

CHARACTERIZING THE VEGETATION WITH LIDAR and GPS TO IMPROVE THE SPRAY APPLICATIONS

INTRODUCTION:

This work has been part of some of the projects developed in the Department of Agroforestry Engineering of the University of Lleida, for the improvement of the applications of plant protection products in fruit trees, vineyard and citrus.

This system compounds for the sensor LIDAR (*Light Detection and Ranging*) and sensor GPS (*Global Position System*), has allowed to eliminate the elements of reference used for obtaining information both side of the trees. The datum obtained with this system will be used in methods of calculation and obtaining of vegetative parameters of the plantation.



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OBJECTIVES:

- Georeferenced datum of the terrestrial sensor LIDAR.
- Generating three-dimensional maps of vegetation.
- Describing and to put on trial the system of datum acquisition LIDAR and GPS.

MATERIAL AND METHODS:

Sensors for positioning:



GPS Garmin.
Slow accuracy

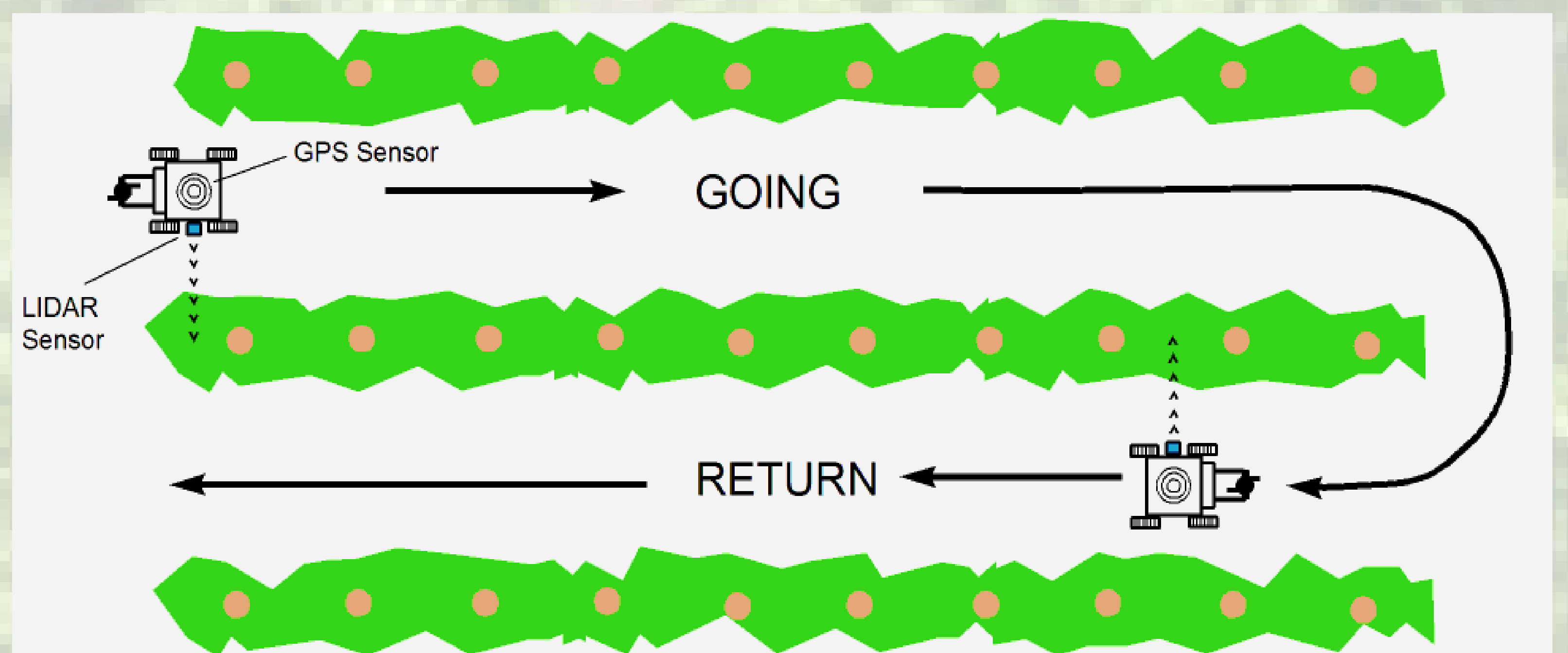


GPS Trimble.
High accuracy

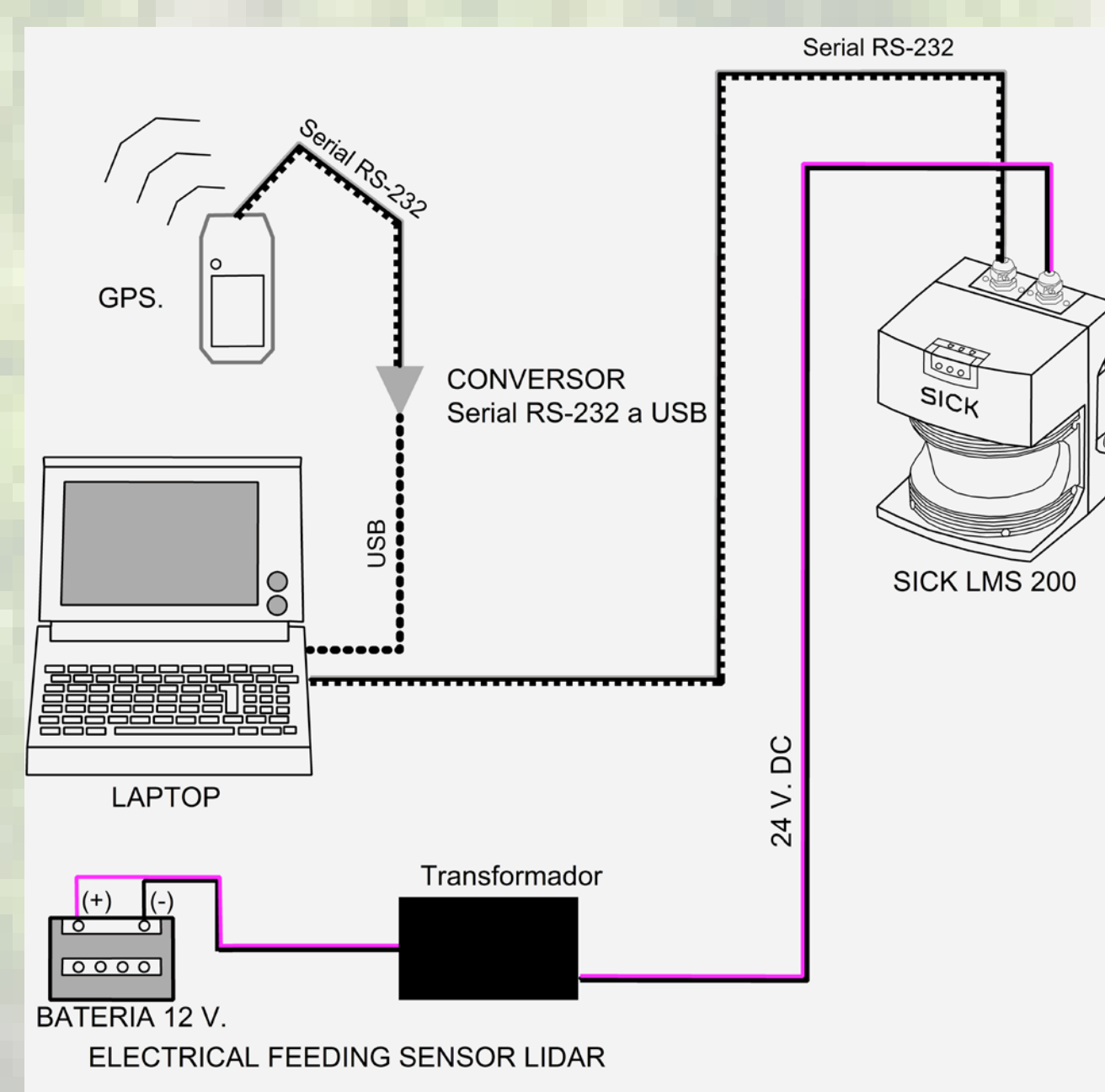


Laser sensor.
SICK LMS 200

Proceeding on field for obtain the datum:



System:



The system used is composed of a sensor terrestrial LIDAR that is capable of scanning the vegetation, a sensor GPS who take the global position (*Latitude and Longitude*) of all the system and a laptop to control and save all the datum obtained.

