

SherpaTT

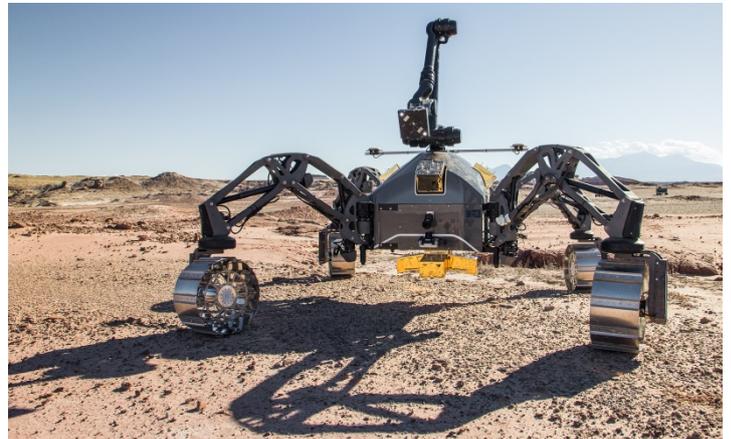
Modular Expandable Hybrid Wheeled-Leg Rover for Cooperative Exploration Tasks

System Description

SherpaTT is the successor of the Sherpa robot originating from the project RIMRES. As a versatile robot with an active suspension system, SherpaTT is able to perform a wide range of locomotion modes, from driving to short traverses of walking. The central manipulator handles modular payload items that are used for example as containers for geological samples or battery modules within a logistics chain. The logistics chain is maintained by a heterogeneous team of mobile robots. To enable the application in maritime scenarios, the suspension units are waterproof. Furthermore, SherpaTT might serve as a mobile base to support humans in the field, e.g. in SAR scenarios. In November 2016, SherpaTT was successfully tested in a four-week field trip in the desert of Utah, USA.

Technical Details

- **Size:** 1960 mm x 1960 mm x 1400 mm (standard pose)
- **Mass:** approx. 150 kg
- **Speed:** 0.7 m/s (max), 0.1 m/s (nominal)
- **Actuators:** RoboDrive BLDC-motor kits, HarmonicDrive gears and partially equipped with linear drive kits
- **Suspension system:** 4 identical units à 5 DoF casted from aluminium – allows active ground adaption and independent body attitude control
- **Force linear joints:** 3500 N
- **Wheel torque:** 74 Nm (nominal)
- **Lidar:** Velodyne HDL-32E
- **Laser range finder:** Hokuyo UST-20LX
- **Camera:** Basler Ace (2048 x 2048 px, 25 fps)
- **IMU:** Xsens MTi-28A AHRS
- **On-board computer:**
 - IntelCore i7-4785T, 2.2 GHz
 - 16 GB RAM
 - 500 GB SSD
- **Motor control:** Distributed, FPGA-based control
- **Mobile access point:** 2.4 GHz, 802.11n
- **Remote control:** Bluetooth
- **Power supply:**
 - 2x LiPo Battery, each: 44.4 V; 10 Ah
 - Alternative option A: power supply via modular Interface
 - Alternative option B: power supply via AC/DC adapter
 - All options hot-swappable



SherpaTT in its final integration state. A BaseCamp is mounted beneath the robot, cubic payload-items are placed in the payload bays around the central manipulation arm.

Fields of Application: Space robotics
Search and Rescue (SAR)
Maritime Ressources

Projects:



SherpaTT during the simulated Mars mission in the desert of Utah (Nov 2016). The system proved its locomotion and cooperative exploration capabilities together with the system Coyote III.

Contact:
DFKI GmbH & University of Bremen
Robotics Innovation Center

Director: Prof. Dr. Frank Kirchner
Phone: +49 421 – 178 45 4100
E-mail: robotik@dfki.de
Website: www.dfki.de/robotics