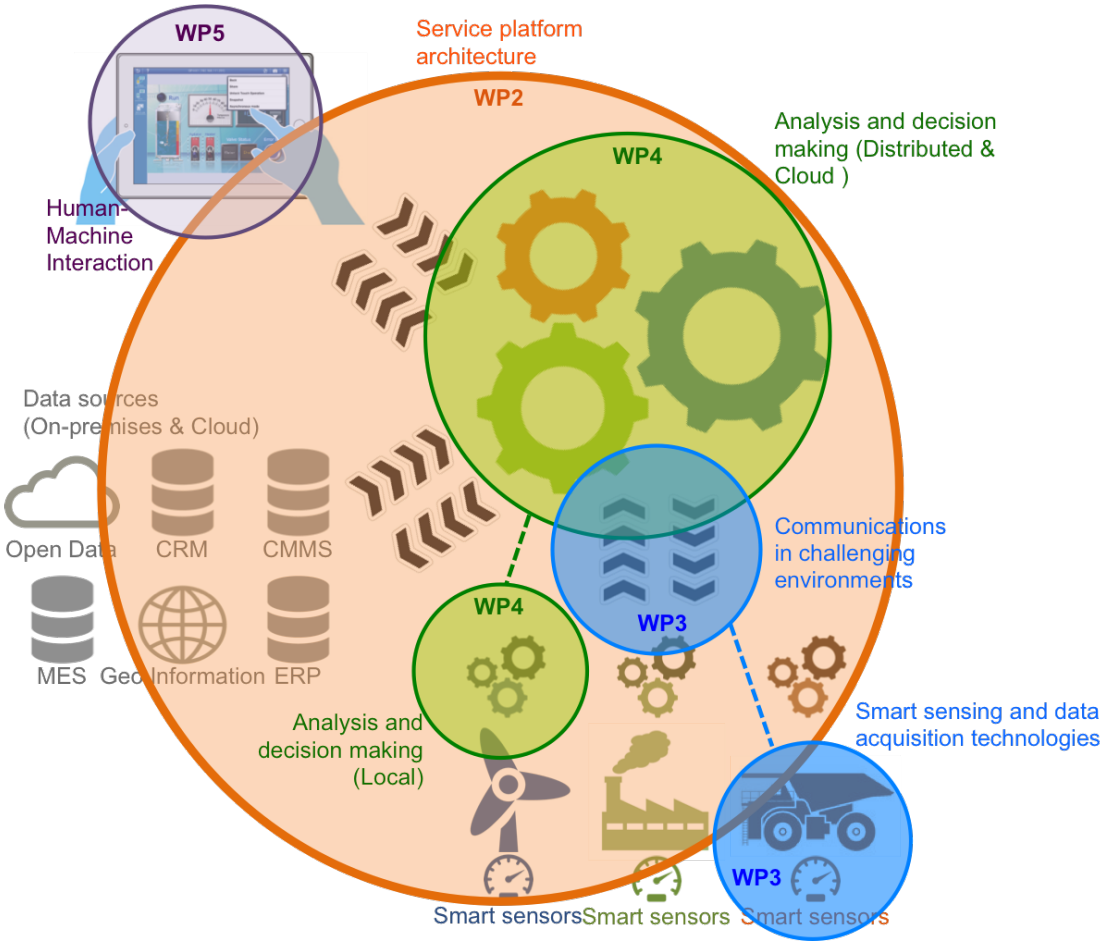
Chapter 6

Publishable summary

The main objective of MANTIS is to develop a cyber physical system based proactive maintenance service platform architecture enabling collaborative maintenance ecosystems.

Maintenance is no longer a necessary evil that costs what it costs, but an important function that creates additional value in the business process as well as new business models with a stronger service orientation.



Physical systems (e.g. industrial machines, vehicles, renewable energy assets) and the environment they operate in, are monitored continuously by a broad and diverse range of intelligent sensors, resulting in massive amounts of data that characterise the usage history, operational condition, location, movement and other physical properties of those systems. These systems form part of a larger network of heterogeneous and collaborative systems (e.g. vehicle fleets or photovoltaic and windmill parks) connected via robust communication mechanisms able to operate in challenging environments.

MANTIS consists of distributed processing chains that efficiently transform raw data into knowledge while minimising the need for bandwidth. Sophisticated distributed sensing and decision making functions are performed at different levels in a collaborative way, ranging from local nodes to locally optimise performance, bandwidth and maintenance; to cloud-based platforms that integrate information from diverse systems and execute distributed processing and analytics algorithms for global decision making. This chain will include key technologies such as those in the Figure:

- Smart sensors, actuators and cyber-physical systems capable of local pre-processing.
- Robust communication systems for harsh environments.
- Distributed machine learning for data validation and decision-making.
- Cloud-based processing, analytics and data availability.
- HMI to provide the right information to the right people at the right time in the right format.

The research addressed in MANTIS will contribute to companies' assets availability, competitiveness, growth and sustainability:

- Reduce the impact of maintenance on productivity and costs
- Increase the availability of assets
- Reduce time required for maintenance tasks
- Improve the quality of the maintenance service and products
- Improve labor working conditions and maintenance performance
- Increase sustainability by preventing material loss (due to out-of-tolerance production)

Several use cases from 4 validation scenarios will be the testing ground for the innovative functionalities of the proactive maintenance service platform architecture and for its future exploitation in the industrial world. They have been selected as representative of those industries or domains and we consider that results obtained in them can be extrapolated to several industry areas and different fields of maintenance.

- Production asset maintenance will be validated in:
  - Shaver production plant
  - Pultrusion line
  - Press machine maintenance
  - Sheet metal working machinery
  - Fire detection system
  - Compressor maintenance
- Vehicle maintenance management will be validated in:
  - Trucks and construction vehicles
  - Offroad and Special Purpose Vehicles
  - Railway systems
- Energy production asset management will be validated in:
  - Offshore wind mills
  - Land wind power fleets
  - Photovoltaic plants
  - Conventional energy production
- Health equipment maintenance will be validated in:
  - Health imaging systems

Contact Details:

Dr. Roberto Uribeetxeberria
MONDRAGON UNIBERTSITATEA
Faculty of Engineering
Electronics and Computing Department
Goiru kalea 2, 20500 Arrasate (Spain)

Email: ruribeetxeberria@mondragon.edu
Tel: +34 943794700