Evento finale progetto Rovitis 4.0 – Webinar 4 dicembre 2020

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Rovitis 4.0: Robot autonomo connesso a DSS per la gestione sostenibile ed efficiente del vigneto

Rovitis 4.0: Autonomous robot connected to a DSS for a sustainable and efficient management of the vineyard

Conclusione di progetto

Azienda Agricola Giorgio Pantano
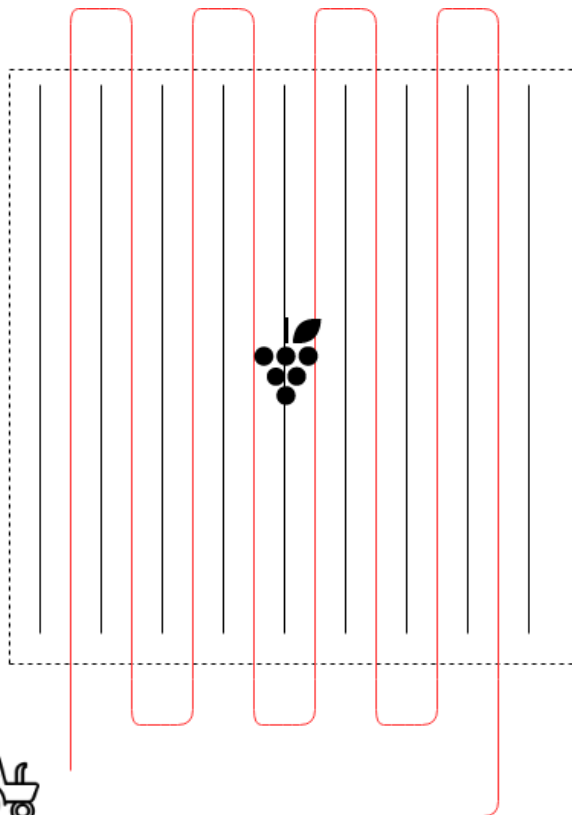Via Stradelle, 40 – Candiana
35020 – Italy

https://www.aziendapantano.it/

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Candiana, 2020-12-04

x 17 times: spraying

x 2 times: weedkilling with chemicals

x 3 times: grass mowing

x 3 times: branches trimming

x 2 times: chemical/organic fertilizer

x 1 times: old canes cutting

=

TOTAL: 28   (for each season)

Sources: https://www.sirsafety.com/en/product/ChemicalTechCoverall-30248-EN
CondifesaTV, Studio dei costi per gli investimenti in agricoltura (2018)

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2008

2011

2014

2009

2013

The idea becomes a prototype
Video (2014)

Rovitis
robotics in viticulture

https://www.youtube.com/watch?v=eEGS7UUa5-w&t=39s

A prototype with worthy views

- Skid steer
- High-Low level control
- Laser scanner and encoders

How to industrialize the concept?

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PSR Veneto Region 16.1 – 16.2 - 2017

Leader Partner

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The Rovitis4.0 project
A decision making for robot agents

