



# CERTIFICATE

This certificate is awarded to

*Harold Murcia*

for completing the summer school

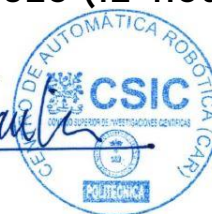
**“AI Autonomous Robots for Agriculture – Weeding with Laser”**

organised by the WeLASER consortium (EC Horizon-2020 programme) and held online on July 10-11, 2023, with a training day at the Centre for Automation and Robotics (CSIC-UPM), Madrid, Spain, on July 12, 2023 (12-hour course).

A blue ink signature of Luis Emmi.

Luis Emmi (Director)  
WeLASER system-integration leader

A blue ink signature of Pablo Gonzalez-de-Santos.



Pablo Gonzalez-de-Santos (Co-director)  
WeLASER Project Coordinator

Issued: July 13, 2023

# AI-Autonomous Robots for Agriculture – Weeding with Laser



Funded by the Horizon 2020 programme  
of the European Union





# AI-Autonomous Robots for Agriculture – Weeding with Laser



## Introducing the Summer School

Pablo Gonzalez-de-Santos

[pablo.gonzalez@csic.es](mailto:pablo.gonzalez@csic.es)

July 10, 2023



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- **WeLASER Project**

- ☐ Sustainable Weed Management in Agriculture with Laser-based Autonomous Tools

- ☐ Dissemination of results

- ☐ Attraction of young researchers

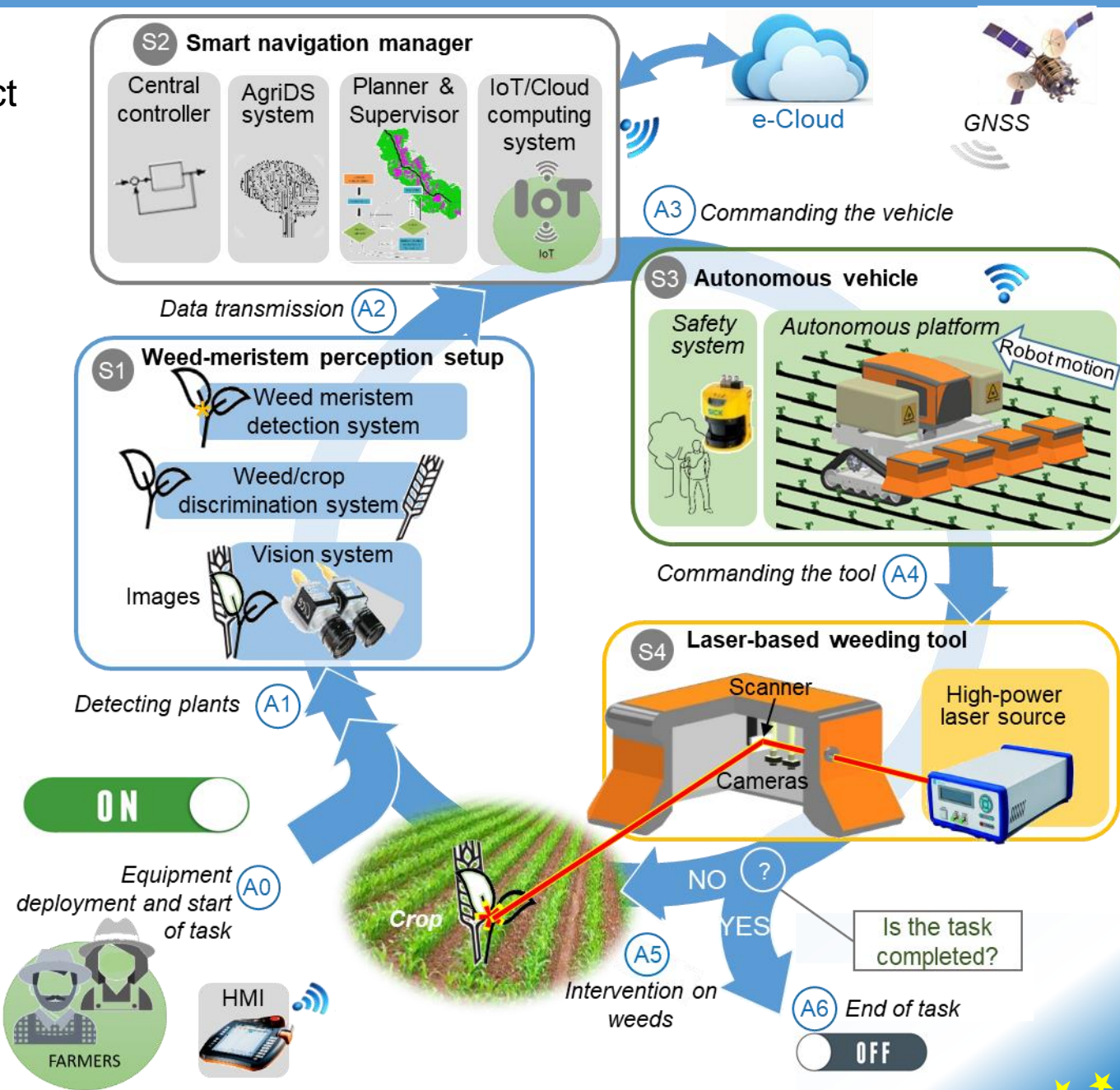
} **WeLASER Summer School**



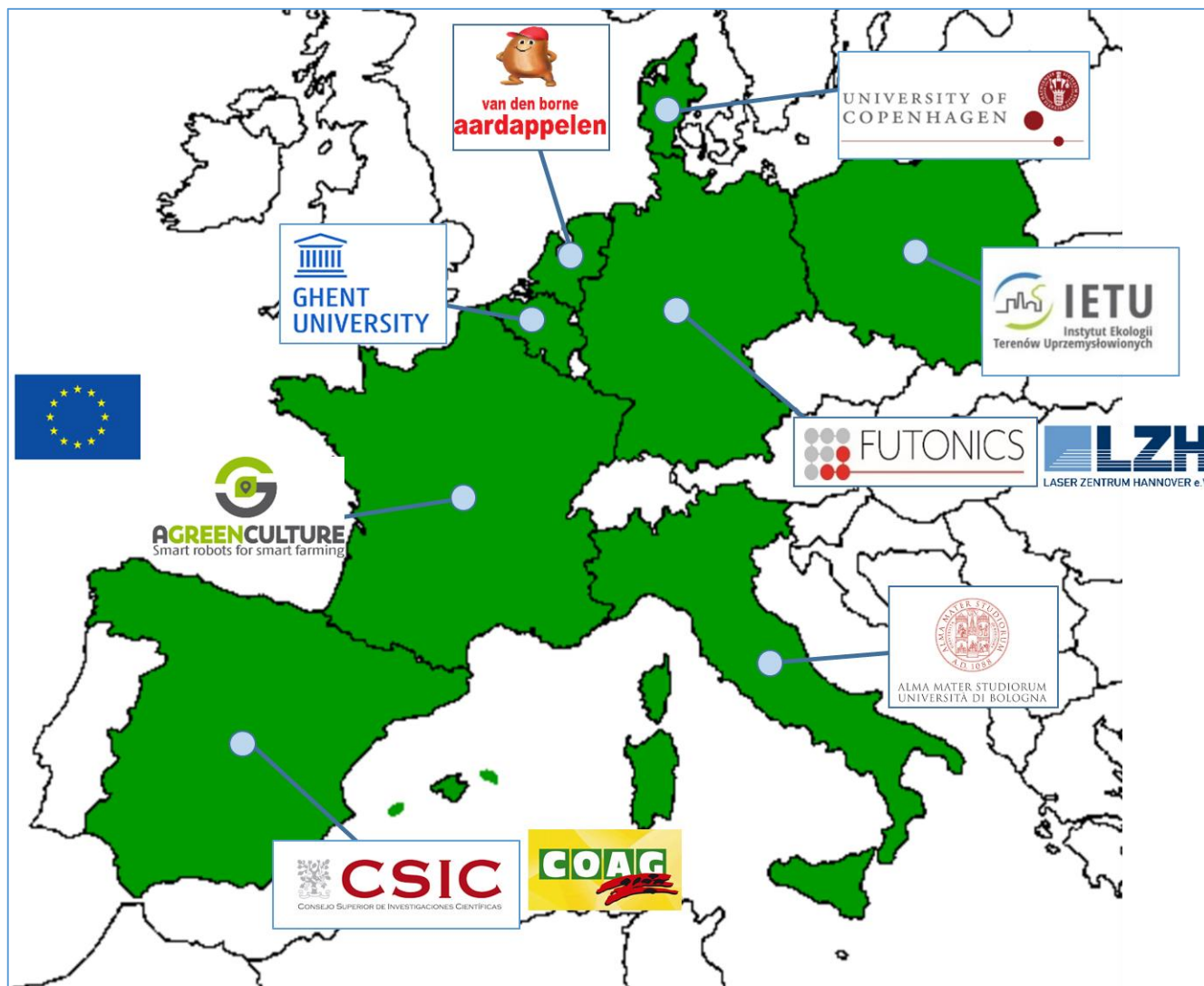


## WeLASER Project

- EU Horizon-2020 funded project to build a precision weeding system based on high-power laser sources and autonomous vehicles to eliminate the use of herbicides and their health and environmental adverse effects



