# AILA
## Mobile Dual-Arm Manipulation

## System Description

The robot AILA is a mobile dual-arm robot system developed as a research platform for investigating aspects of the multidisciplinary area of mobile manipulation. Mobility, perception, manipulation and, primarily, the use of all these subareas within a single system that is able to perceive and understand its environment, move around, manipulate, learn about objects and deal with unstructured and uncertain environments is the goal of this research area.



## Technical Details

- **Size**: 1.15 m x 0.75 m x 1.7 m

- **Weight:** Mobile base ca. 100 kg, body ca. 60 kg

- **Runtime:** approx. 30 minutes

- **Speed:** 20°/s - 180°/s per joint, mobile base 4 km/h

- **70 degrees of freedom:** 2 x 7-DOF arms (Payload/Weight > 1), 4-DOF torso, 2-DOF head, 12-DOF mobile base, 2 x 18-DOF hands

- **Actuation:** Brushless DC motors with Harmonic Drive gears

- Two Prosilica GC780C cameras in the head that create a stereo system

- A periodically-tilting short-ranged Hokuyo URG Laser scanner in the chest and a Mesa SR-4000 3D Time-of-Flight (TOF) camera in the robot's belly

- Two long-ranging Hokuyo UTM Laser scanners provide a circumferential view for the mobile base

- **Two 3.5-inches embedded PCs:** one for motion control located in the head and one for navigation located in the mobile base

- A mini-ITX board in combination with a dedicated graphics card for vision processing is located in the torso

- The communication network consists of independent LVDS and CAN lines for controlling the two arms, the torso, and the wheel modules of the mobile base

- GigaEthernet routed through two five-port switches connect the head cameras, the three computers, and the outside world

- Two six-axis force/torque sensors at the robot's wrists

- Tactile sensors in the fingertips and hand palms

- In-house developed joint electronics consisting of a stack of three PCBs (power electronics, FPGA, interfaces and sensors)
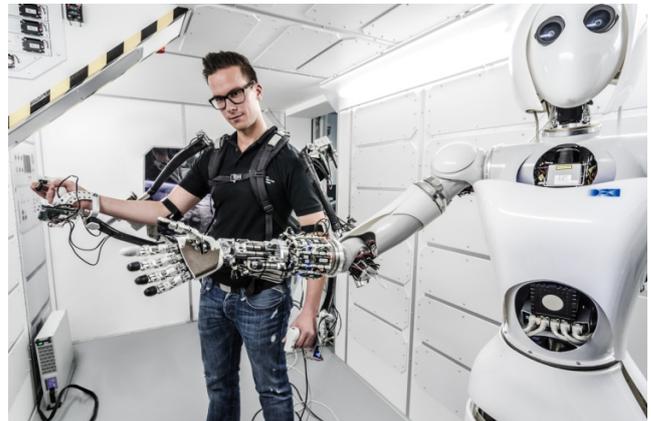
**Application:** Logistics, Production and Consumer

**Projects:**

**BesMan**
Behaviors for Mobile Manipulation
(05/2012 - 07/2016)

**ROBOFOOT**
Smart robotics for high added value footwear industry
(09/2010 - 02/2013)

**SemProM**
Semantic Product Memory
(02/2008 - 01/2011)



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