerative alternative for combined air revitalization, waste water treatment, and food supplement production. In order to correctly size a membrane-based, flat-panel photobioreactor for a biological life support system, a dynamic simulation model needs to be developed that predicts cyanobacteria growth under varying environmental influences.

Project description:
The simulation model is to be integrated into the dynamic life support simulation tool V-HAB, which has been developed at the Technical University of Munich (TUM). V-HAB is used to simulate the interactions between a photobioreactor and a crew of astronauts in a spacecraft cabin. Some of the model parameters will need to be determined in the lab. The goal of this project is to estimate mass, power, and volume requirements for the simulated life support system architecture.

We seek students with:

- experience with MatLab and object-oriented programming
- a proactive approach to problem-solving
- some experience with biology is helpful, but not mandatory

We offer:

- involvement with a joint project between MaMBA (ZARM), the Laboratory of Applied Space Microbiology (ZARM), and the Department of Astronautics (TUM)
- the opportunity to explore new technologies and receive excellent supervision
- this project is ideally suited as a master project, but can be followed-up with a Master thesis

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Please attach a CV and your current study records.