



Master Thesis Work / Draft

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Entwicklung eines Tether-Management Systems für ein robotisches Explorationsfahrzeug für eine potentielle Mondmission

Development of a tether management 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 must access the skylight from the lunar surface and safely reach its bottom where it begins the exploration of the potential lava tube. The descending REU will use a tether to move down the walls of the skylight while one of the REUs remaining on the surface serves as an anchor and assists in the descent.

For this part of the mission, a suitable descent method using two robotic rovers and a tether shall be chosen. Based on this, a mechanism shall be conceived and designed that enables the descending rover to reach the bottom of the skylight via the tether while the other REU assists.

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 tethered descent methods and mechanisms
- Analysis and selection of tethered descent methods
- Development, evaluation, and selection of mechanism concepts for the selected method
- Mechanical design of the selected mechanism
 - Structural analysis (analytical and/or FEA)
 - 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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