# Introduction: consortium



- **Introduce**

- ☐ Robotics for agriculture
- ☐ AI to control autonomous robots
- ☐ Complementary techniques (IoT and Cloud Computing)
- ☐ AI perception algorithms for weeding with laser

- **Present**

- ☐ Commercial portfolio or agricultural robots

- **Complement with**

- ☐ Biological aspects
- ☐ Economical aspects
- ☐ Ecological aspects

# Summer School schedule

- Days 1 and 2 - online

Monday, July 10, 2023  
(Online sessions)

09:30-10:15	<b>Introducing the summer school</b> <b>Precision agriculture and robotics</b> Pablo Gonzalez-de-Santos (
10:15-11:00	<b>AI controllers for autonom</b> Luis Emmi (CSIC, Spain)
11:00-11:15	Break
11:15-12:00	<b>Cloud computing for agric</b> Matteo Francia (University
12:00 – 12:45	<b>Precision agriculture: farm management</b> Joachim Schouteten (Ghent

Tuesday, July 11, 2023  
(Online sessions)

09:30-10:15	<b>AI algorithms for weeding with laser</b> Laser Zentrum Hannover, Germany
10:15-11:00	<b>Laser effect on crops and animals</b> Christian Andreasen (University of Copenhagen, Denmark)
11:00-11:15	Break
11:15-12:00	<b>IoT for agriculture</b> Giuliano Vitali (University of Bologna, Italy)
12:00–12:45	<b>Real robots for real agriculture</b> (AGREENCULTURE, France)
12:45-13:30	<b>Ecological aspects of using autonomous robots for agriculture</b> Janusz Krupanek (Institute for the Ecology of Industrial Areas, Poland)



## • Days 3 – online/onsite

Wednesday, July 12, 2023 (On-site / Online sessions)		On-site	Online
09:30-10:00	Moving from Madrid to CAR (UPM-CSIC)	CAR Shuttle	
10:00-10:30	<ul style="list-style-type: none"> <li>Introducing CAR</li> <li>Introducing the demo</li> </ul> Pablo Gonzalez-de-Santos (CSIC, Spain)	CAR Auditorium	Online
10:30-11:00	Introducing the WeLASER equipment and training Luis Emmi (CSIC, Spain)	High-bay Lab	Online
11:00-11:30	Coffee break		
11:30-13:00	Demo Luis Emmi (CSIC, Spain)	Experimental Field	Online
13:00-13:15	Questionnaire to attendees Pablo Gonzalez-de-Santos (CSIC, Spain)		Online
13:15-14:30	Lunch at CAR-CSIC		
14:30	Returning to Madrid	CAR Shuttle	



- **Questionnaire**


### WeLASER Summer School Questionnaire



[Sign in to Google](#) to save your progress. [Learn more](#)

Summer School

AI-Autonomous Robots for  
Agriculture – Weeding with laser

July 10-12, 2023



H2020 N° 101000256

### WeLASER Summer School Questionnaire

[Sign in to Google](#) to save your progress. [Learn more](#)

\* Indicates required question

#### Program Evaluation

a. How satisfied are you with the overall WeLASER summer school program? \*

☐ Very dissatisfied

☐ Dissatisfied

☐ Neutral

☐ Satisfied

☐ Very satisfied

b. What aspects of the program did you enjoy the most?

Your answer

c. Are there any areas of improvement you would suggest for future summer school programs?

Your answer

[Questionnaire link](#)

- Certificate

A certificate template with a green floral border. At the top center is the WeLASER Summer School logo. Below it, the word "CERTIFICATE" is written in a green, serif font. The text "This certificate is awarded to:" is followed by a horizontal line. Below the line, the name "Name.Surname" is written in a blue, cursive font. Another horizontal line follows. Below this line, the text "for completing the summer school:" is followed by a horizontal line. Below the line, the text "“AI-Autonomous Robots for Agriculture -- Weeding with Laser”" is written in a green, serif font. Below this, the text "organised by the WeLASER consortium (EC Horizon-2020 programme) and held online on July 10-11, 2023, with a training day at the Centre for Automation and Robotics (CSIC-UPM), Madrid, Spain, on July 12, 2023. (12-hour course)." is written in a black, serif font. Below this, there are two horizontal lines. The first line is followed by the text "Luis Emmi (Director)" and the second line is followed by the text "Pablo Gonzalez de Santos (Director)". Below these lines, the text "Issued: July 13, 2023" is written in a black, serif font.



- **Presentations:**
  - ☐ Focused on a general audience
  - ☐ The slides will be provided to attendees
- **Questions & comments**
  - ☐ Using the chat



# AI-Autonomous Robots for Agriculture – Weeding with Laser



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