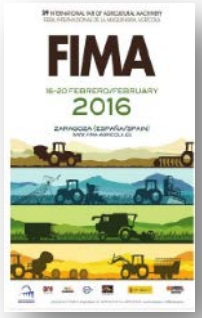

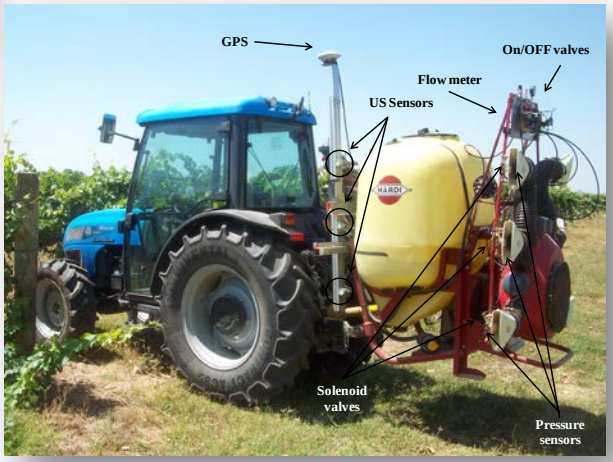

Innovation in Agricultural Machinery and Spray Equipment in Mediterranean Agriculture

Prof. Emilio Gil

Department of Agricultural Engineering and Biotechnology

Universidad Politécnica de Cataluña

Challenges regarding to spray application techniques

Productivity – optimization (Cost vs. Gain Approach)
Food quality (input management, market requirements, residues)
Safety (Operator, Environment, Equipment)
Information – Feedback (traceability)

Technologies providing potential answers
Dosage - Volume/ha adjustment
GNSS based solutions (traceability, guiding)
Canopy detection and adjustment
Drift management

Every crop production industry has unique specifications
MEDITERRANEAN AGRICULTURE PRESENTS SPCIFIC REQUIREMENTS


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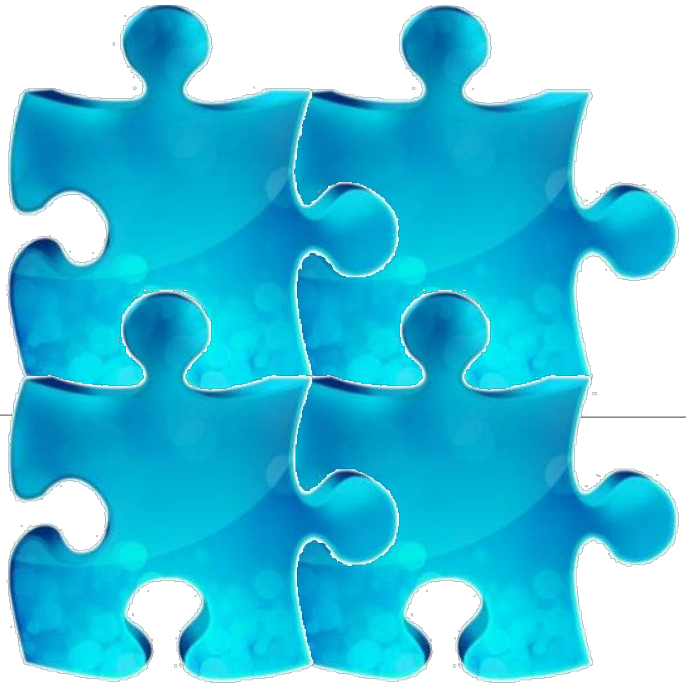
Pesticide Authorisation (placing on the market) 2009/1107 repl. Directive 91/414

Framework Directive on Sustainable Use of Pesticides (**SUD) 2009/128**



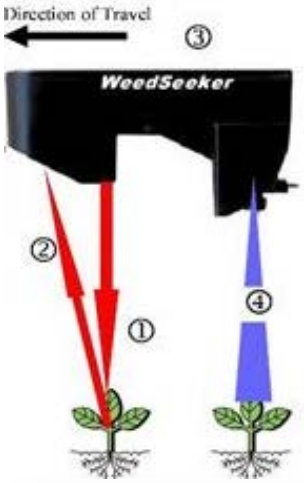
Revision of Machinery Directive (Pesticide application equipment) **2009/127**

