

Passive Upper Body Exoskeleton

Dual arm upper body exoskeleton for teleoperation

System Description

The dual arm upper body exoskeleton is a human-machine-interface used for teleoperation of robotic systems in a safe and intuitive way with natural movements. It is connected to the operator through six contact points. The kinematic structure follows the human movements of the arms and the torso and transmits the movements to the target system. Furthermore, the hand interface is able to give the operator a haptic feedback. The kinematic structure has eight active degrees of freedom at each arm and four active degrees of freedom at the back.

Technical Details

- **Size:** 0.8 m x 0.85 m x 0.3 m
- **Weight:** 13.5 kg
- **Power supply:** 12 V
- 8 passive DOF per arm, 4 passive DOF at the back, 2 active DOF at the hand interface
- 6 contact points to the operator, adjustable to the 95^{er} percentile of the European male
- **Materials:** aluminum, carbon fire reinforced plastics, synthetics
- Passive compensation of gravitation by spring elements, weight introduced into the hip
- Hand interface with force feedback (MKS95 servo motors)
- **Sensors:** 24 x iC-Haus MH8, 2 x Honeywell force sensor FSG15N1A
- Distributed STM 32F1 microcontroller for measurements and motor control
- CAN bus system for system communication
- ROS mapping of movements via UDP protocol to different robotic systems

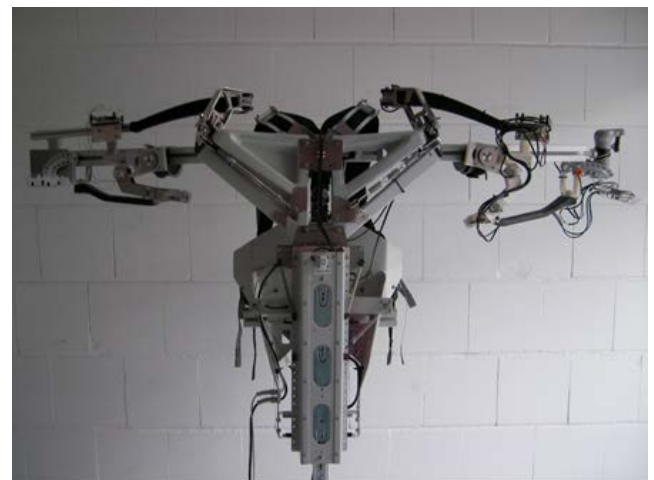


Teleoperation of the human robot AILA in an ISS environment

Application: Space robotics, Teleoperation

Projects:

- TransTerra**
Semi-autonomous cooperative exploration of planetary surfaces including the installation of a logistic chain as well as consideration of the terrestrial applicability of individual aspects
(05/2013 - 12/2017)
- RECUPERA-Reha**
Full-body exoskeleton for upper body robotic assistance
(09/2014 - 08/2017)
- CAPIO**
Dual Arm Exoskeleton
(01/2011 - 12/2013)



The passive upper body exoskeleton in its resting state

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