Deutsches Forschungszentrum für Künstliche Intelligenz GmbH

MoVe

Moon Vehicle

System description

With a mass of about 5 kg, the MoVe rover is made for exploring the lunar surface. The system is the result of the SERACH project, completed in January 2022, and the cooperation with the Walter Kern GmbH. In the project research at DFKI focused on the development of the Electrical Power System (EPS), used to power the rover by sun light. Therefore, it could be said, that the rover is made as a mobile testbed for the electronics inside, as for driving itself. The rover was used to investigate fundamental relationships for the system design due to the nature of the autarky power supply and its influences on other subsystems. These includes to answer questions such as: How fast can the rover still drive without drawing power from its batteries? Can we build a rover that doesn't need batteries? How can we place the solar cells in order to have holistic energy during the lunar day and how could a thermal control system for the rover could like?

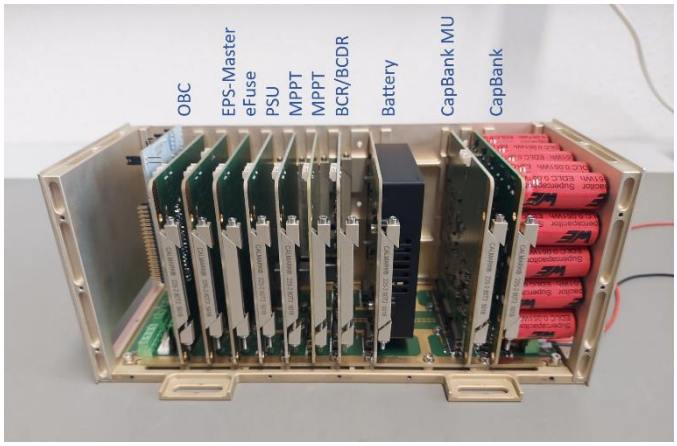
Technical details

- **Size:** 0,47 m x 0,45m x 0,65 m
- **Mass:** ca. 5,9 kg
- **Runtime:** Solar powered: ∞, with Batterie ca. 6,5h
- **Velocity:** max. 0,1m/s
- 4-wheeled exploration rover with skid steering and boogie suspension to evaluate different configurations of the electrical power supply in a mobile system
- **Drivetrain/motors:** Brushed DC motors, Maxon, with planetary gears
- **Electrical power System (EPS):** Configurable EPS based on COTS components with slot system on a backplane as an experimental platform for evaluating different storage technologies and solar controllers (see picture below right)
- **Electrical Power Storage available:** 3x LSH20 Li-SOCl2 cells, 3x 18650 LiFePo cells, 25x ECAP STSC Super CAPs
- **Solar controller available:** 2x MPPT-Controller with each 2 Channels, 1x Shunt-Controller with 6 channels
- **Solar cells:** 42 x 3G30A Cells on 4 panels with a peak power of 12W (assumption that the light comes just from one direction)

Applications: Technology Testing, Space, New Space, Exploration Rover

Projects: **SEARCH**
Surface Exploration Android Remotely Controlled by Humans
(08/2020 - 31/01/2023)

Publications: **Towards Influences of the EPS on Lunar Rover's Systems Design**
N. A. Mulsow, B. Hülsen, P. Schöberl
In Proceedings of the 16th Symposium on Advanced Space Technologies in Robotics and Automation, (ASTRA-2022), Jun/2022.



The heart of the rover, the configurable EPS is equipped with a backplane and allows to quickly move technologies to be tested in a real system.

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