Water Framework Directive (WFD) 2000/60/EC

TREND: INCREASING FOCUS ON THE USE PHASE OF PESTICIDES

Vegetation detection for site specific applications

WeedSeeker ®



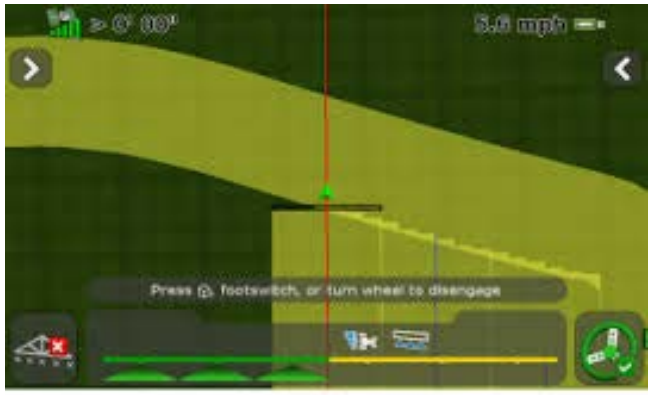
AmaSpot sensor nozzle system

FIMA

Principles and applications of Boom Section Control

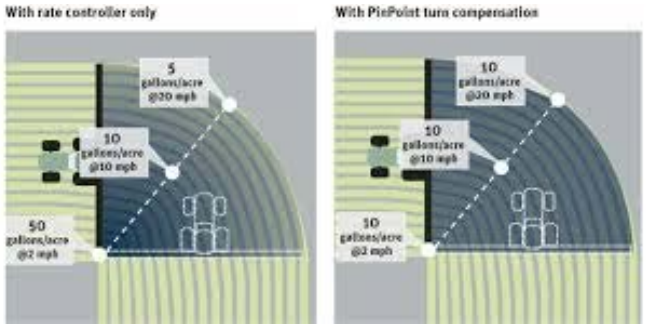
1- Automatic switch of boom sections

2- GNSS aided control

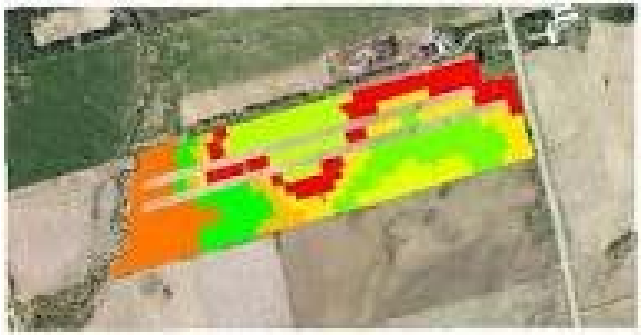


Trimble CFX-750 Display with Field-IQ
Six boom sections

