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Modules of alternative education systems to encourage mechatronics for precision farming

Version 1

REPORT

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One of the objectives of the Transfarm 4.0 project is to involve, raise awareness and disseminate the experiences gained during the project on the subject of precision agriculture and to promote the teaching of these techniques within the study plan of high schools. This development of new study plans deemed strategic for the development of the agricultural sector in the coming years. With this aim, CREA organized a training day to bring students of two selected high schools closer to some topics of precision agriculture. In this regard, two companies active in the sector, developers and adopters of precision instruments, were involved to propose two presentations.

In the first phase of the activity the presentation of the Transfarm 4.0 Project was done by Dr. Luca Masiero from CREA, with a general introduction to the topic of Precision Agriculture and presentation of the technologies develop in the project, this session was followed by an open debate and question from and for the students.

The second phase of the activities involved a general explanation on the application and use of UAS tools in agriculture, as the use of drones for the creation of prescription maps and representation of the landscape. EPC - European Project Consulting prepared a presentation focuses on the economic, environmental, and monitoring advantages of the applied technological instrumentation, as well as the practical demonstration of data elaborations from a standard survey by evaluating the cartographic results obtained. The described instrumentation support farmers in making quick and precise decisions with the aim of optimizing production factors and agronomic interventions on crops. The application fields of drones in agriculture range from the creation of digital soil models, to force maps through the use of multispectral cameras, to the distribution of products with variable dosage. The multitude of data available allow to follow the procedure from planning the crops to harvesting, and through the monitoring of the vegetative state of the plants. The advantages in using these technologies cover several aspects, mainly economic and environmental. Supporting the farmer in taking right choices and saving production factors and by reducing the pressure of some agricultural systems and in particular chemicals.

The third phase involved a demonstration of a drone flight of about 20 minutes by EPC, with recording and aerial photos. The drone model Matrice 300 RTK from the manufacturer DJI made it possible to detect about 3ha of vineyards by acquiring both aerial photos and laser points from a height of 60m. The drone is equipped with the latest generation Zenmuse L1 sensor, an instrument equipped with both an RGB camera with 20 MP resolution and a LiDAR sensor that allows to acquire hundreds of thousands of points per second. The acquisition of the described data, through a subsequent processing, provides various fundamental documents for territorial planning. Among these, the orthophoto that allows to make measurements with centimeter precision and the digital models of the terrain that provides plano-altimetric trend of the land measured with precision below 5cm.

In the fourth phase of the activity the NESAs company demonstrated the operation of field control units, weather control units and main sensors, with a detailed explanation on how to install and



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manage them. Nesa together with Crea showed the component of the weather station, in particular all the proximal sensors and data logger necessary to collect the data from a specific environment site. After the presentation of the tools, Luca Masiero showed the students the potentiality of the sensors to create a mathematical model that help farmers to predict plant diseases. At last dr. Bassetto from Nesa showed how the data collected from sensors are collected and elaborated in a decision support system to improve farm efficiency.



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