

# AMPARO

## Autonomous Mobile Robot Manipulator

### System Description

The system Amparo was developed during the project IMPERA for setting up lunar infrastructure. The robot has 2D and 3D sensing capabilities and autonomously fulfils the tasks of handling, assembly, and transportation of objects in a lunar scenario. The mobile platform consists of a Pioneer 3-AT from Adept. The manipulator is the Jaco Arm from Kinova. The pan-tilt unit for tilting the laser scanner is a D46 from FLIR.

### Technical Details

- **Size:** 0.60 m x 0.50 m x 1.3 m
- **Weight:** 25 kg
- **Power Supply:** 12 V Lead Battery, 34 Ah
- **Runtime:** ca. 30 min
- **Sensors:** 2 x Hokuyo laser range finder UTM 30LX, 2 x AVT Guppy cameras for stereo vision
- Embedded i7 CPU board
- **Pioneer 3 AT:**
  - Skid Steering Drive
  - Turn Radius: 0 cm
  - Swing Radius: 34 cm
  - Max. Forward/Backward Speed: 0.7 m/s
  - Rotation Speed: 140°/s
  - Max. Traversable Step: 10 cm
  - Max. Traversable Gap: 15 cm
  - Max. Traversable Grade: 35 %
- **Kinova Jaco Arm:**
  - Weight: 5.7 kg
  - Payload 1.5 kg mid-range, 1.0 kg full extension
  - Range: 90 cm
  - Position tolerance: 8 mm
  - Relative position tolerance: 1.6 mm
  - Voltage: 18VDC until 29VDC
  - Power: 40 W
- **Pan-Tilt Unit FLIR D46:**
  - Max. payload: 6 kg
  - Weight: 1.5 kg
  - Position resolution: 0.051°
  - Max. Rotation speed 300°/sec
  - Pan range: +/- 180°
  - Tilt range: +31°/-80°



**Application:** Space Robotics

**Projects:** **IMPERA**  
Integrated mission planning for  
co-operative robots  
(04/2011 - 03/2014)



**Contact:**  
DFKI GmbH & University of Bremen  
Robotics Innovation Center

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