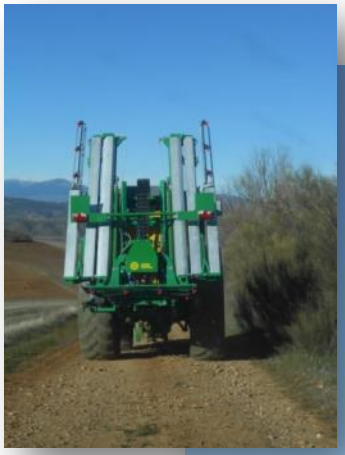
3- Variable rate adaptation



Capstan Ag



VRA map

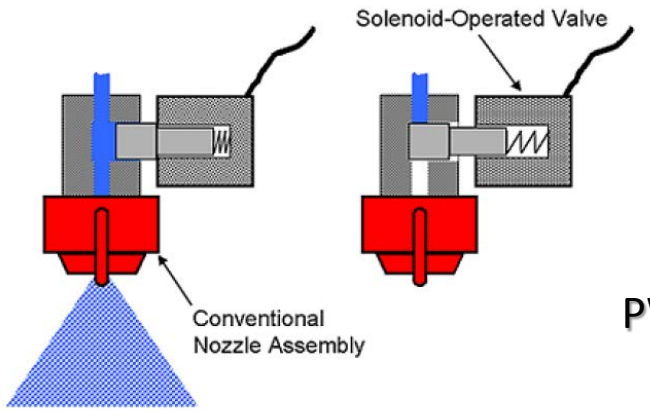



GIL

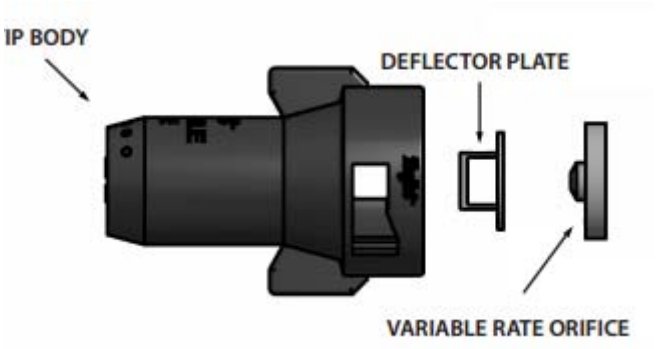

GIL

DEPOSITO
PRINCIPAL
TRABAJO
DEPOSITO
LAVA CIRCUITOS

GNSS based solutions : Single nozzle control



PWM control valve - Raven

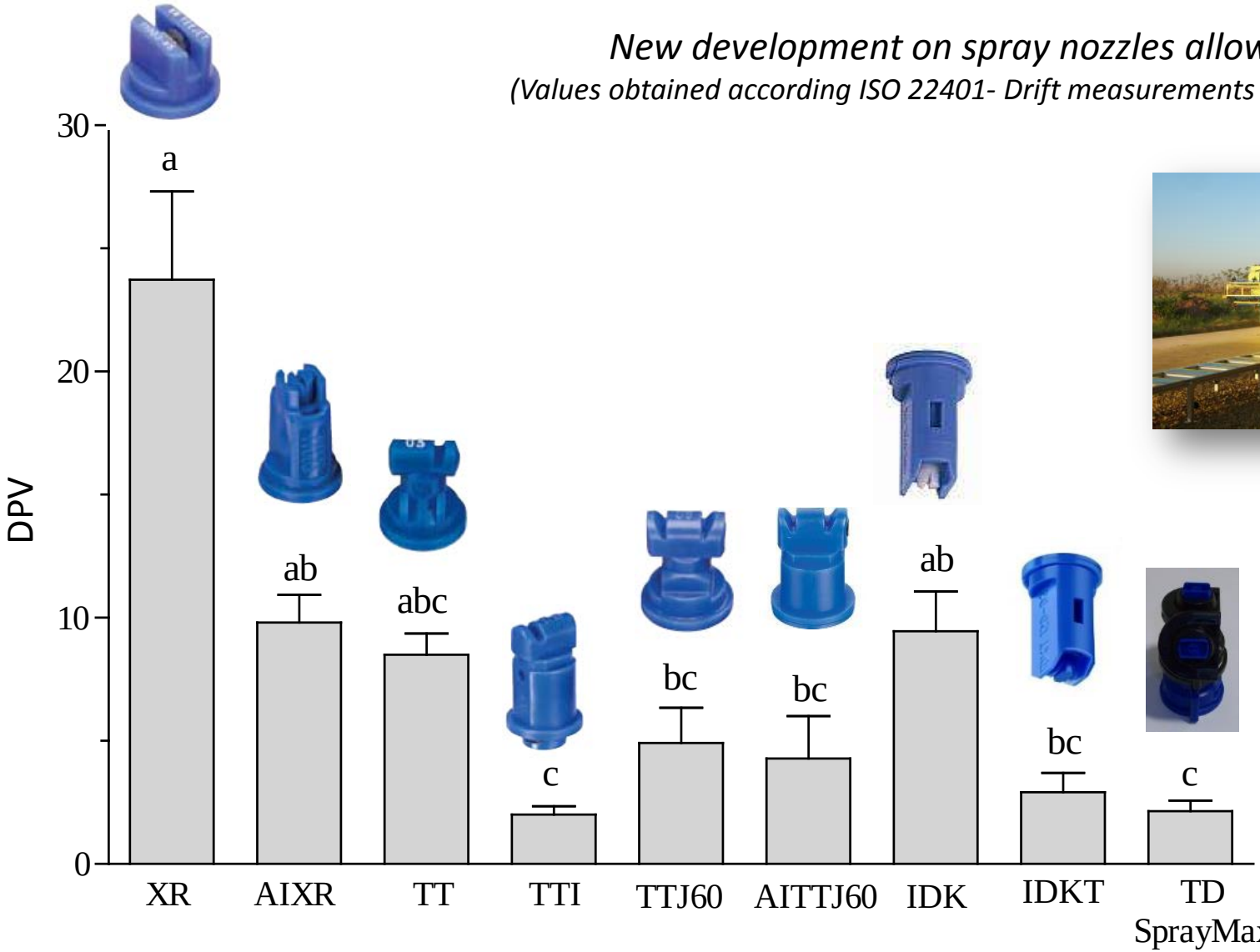


Variable Rate Nozzle - Teejet

Drift

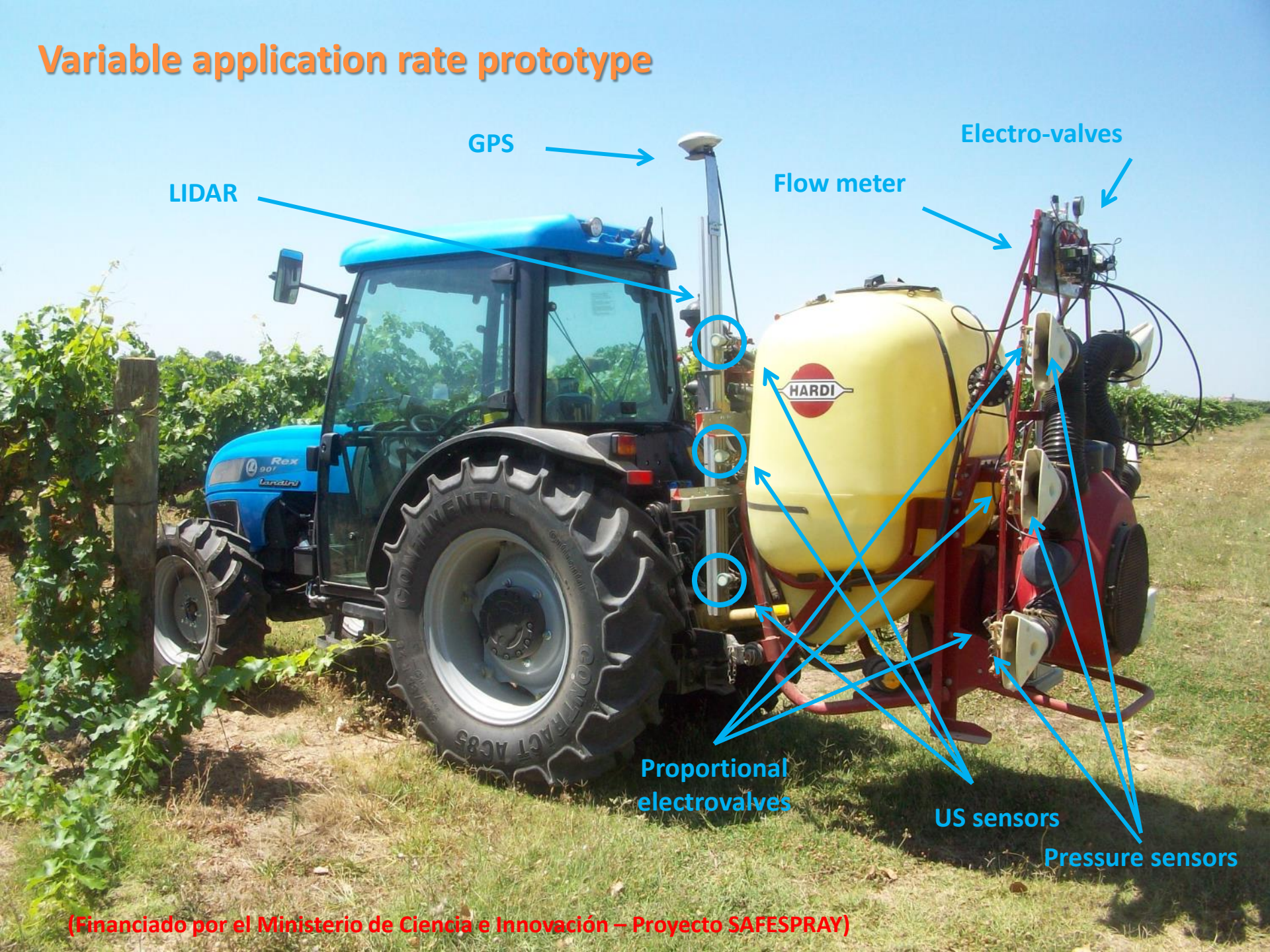
New development on spray nozzles allows to reduce drift

