Efficient and effective maintenance is crucial for all kind of industries. In the case of capital intensive investment industries it is even more relevant and has an important impact in the operation costs during the long life cycle of their production means.

Besides the traditional maintenance problems of any industrial installation, this kind of facilities presents other additional challenging characteristics:

- **Extensive production facilities**
- **Huge number of control points**
- **Multiple inspection technologies to be used**
- **Hazardous working conditions**

MAINBOT proposes using **service robots to autonomously execute inspection tasks in extensive industrial plants** in equipment that is arranged horizontally (using ground robots) or vertically (climbing robots).

The industrial objectives are:

- **Ubiquitous sensing**: To provide a means to help measuring several physical parameters in multiple points by **autonomous robots able to navigate and climb structures** , handling sensors or special non destructive testing equipment
- To develop a **surveillance robotic system** able to detect leakages of fluids using vision system
- **Robotized non destructive testing** of surface deterioration of equipment in extensive plants and detection of broken elements
- **Robotized non destructive testing** of internal deterioration in pipes and walls of tanks, chimneys etc., from outside the element to be inspected

Those objectives will by achieve by the development of:

- **Ground robots** able to navigate in large industrial plants handling sensors and manipulator for inspection and maintenance, and overcoming obstacles and terrain conditions

- Robots able to **climb** vertical (or almost) industrial equipment handling sensors and manipulator for inspection and maintenance

Our approach is not to develop robots from scratch but to take available **wheeled mobile platforms and climbing robots**
that have already been tested in other related scenarios as starting point, and adapt them deploying innovative solutions in order to fulfill these industrial objectives:

- **Autonomous navigation**: Robots (ground and climbing) must be able to **autonomously** navigate in a rather structured environment in a
safe
way.

- **Mobile manipulation** of tools and sensing equipment for maintenance and inspection.
- **Sensor fusion**: to exploit the information provided by multiple sensing technologies deployed in the robot.

These industrial objectives will be validated in a real industrial scenario, a thermal solar plant (230 hectares, 200.000 mirrors, 90 km of absorber tubes, huge tanks, hazardous working conditions) that depicts common problems of this kind of plants.

The operation of semi-autonomous or fully autonomous mobile robots will **increase the efficiency of the plant, reduce the operation and maintenance costs and improve safety and working conditions of workers**

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