



The European Coordination Hub for Open Robotics Development



GRAPE – Ground Robot for vineyArd monitoring and ProtEction

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Brief Experiment Description

GRAPE addresses the **agricultural and food robotics scenario**, in particular, the market of **instruments for biological control** by developing the tools required to execute **vineyard monitoring and farming tasks** with **(semi) autonomous Unmanned Ground Vehicles (UGVs)**

Two agricultural tasks which have high and proven impact on the growth of the vineyards



- Autonomously perform **grapes and foliage inspection** in vineyards with UGVs. If a problem is detected, the agronomist can teleoperate the required analysis.
- **Application of pheromone dispensers** to protect the grapevine from the grape moths, by way of mating disruption. UGVs travel the vineyard, select target plants, and, by means of an onboard manipulator lightly slide on, or twist around, deploy the dispenser on the branches

GRAPE Concept



Objectives

- Development of a **robotic platform for vineyard applications**
 - able to navigate on rough terrains
 - to detect and monitor plants
 - and to manipulate small objects such as the pheromone dispensers
- Increase robot **acceptance by farmers and agronomists**
 - user interface is kept as simple as possible moving the complexity to the control system and making the platform as autonomous as possible
 - maintain a regular contact with stakeholders on the field among which winegrovers such as D.O. Penedès, Rotari in Italy and Château Coutet Saint-Emilion in France, among others

Novelty



Advanced capabilities for vineyard navigation



Advanced perception capabilities for plant detection and monitoring



Dispenser manipulation and deployment



Specialized robot operator/farmer interface

Impact

Economical and Social Impacts

- Significantly reduce the negative environmental impact of farming due to over-application of chemicals. **Biological control instead of chemical pesticides.**
- Improving vineyard health monitoring at **plant level**
- Creating a **new product line** and a **new job positions** for the VITIROVER
- Increasing **market adoption** of agricultural robots

Scientific and Technical Impacts

- **Long-life operations** in large environments
- Navigation on **sloping rough terrains**
- Improved **classification algorithms** for grapevine parts
- 1 Journal paper accepted, 3 conference papers and 3 trade fairs