(Values obtained according ISO 22401- Drift measurements using drift test bench



(Gil et al., 2013)

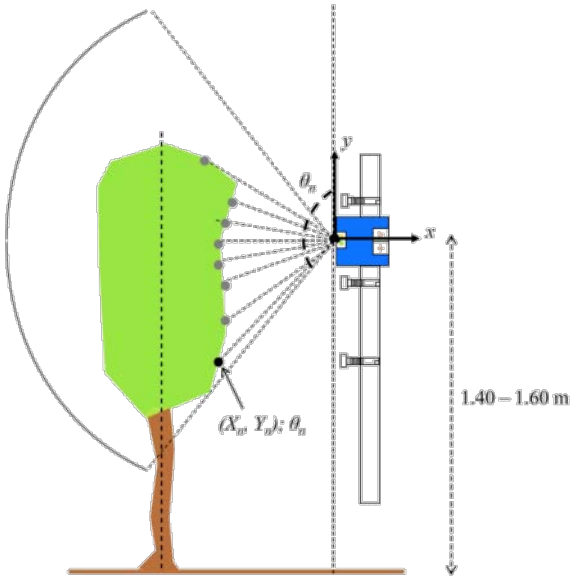
Variable application rate prototype

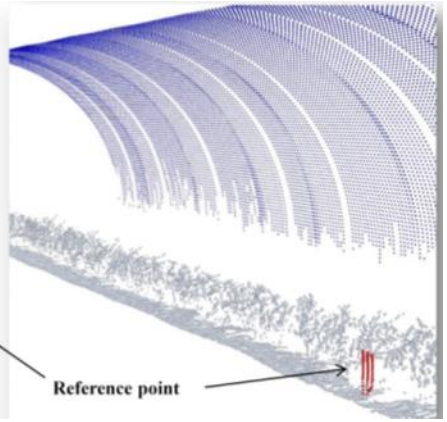


(Financiado por el Ministerio de Ciencia e Innovación – Proyecto SAFESPRAY)

