Selected Use cases

MAINBOT proposes the use of mobile platforms for inspection tasks in large areas and vertical infrastructures. A set of application scenarios that cover the general requirements of the maintenance activities in large industries have been selected.

The ground robot has to move in a large area, the solar field, and it has to reach different inspection areas in the plant and stop at pre-established points. The climbing robot has to move in a vertical structure, a tower, and it has to reach different inspection points and stop at pre-established points.

Scenario:: Use cases

Applies to

Ubiquitous sensing

Operation 1: Mirror reflectivity measurement

- Number of mirrors: 209.664 (each)
- Total surface of mirrors: 510.120 m2 (each)

Ground Robot

Leakages

Operation 2: Heat Transfer Fluid Leakage detection

- Leakage detection
- 90km of tubes (each)

Ground Robot

Surface defects

Operation 3: Coating degradation

Climbing Robot

Operation 4: Broken mirrors

Ground Robot

Operation 5: Loss of vacuum in collector pipes

Ground Robot

Internal defects

Operation 6: Corrosion, cracks

Climbing robot

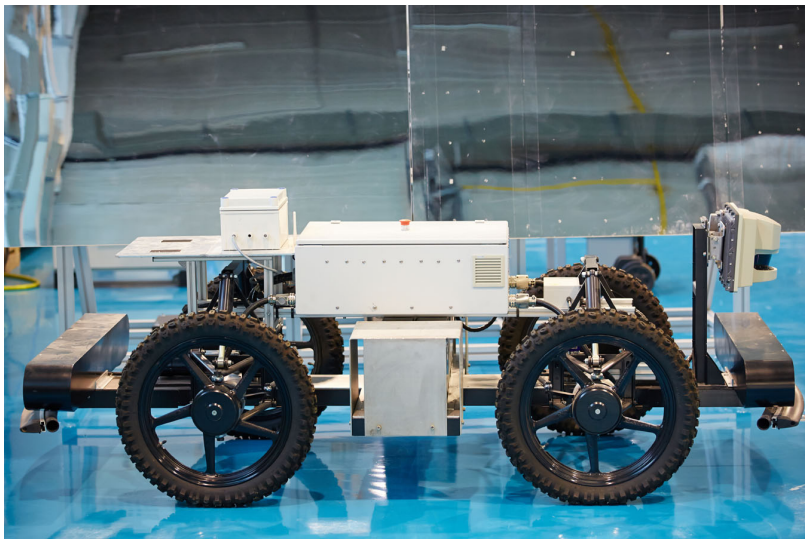
Selected Scenarios

Valle Thermosolar plant

Gemasolar Thermosolar tower

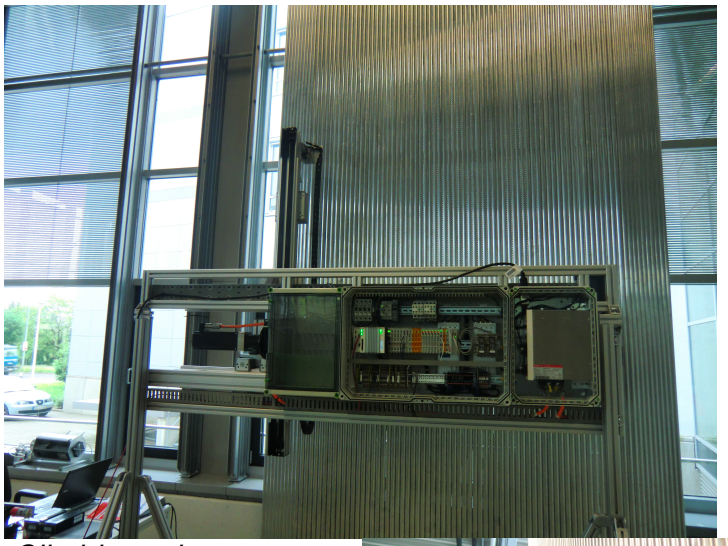
Robot prototypes and mockups

Two kind of Robotic Solutions are developed in MAINBOT. Ground robot, a mobile manipulator composed of a mobile base a RobuCarTT and a 6DOF Manipulator. Vertical robot that consist of a mobile base and a internal arm for inspection system positioning.



Ground platform

Ground arm



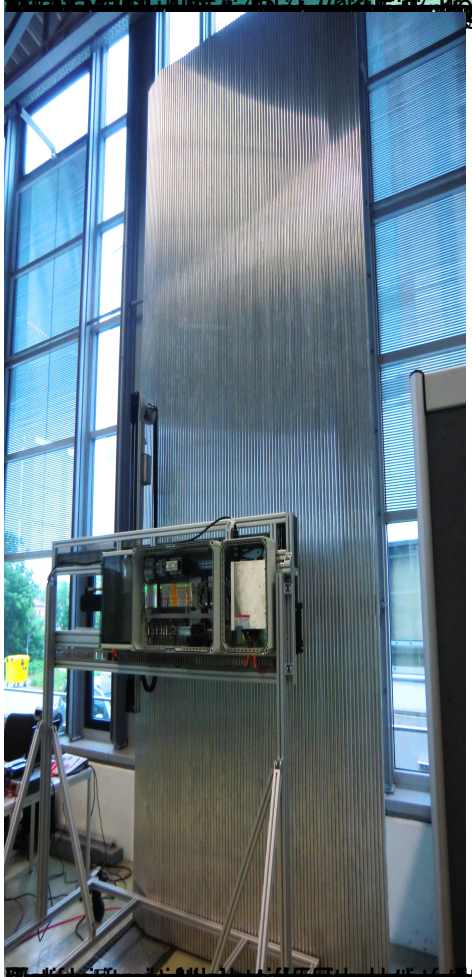
Climbing robot

Climbing robot arm

Ground Mockup (Operation 1)

Parabolic Through mockup allows simulating the position of the mirrors that can be found in a Parabolic Through Technology solar field. It will be used to evaluate the performance of the navigation and manipulation algorithms.

The mockup consists of two curve mirrors similar to those used in the real Parabolic Through solar field. The structure allows positioning the mirrors in different angles.



Ground robot moving inside a loop during the experiments

Robot setup

Robot setup