



## Task Description Master's Thesis

### Development of a concept and a virtual model of a Carbon Dioxide Removal Assembly for the IRS Life Support System Laboratory

#### Motivation:

The next generation of human space exploration missions will take crews farther away from Earth than ever before. These missions will necessitate increasingly sophisticated Life Support Systems (LSSs) to ensure astronauts stay alive, happy and healthy. Mission scenarios of this kind therefore require greater autonomy, relying on sensing instruments to detect off-nominal behaviour.

In order to be able to simulate LSSs at the IRS, a small-scale laboratory is going to be constructed. Apart from a central vacuum chamber the laboratory consists of various subsystems. One of these is the Carbon Dioxide Removal Assembly (CDRA), which is currently being used onboard the ISS to remove excess carbon dioxide from the atmosphere.

The aim of this thesis is to investigate the functionality of the CDRA and its usage in other research facilities. The CDRA is then designed and adapted for the IRS LSS laboratory and modelled in the MATLAB tool V-HAB. Research should therefore include the working of a CDRA, its implementation as well as requirements for the IRS laboratory.

#### Task Description:

- Familiarization with the CDRA technology
- Research on the workings of a CDRA and other implementations
- Identification of requirements for the IRS laboratory
- Development of a concept for the CDRA inside the IRS laboratory
- Design of the CDRA
- Implementation and modelling of the CDRA in V-HAB
- Documentation

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#### Start date:

Choose Date

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