Canopy characterization

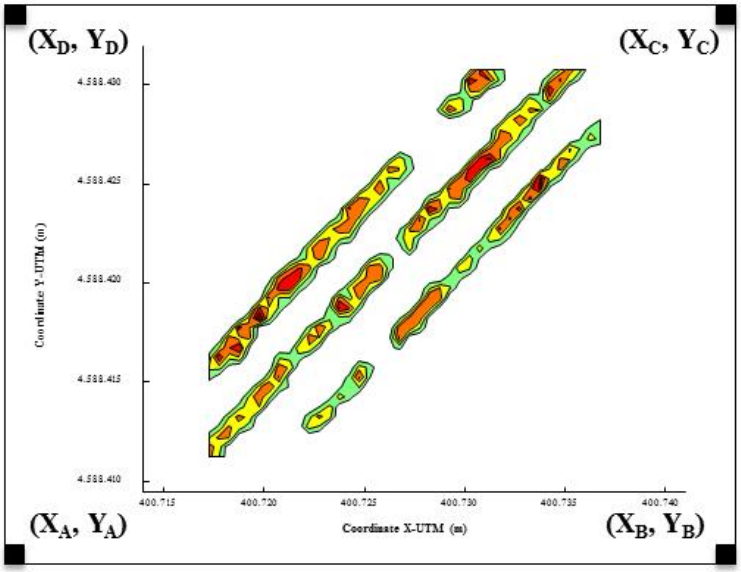
Use of sensors



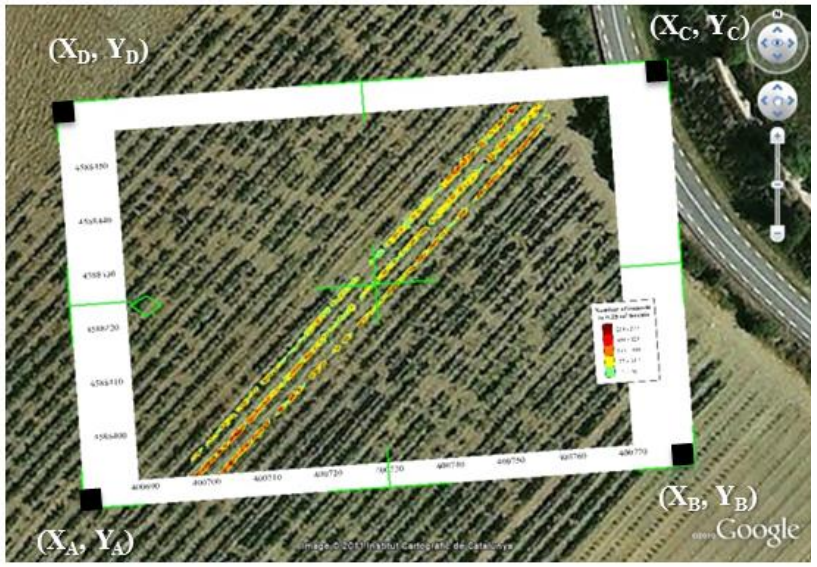


New technologies for canopy characterization

Density map image file (*.gif)



Converted file (*.kmz)



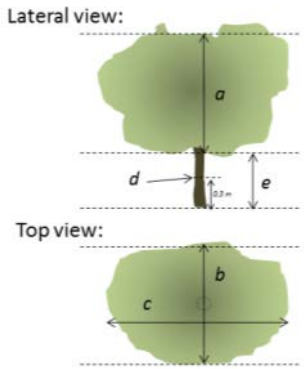
Gil, E.; Llorens, J.; Llop, J.; Fàbregas, X.; Gallart, M. Use of a terrestrial lidar sensor for drift detection in vineyard spraying. *Sensors* **2013**, *13*, 516–534.

Gil, E., Arnó, J., Llorens, J., Sanz, R., Llop, J., Rosell-Polo, JR., Gallart, M., Escolà, A. 2014. Advanced Technologies for the Improvement of Spray Application Techniques in Spanish Viticulture: an overview. *Sensors* **2014**, 14, 691-708

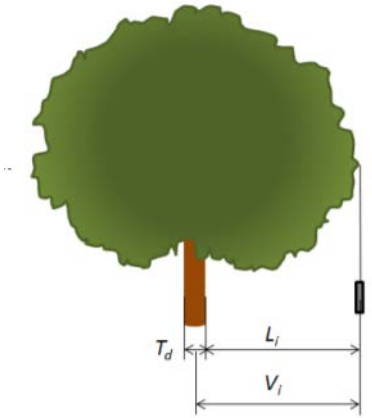
Healthy Crop,
Healthy Environment,
Healthy Finances

Tree crown volume measurements in olive trees

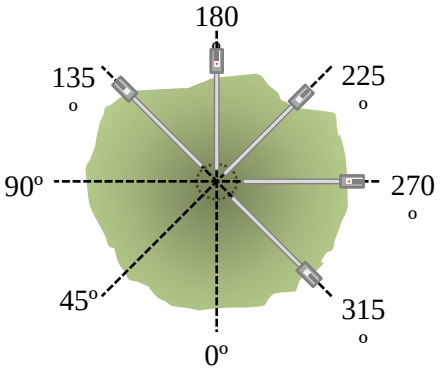
Ellipsoid volume

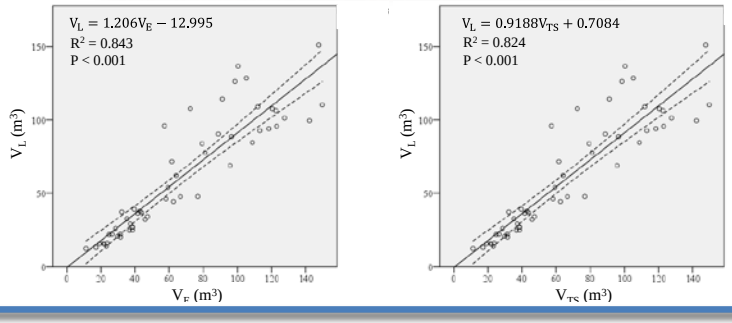


Vertical crown projected Area

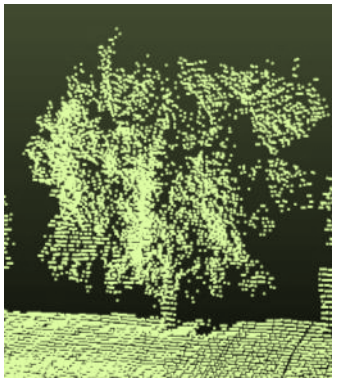


Tree silhouette





LiDAR canopy characterization



Unidad de Mecanización Agraria
http://uma.deab.upc.edu

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

spray drift – ISO 22866

Quantity of plant protection product that is carried out of the sprayed(treated) area by the action of air currents during the application process

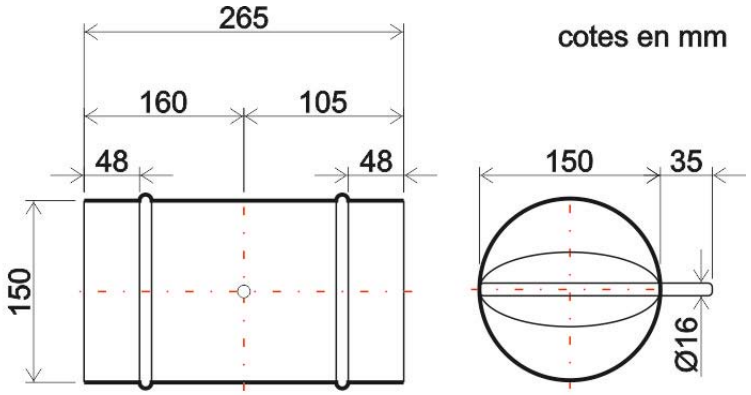
Drift management (boom sprayers)

