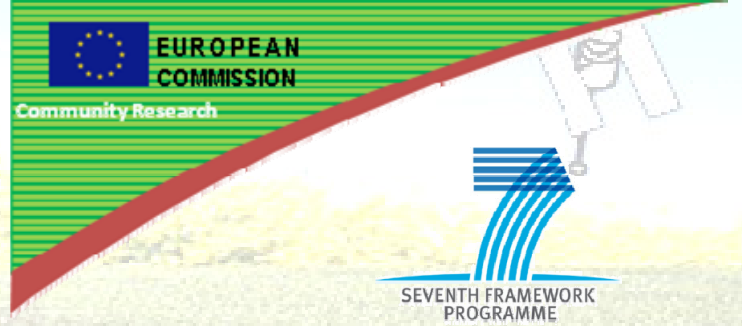


# Consortium



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## RHEA: Robot Fleets for Highly Efficient Agriculture and Forestry Management NMP2-LA-2010-245986



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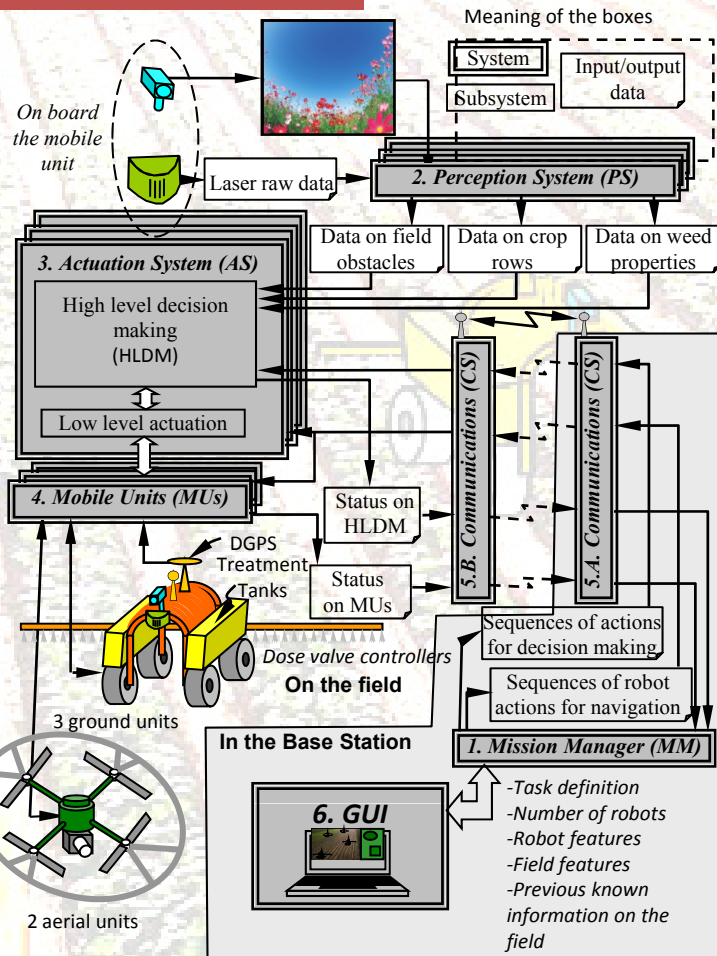
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## RHEA goals

RHEA is a FP7 project devoted to change the traditional way of proceeding in agriculture and forestry by putting together a fleet of small, safe, reconfigurable, heterogeneous and complementary robots for weed removal and pest management in agriculture and forestry activities in order to minimize chemical product, energy and time, while maximizing the quality of products and safety, guaranteeing the application of the aforementioned procedures to the entire operation field

## System breakdown



## Objectives

As specific scientific and technical objectives, RHEA will concentrate on the development of:

- **Advanced systems and algorithms for crop assessment and weed mapping** based on computer vision in two modes: remote sensing – information gathered by means of aircrafts or UAVs– and ground sensing –information collected from ground robotic platforms–
- **Innovative algorithms for decision-making** modules, including behaviors such as coordination, cooperation and collaboration
- **Enhanced actuators for precise, real-time herbicide spraying**
- **Improved end-effectors to destroy weeds** based on both thermal and mechanical systems
- **A fleet of mobile units –ground and aerial vehicles–** capable of acquiring images of the task field and either applying mechanical or chemical processes for crop and weed management
- **Robot guidance devices and algorithms based on computer vision –forward-looking view of the crop rows and obstacle avoidance–.**
- **Human-machine interfaces for monitoring/controlling autonomous outdoor vehicles.**
- **New strategies for re-planning the mission** with teams of heterogeneous robots after the failure of a number of robots.

## Expected advances

### Scientific and Technical advances

- RHEA will apply precision agriculture techniques by using robots and location systems for improving the accuracy of the processes

- RHEA will develop new actuation systems for both herbicide/fertilize spraying and mechanical/thermal weed removal
- RHEA will allow groups of robots to be adapted to different fields in an easier way than the large traditional vehicles, thus optimizing the robot use
- RHEA will afford precise algorithms to extract features from vision systems that will allow detecting and identifying weed patches more accurately
- RHEA will develop Artificial Intelligence algorithms to compute the mission plan of a fleet of heterogeneous robots

### Social advances

- The application of small robots in RHEA will bring the benefit of safety with respect to the current vehicles in use
- RHEA will improve the health conditions because of the reduction of herbicide and fertilisers
- RHEA will allow both men and women to take up jobs in industry and services regardless of physical condition
- RHEA will help to increase the number of technical jobs in rural areas and thus to sustain the number of inhabitants in rural areas

### Economical and ecological advances

- A group of heterogeneous robots will permit to complement different weed reduction methods to minimize both mission time and herbicide with the related economic savings
- The reduction in the emissions of chemicals has a strong direct influence on the environment
- RHEA will integrate new fuel cell and solar technology power systems into agriculture machinery and onboard equipment that will provide zero emissions
- RHEA will help to the agriculture European machinery manufacturers to keep their leading position in the world market
- RHEA will sustain the incomes in rural areas