- **Teaching**

Operator decides where to go

- **Home station**

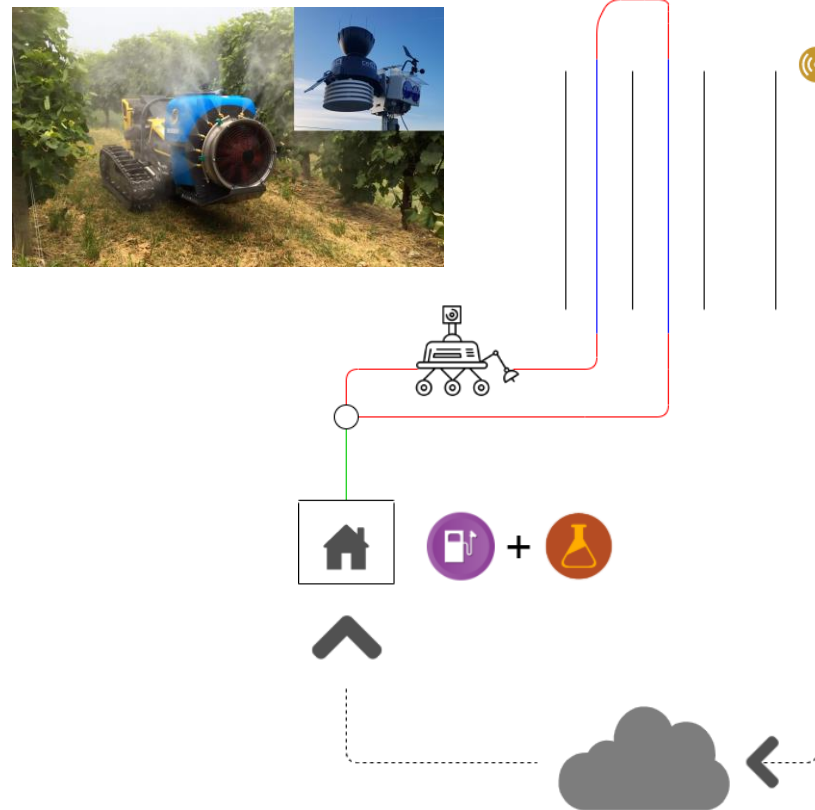Parking and automatic filling of liquids

- **In-field sensors**

Information is coming from the real field, better knowledge of crop status
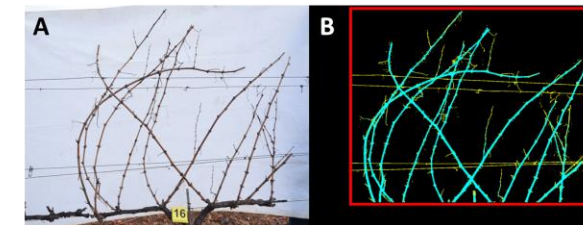
- **On-board sensors**

Information directly from the robot, no need of UAVs

- **DSS**

Choose best spraying timing

Source: [1]

Source: [2]

Sources:
1: (2018) DLR, Dionysos, available online (https://www.dlr.de/content/en/images/2019/4/dionysos-en.html)
2: (2019) Millan, Vineyard pruning weight assessment by machine vision: towards an on-the-go measurement system, 21th GIESCO International Meeting, Thessaloniki, Greece
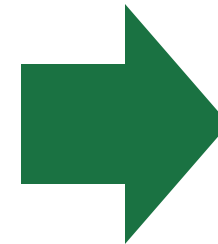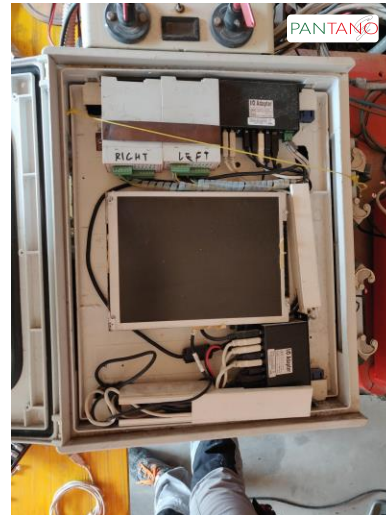
An "industrialized" version on the views