Drift management (bush and tree crop sprayers)






DriftStopper EVO (Caffini, SpA)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cotes en mm
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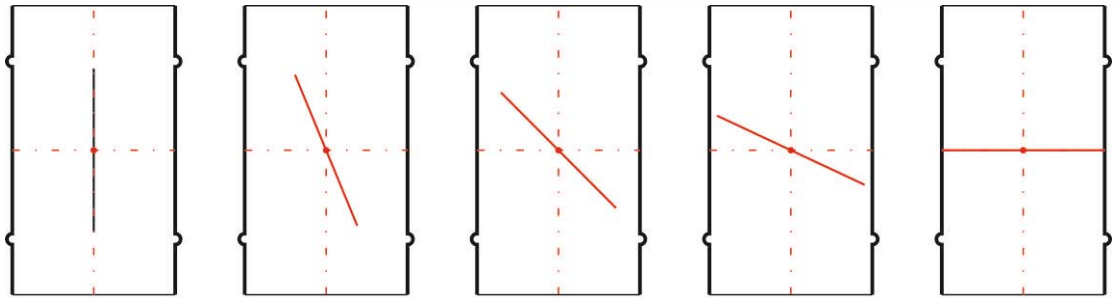

100%
75%
50%
25%
0%

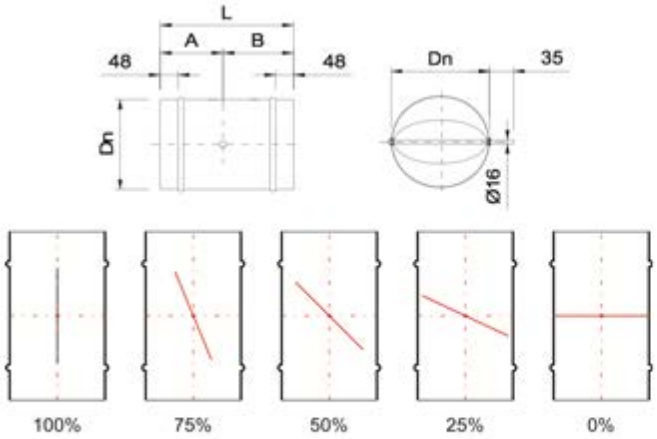
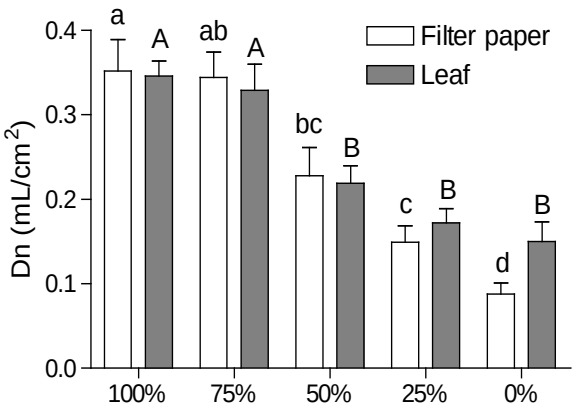
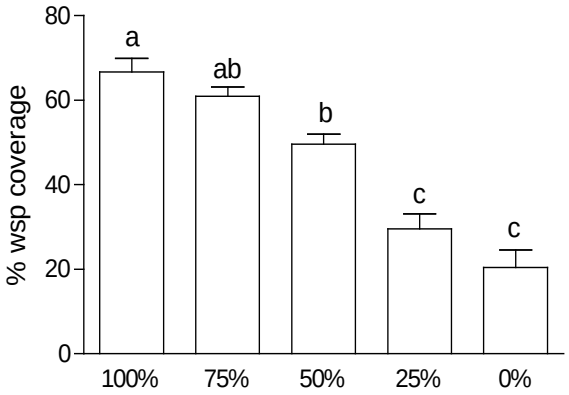


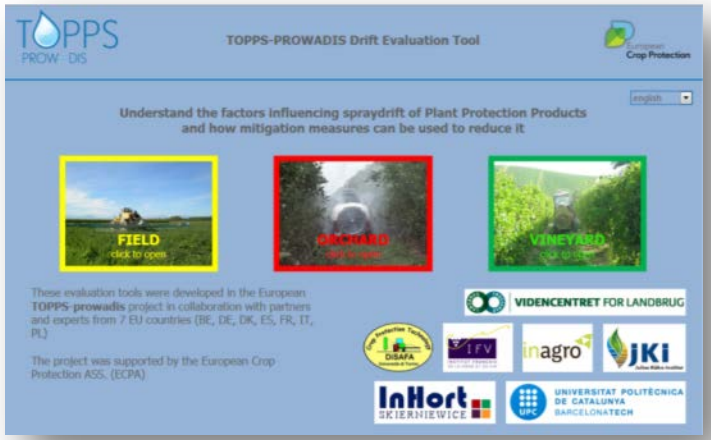
Figure 1. Technical characteristics of the adjustable valve (left) and Iris 1500 L sprayer (Ilemo Hardi S.A.U.) modified for the trials (right).

