

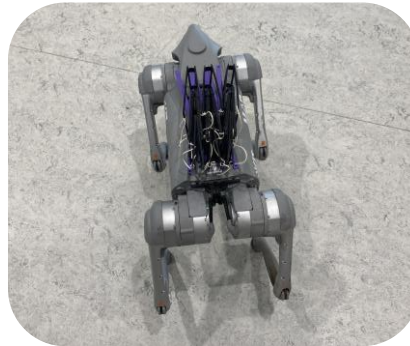
Thesis – Foldable Solar Panels for Mobile Robots

Design & Prototyping

Advances in artificial intelligence and robotics are rapidly transforming how autonomous systems perceive, navigate, and interact with the world. Often cited applications for mobile systems are search & rescue as well as exploration. However, mobile systems are severely limited in these applications by means of energy supply.

Basic Thesis Concept

The general goal of this thesis is to develop and test a foldable solar panel backpack for mobile walking robots, such as a Unitree Go2 or ANYmal. The thesis builds upon a prior bachelor theses, which evaluated the general feasibility and compared potential solar cell materials, as well as folding mechanisms. Based on this, a real live prototype is to be designed, manufactured and tested on a real robot in outdoor environments.



Folding Mechanism & Actuation

The Challenge

- The core challenge of this thesis lies in the design of a suitable folding mechanism, combined with a fitting actuation method

Folding Mechanism

- Large effective surface/package volume ratio
- Avoids “finite thickness effect”
- Provides high stiffness when unfolded

Actuation

- Lightweight
- Small package size
- Potentially allows for unfolding in 2 axis directions

Evaluation Goals

- The prototype is developed, manufactured and integrated into the chosen robotic system
- The system is successfully actuated
- The system can be used multiple times without mechanical errors
- The system can charge the robots battery at least while turned off, potentially also during operation
- Charging parameters are collected to evaluate system efficiency and usefulness for self-sufficient missions

Do you want to work on cutting edge robotics research?

Type: Master Thesis

Date: As soon as possible

Supervisors: Prof. Dr.-Ing. Arne Rönna, M.Sc. Björn-Felix Dettmar

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We look forward to receive your application (inc. current grade transcript)!