The system also is equipped with an electrical supply that allows him to have more than 2 hours of autonomy.

During the field trials (see figure upper) is obtained the information of both sensors.

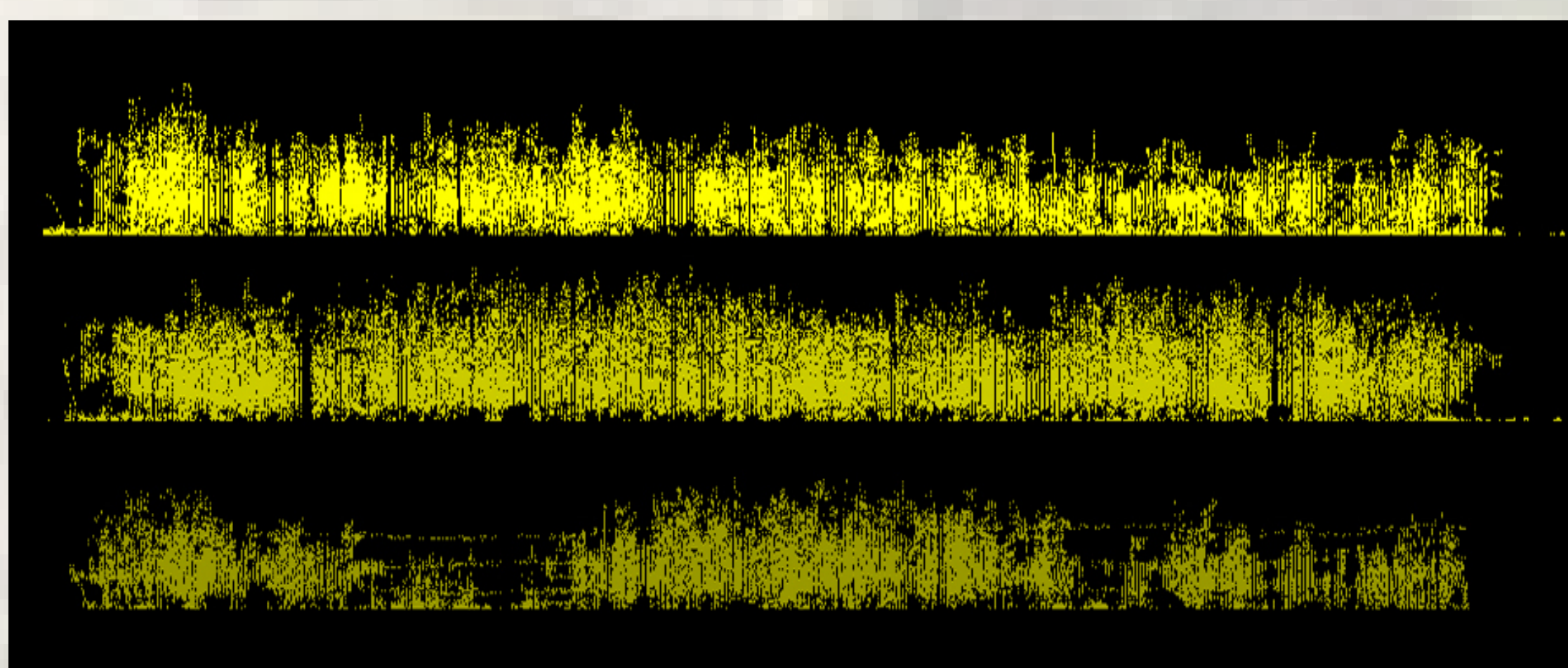
In the case of the GPS a file is saved with the sentence NMEA sent by the sensor. And in the sensor LIDAR the file is saved with all the measures carried about the vegetation.

To test the capacity of the system in field, two sensor GPS with different accuracy have been used.

Through a post-process in laboratory, the three-dimensional tree has been generated with global positioning, that we can see this in the figures below.

RESULTS AND CONCLUSIONS:

With this system we have obtained very detailed information from the scanned plantation. This information can be represented in any system which it allows to make graphs of points through three coordinates (x,y,z) and from here the calculations and measures can be arranged.



With this system will be able to abord new goals as:

- Full crop characterization.
- Variable rate in spray applications ("on line").
- Crop mapping for other uses.

