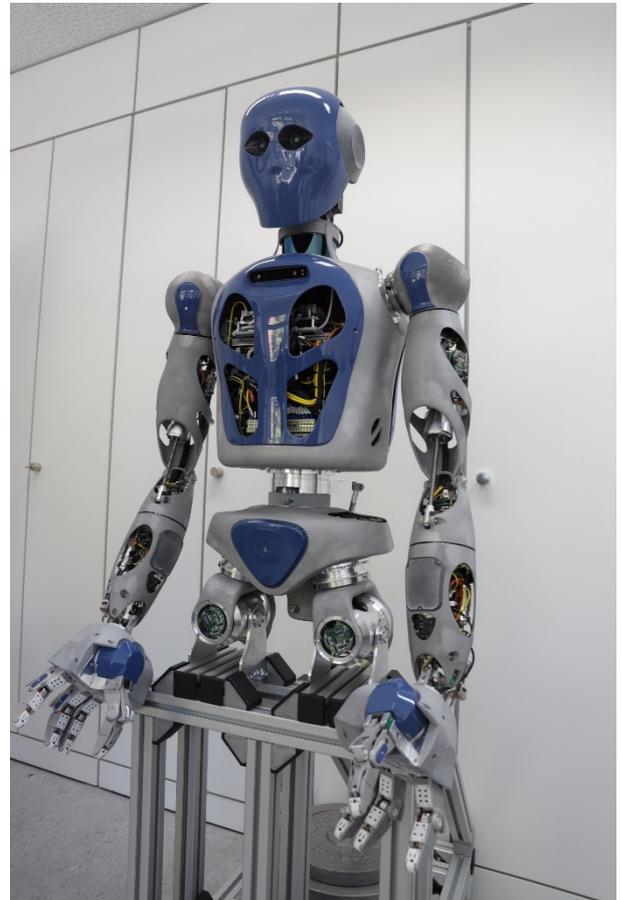


RH5 Manus

Humanoid robot as an assistance system in a human-optimized environment

System Description

The humanoid robot RH5 Manus is a further development of the robot RH5, which was developed for use in a direct human environment, e.g. on a future moon station. The upper body as well as the arms and the head of the robot, which serves as a sensor carrier for the visual and acoustic perception of the system, were revised for this robot. In addition to autonomous and semi-autonomous use, the robot should also be able to be teleoperated by means of an exoskeleton, whereby the visual perception and acting forces and moments of the robot are made available to the controlling person by means of virtual reality methods. For the time being, the robot was installed on a passive platform. There is an interface compatible to the legs of the robot RH5. The hybrid serial and parallel design architecture was further developed to optimize weight while increasing stiffness. For improved dynamic behavior, the drive components of the arms were optimized and masses were shifted towards the shoulder joints. The system was equipped with modular grippers which are optionally available in 3 variations as 2-, 3- and 4-finger grippers and can be exchanged with little effort on the robot. The grippers are adaptive and equipped with a haptic sensor system.



Humanoid robot RH5 Manus

Technical Details

- **Size:** 340 x 580 x 1870 mm (on platform)
- **Weight:** 36 kg (excluding platform, equipped with 2x 4-finger-gripper)
- **Runtime:** min. 30 minutes
- **Speed:** --
- **30 degrees of freedom:** 2 x 7-DOF arms , 3-DOF torso, 3-DOF head, 2 x 5-DOF gripper
- **Actuation:** 19x BLDC RoboDrive + HarmonicDrive, 8x RoboDrive + Ballscrew, 3x Dynamixel
- Mechanical interface compatible to legs of robot RH5
- optional 2-, 3- und 4-finger-gripper, passiv adaptiv
- 2x ZED Mini stereo camera for object detection
- Xsens MTi-300 AHRS IMU
- Velodyne LiDAR VLP-16 Puck for mapping and self-localization
- ATI 6-DOF force torque sensors (2 pc.) at wrist joints
- Two Core i7 CPUs in the head and torso of the robot
- Three GPU Auvidea Jetson TX2
- Optional batterie backpack (5Ah, 48V)

Application: Production and Consumer, Space

Projects: **TransFIT**
Flexible Interaction for infrastructures establishment by means of teleoperation and direct collaboration; transfer into industry 4.0
(07/2017 - 06/2021)

Contact:
DFKI GmbH
Robotics Innovation Center

Director: Prof. Dr. Dr. h.c. Frank Kirchner
Phone: +49 421 17845 4100
E-mail: robotics@dfki.de
Website: www.dfki.de/robotics