Rovitis4.0 background
Skid-steer and platforms

An "industrialized" version on the views

Sources: https://energreen.it/   M.Eng Matteo Pantano / Az. Agr. Giorgio Pantano

An "industrialized" version on the views

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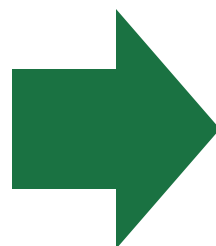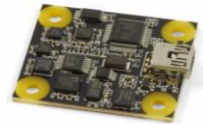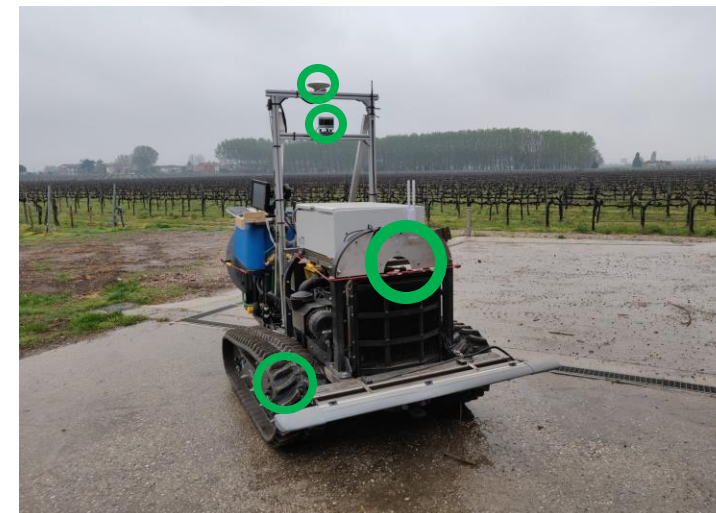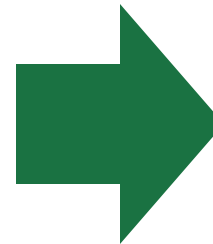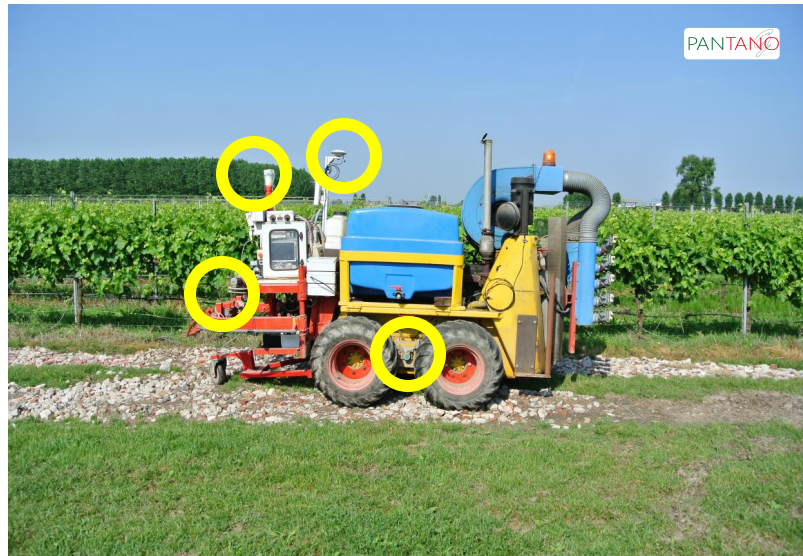
The Rovitis robot must drive in highly vegetation areas and the software system must cope with them.
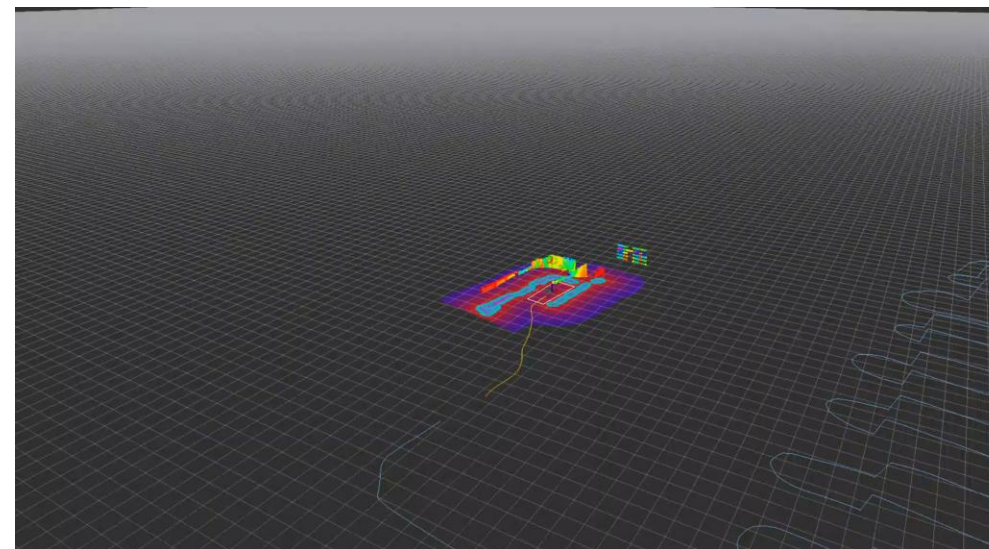

https://youtu.be/_2R5TlfcC4I

https://youtu.be/Ka7NG7kK-RU

The Rovitis robot is not a "dummy" system which just uses GPS but it is a **highly intelligent machine which uses the sensors and the software systems to detect its environment and act in on it**. Example of those are: planning algorithms in highly vegetation areas, detection of rows and obstacle avoidance.