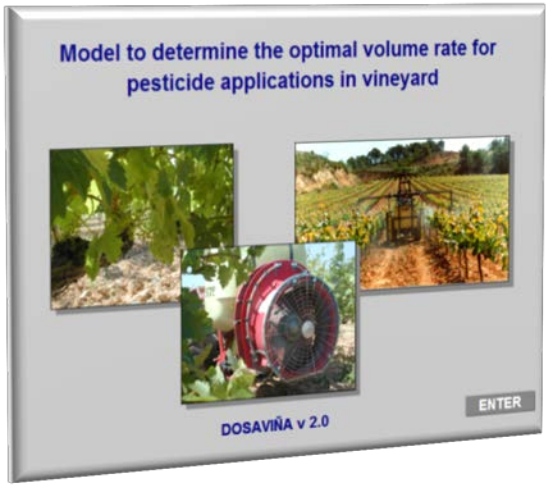




(Developed by UPC)

Drift Evaluation Tool (TOPPS)





DOSAVIÑA - (Developed by UPC)

EU Directive 128/2009/CE

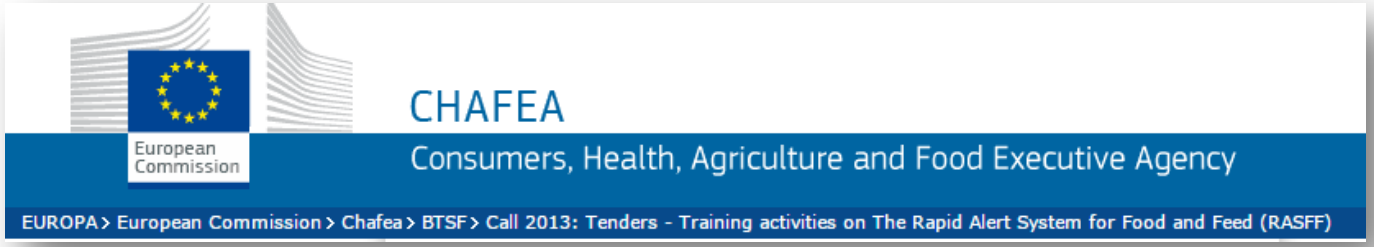
Sprayers in use
(farmers, advisors)

- Calibration
- Inspection
- BMP
- Drift reduction

EU Directive 127/2009/CE

New sprayers
(manufacturers, distributors)

- Environmental aspects
- Inspection
- Drift reduction
- Adjustment



Organization and implementation of training activities on inspection and calibration of pesticide application equipment in professional use

Project LIFE-FITOVID- Implementation of Demonstrative & Innovative Strategies to reduce the use of plant protection products in viticulture

TOPPS
Water Protection

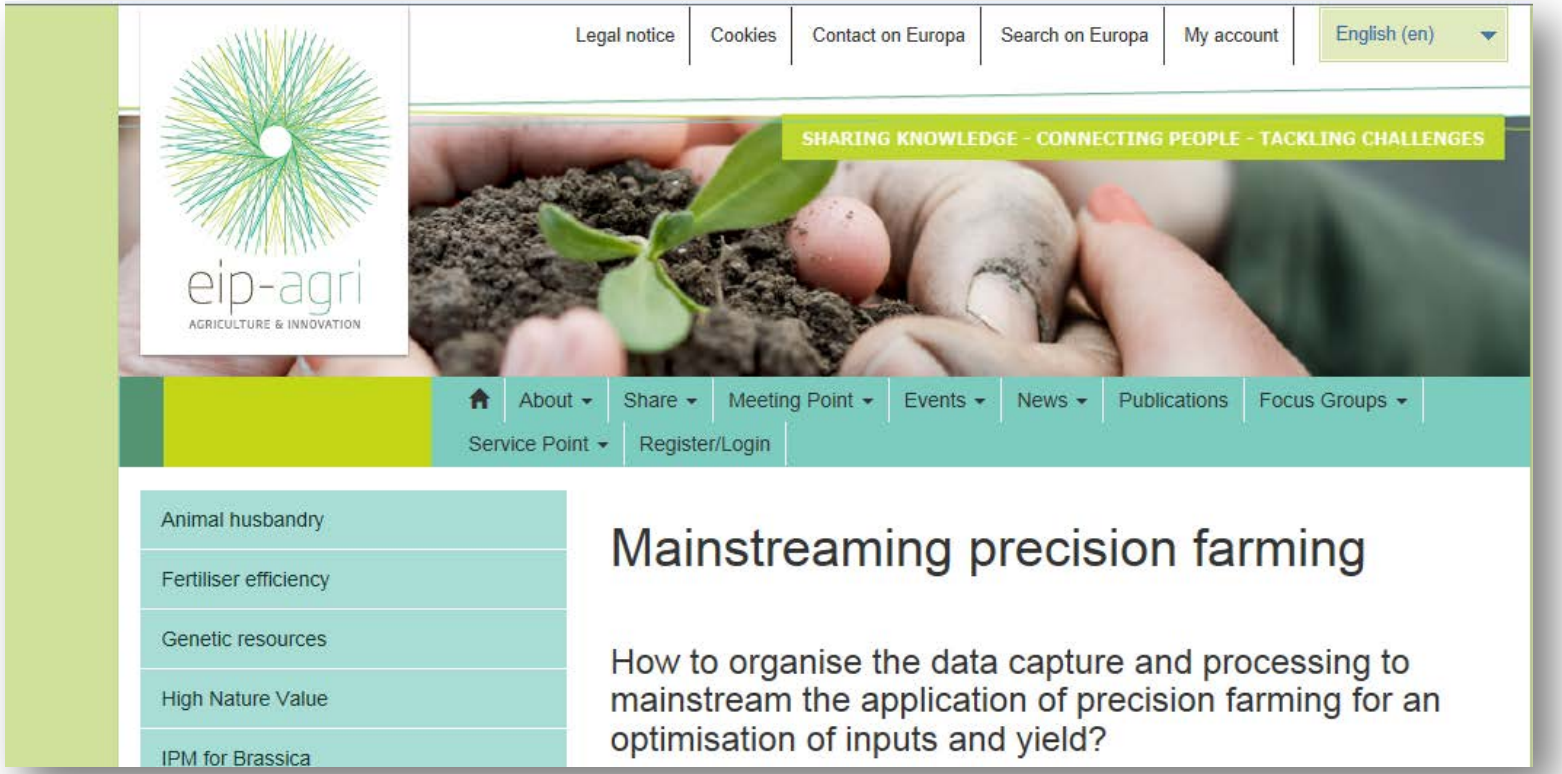
TOPPS – WATER PROTECTION – Train the Operators to Promote best management Practices and Sustainability

