



**Bachelor/Master Thesis Work / Draft**

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**Entwicklung eines Docking-Systems für ein robotisches Explorationsfahrzeug für eine Mondmission**

**Development of a docking system for a robotic exploration unit in a lunar scenario**

Motivation:

In the project CoRob-X, a team of three robotic exploration units (REUs) shall explore a lunar skylight and the lava tube expected below it. To achieve this, one rover will access the skylight from the surface via a tether system it is connected to with a docking interface provided by a project partner. At reaching the bottom of the skylight, the rover will be deployed while the tether system and docking interface remain stationary and serve as a communication relay and recharging station.

The assembly containing the docking interface will be the interface between rover and tether and will therefore also contain or be connected to a mechanism that interacts with the tether. It needs to be designed to assume a pose and position that enable the rover to repeatedly and reliably undock and redock. The position of the docking interface must be identifiable by the REU. Furthermore, it must contain a wireless communication device. Mass and dimensions of the system must be in a range that allows the REU to carry the system to the rim of the skylight and possibly also a certain distance at the bottom of the skylight.

Although the mechanism will be used in a terrestrial demonstrator, the motivation of the project is a lunar mission. Consequently, the lunar environment must be considered throughout all tasks performed in this thesis and it must be shown that the mechanism can function under lunar conditions.

Task description of the Master thesis work:

- Research on rover docking systems and procedures
- Development, evaluation, and selection of concepts for the selected docking assembly
- Mechanical design of the selected mechanism
  - Structural analysis (analytical and/or FEA)
  - Potentially Thermal analysis
- Documentation of the analyses and development

The thesis will be accomplished at Robotics Innovation Center - Deutsches Forschungszentrum für künstliche Intelligenz (DFKI) Bremen.

Internal supervisor: Moritz Nitz, Patrick Winterhalder

External supervisor: Christopher Schulz (DFKI)

Starting date: as soon as possible

Submission until: [Click for date](#)

**Acknowledgement of receipt:**

I hereby confirm that I read and understood the task of the master thesis, the juridical regulations as well as the study- and exam regulations.

Date	Date	Date
Prof. Dr.-Ing. Sabine Klinkner (Responsible Professor)	External Supervisor	Signature of the student

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