https://youtu.be/D4LC81_bTGM

Automatic refilling
For human-less operations

Camera recognition and Gantry

Kinematics with image processing

Coffee machine for accurate dosing

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APPS are easy to understand and handle

The Rovitis robot gets the information on where to drive through the teach&repeat methodology. This is achieved through a **highly customizable app** and an **open-source** platform for farming robotic applications.
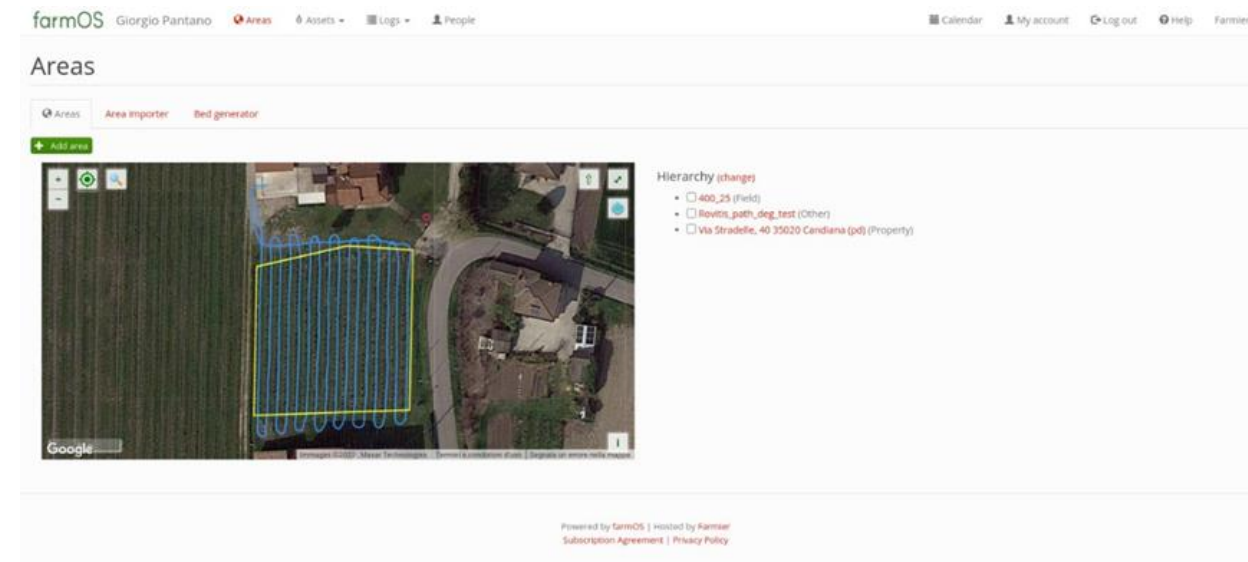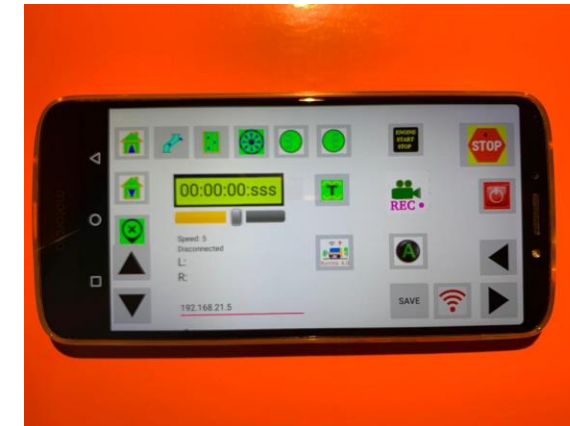
Finally, the grape producer gets off from tractor

In 2020 Pantano's "robots-grapes" were delivered to *Cantina di Cona*. The grapes were the product of the "robot" vineyard where all 13 treatments were done using Rovitis and not a traditional tractor.

https://www.youtube.com/watch?v=2hK7Tz2j-co&feature=youtu.be

https://www.youtube.com/watch?v=yls_-odmj2Y&feature=youtu.be

Decreto MIT 70/2018 (Smart Road)

Ing. Mario Nobile – DG Sistemi Informativi

12 Sep 2019 ministro@politicheagricole.gov.it

09 Jan 2020 urp@pec.politicheagricole.gov.it

Art. 842 c.c.