EIP-FOCUS GROUP PRECISION FARMING

AGRICULTURA Y DESARROLLO RURAL

http://ec.europa.eu/eip/agriculture/

Comisión Europea > Agricultura y Desarrollo Rural



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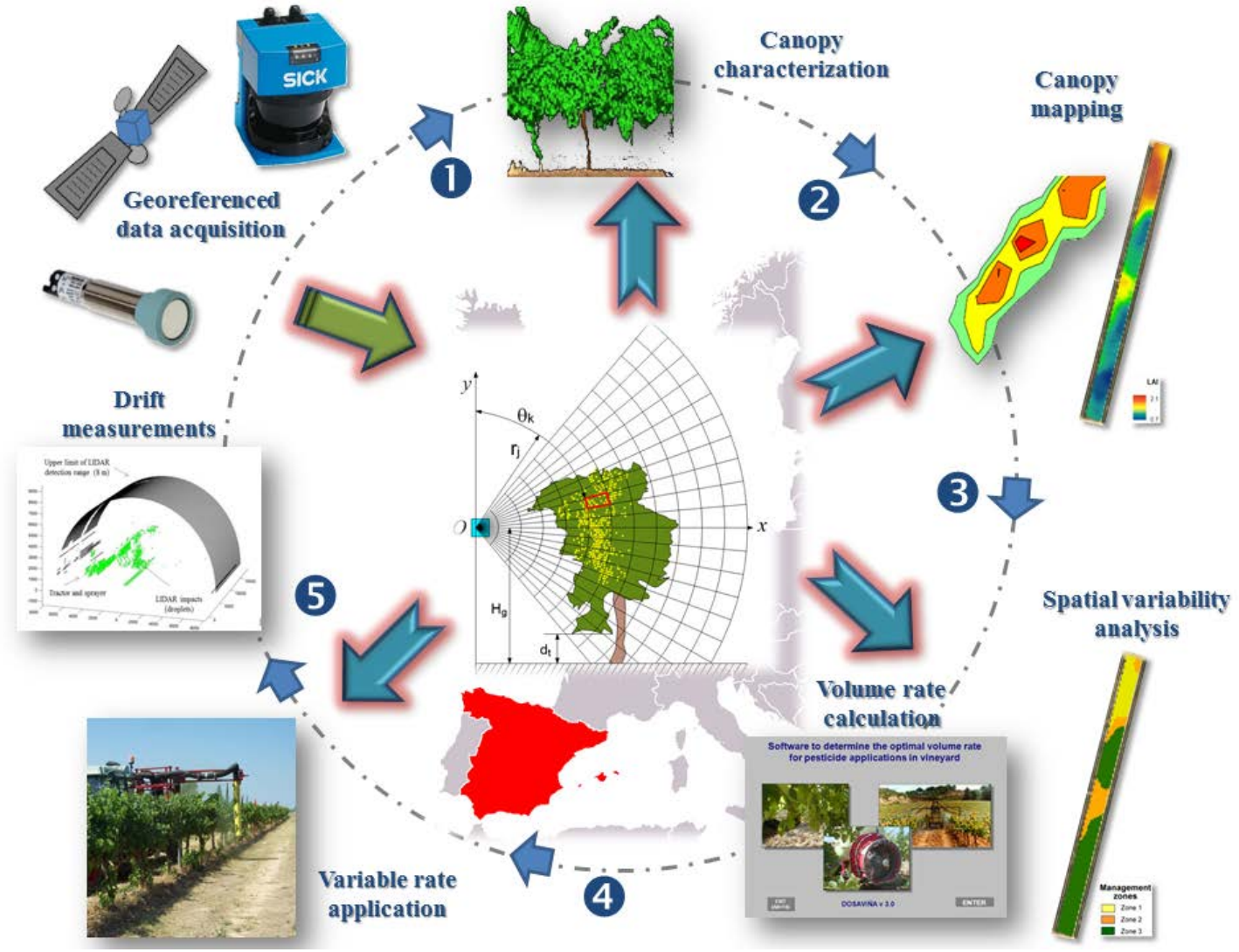

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Thank you very much