

WeLASER, CLOSER TO PESTICIDE-FREE AGRICULTURE

- **Producing more, in a less polluting way and with all the guarantees for human health and the planet's health is possible.**
- **A development in which the Department of Plant and Environmental Sciences of the University of Copenhagen (CPH) participates together with 9 other entities from 8 EU countries.**

Madrid, 18 December 2023. - After 3 years of work, an international partnership **has realised a precision weeding tool proving that herbicide free agriculture is at hand.**

The partnership formed by research centres, universities, private companies and farmers' organisations from **Spain, Germany, Denmark, France, Poland, Belgium, Italy and the Netherlands**, by **WeLASER** project funded by the EU within its "Horizon 2020" programme, **has completed the first stage of the development of the a precision weeding prototype tool** that allows progress in eradicating the use of herbicides, improving the productivity and competitiveness of crops, thus **eliminating health risks and the adverse environmental effects** of chemicals.

The prototype includes an autonomous vehicle that drives through the crop and is equipped with an advanced detection system based on artificial intelligence (AI) through image acquisition and data processing, which allows it to distinguish and localize the centre of growth of the weed to be eradicated. Once targeted through the scanner, it directs the high-powered fibre laser source to that meristem. **This fast modulation concept allows precise energy pulses to be directed for highly efficient weed treatment.** Data management are managed by a cloud computing architecture and the system includes the IoT technology.

Although this project is currently concluding this first phase of development, further work will be needed, for example, to reduce the time required to work in the field, to make the prototype easier to handle and connect, and to reduce production costs in order to achieve a marketable model on the market.

A project of maximum cooperation between entities from all over Europe

WeLASER is the result of the cooperation of 10 partners from 8 EU member states. On the Spanish side, the Centro de Automática y Robótica (**CAR**) belonging to the Consejo Superior de Investigaciones Científicas (**CSIC**) and coordinator of the project and the Coordinadora de Organizaciones de Agricultores y Ganaderos (**COAG**); on the German side, the Laser Zentrum Hannover e.V. (**LZH**) and the company Futonics Laser GmbH (**FUT**); from Denmark, the Department of Plant and Environmental Sciences of the University of Copenhagen (**CPH**); from France, the company AgreenCulture (**AGC**); from Italy, the Interdepartmental Centre

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for Industrial Agri-Food Research of the University of Bologna (**UNIBO**); from Poland, the Instytut Ekologii Terenów Uprzemysłowionych (Institute of Ecology of Industrial Areas) (**IETU**) in Katowice; from Belgium, the Department of Agricultural Economics of the Faculty of Biosciences Engineering of the University of Ghent; and from the Netherlands (**UGENT**), Van Den Borne Projecten BV, the innovation department of the Van Den Borne Aardappelen (**VDBP**) farm located in Reusel.

For Pablo González de Santos, from the CSIC's Centro de Automática y Robótica, coordinator of the project, "WeLASER has been a perfect collaboration between leading organisations in each of their fields of work, which has made it possible to have the latest technologies and advances necessary for the development of such a cutting-edge and necessary project".

Beyond the development of the prototype, this project has resulted in the development of different innovations with multiple applications such as a high-power fibre laser source for the control of adventitious weeds through precise energy pulses, with an innovative pump and cooling concept that minimises the energy demand of the laser for the weeding process; an improved power supply system for autonomous robotic platforms; an intelligent navigation manager for autonomous robots applicable to precision farming that enables navigation throughout the farm, not limited exclusively to the crop field and integrates different Artificial Intelligence (AI) methodologies to identify various types of crops, including wide and narrow crops; and an AI-based laser weed control implement that enables a wide working range for individualised plant treatment in crops of different types, while complying with all safety regulations required for working with laser technology.

Ensuring food production on a safe planet

Faced with an increasingly growing population in an environment of climate change like the one we live in, humanity's great challenge is how to guarantee food production without harming the environment or the health of the population with increasingly efficient and less polluting production systems.

In Europe alone, around **130 million tonnes of synthetic herbicides are used each year** (not counting other chemicals), substances which, when applied, do not discriminate between beneficial plants and insects in the soil that are not their target and which, moreover, can have effects on the health of animals and humans.

In addition, weeds are developing resistance, which means that existing **herbicides are becoming less and less effective**.

For González de Santos, "The WeLASER consortium is motivated to adopt smarter farming methods and build more sustainable food production systems while preserving the environment and health. WeLASER opens up a reliable and safe option and offers breakthroughs to solve a global problem".

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