NO ANSWERS

Methodology for Plant Specific Cultivation through a Plant Identification pipeline

2020 IEEE International Workshop on Metrology for Agriculture and Forestry

Matteo Pantano et al.
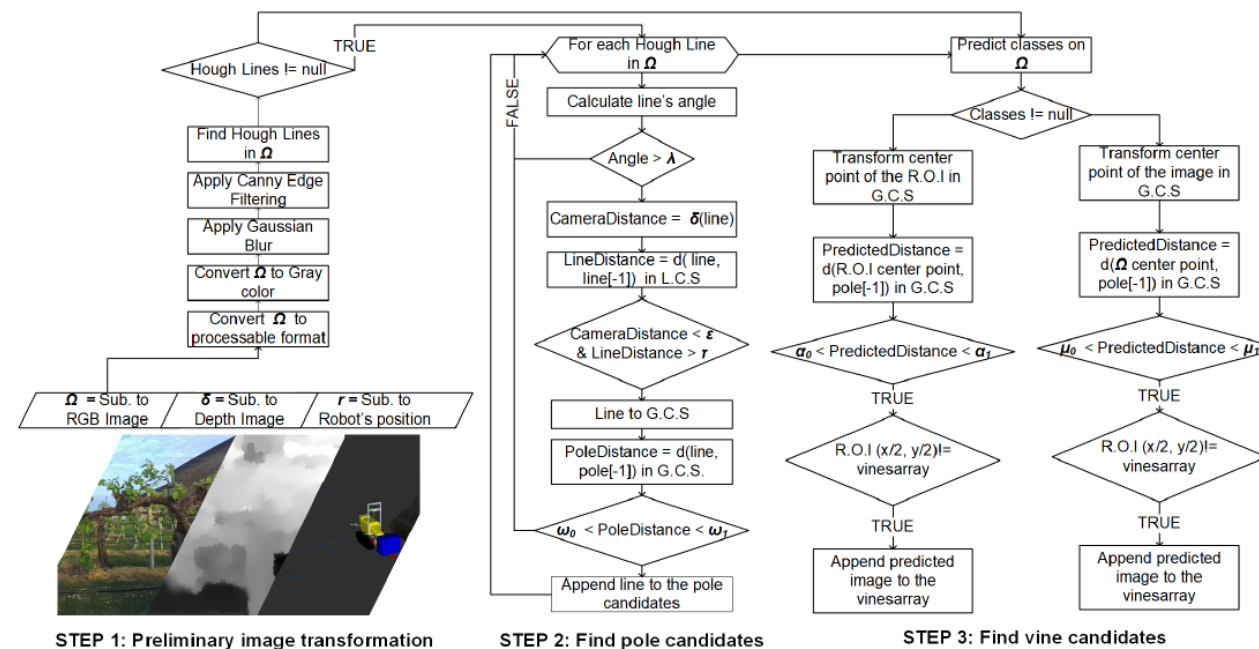
We need a clear answer from Italy!

FIRA 2020 8-10 December
GLOBALIZATION STRATEGY

National Ambassadors to promote FIRA in their own countries:
- **USA**: Jim Sulecki, freelance agent
- **JAPAN**: EU-Japan Centre for Industrial Cooperation
- **AUSTALIA**: SPAA Society of Precision Agriculture Australia
- **TURKEY**: Tarmakbir
- **SLOVENIA**: Agrifood - ITC
- **IRELAND**: The Yield Lab
- **BRAZIL**: ABIMAQ
- **ISRAEL**: Volcani Institute
- **ROMANIA**: IND-AGRO-POL
- **SPAIN**: FEMAC
- **FRANCE**: Agronov, Université de Montpellier...

Italy?

AMBITION:
create a global ecosystem for agricultural robotics

Robot kit for getting off the tractor

Software Stack

ECU

Embedded computer

Lidar

Low-cost GPS

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https://youtu.be/IQaKmxqgfRw

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Thank you, questions?

2020-12-04   M.Eng Matteo Pantano / Az. Agr. Giorgio Pantano