A NEW ELECTRONIC CONTROL SYSTEM FOR UNMANNED UNDERWATER VEHICLES
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Abstract - In this paper a new electronic control system for unmanned underwater vehicles is presented. This control system is characterized by a distribution in control over two networks of type CANBus and Ethernet. This new electronic control system integrates functionalities of AUVs, as the automatic execution of preprogrammed trajectories. The control system also integrates an acoustic positioning system based on USBL. The information of relative positioning is sent through specific software tools towards NEPTUS Software for the command and control of the unmanned vehicle, in this way it is possible to observe the positioning of the vehicle under water.

Keywords - UUV, electronic controllers, CANBUS, acoustics, usbl.

I. INTRODUCTION
In recent years the price of components used in robotics has been greatly reduced, making these electronic technologies more accessible for building your own underwater robot. In this paper a new electronic control system that implements the basic functionality of the UUV vehicles using generic electronic components is presented. This new electronic control system is the base for building a new family of underwater vehicles at the Underwater Vehicles Laboratory of the Universidad Politécnica de Cartagena.

II. THE ELECTRONIC CONTROL SYSTEM.
In this paper a new electronic control system for unmanned underwater vehicles is presented. This control system is characterized by being distributed over two communication networks: CANBus and Ethernet. On the CANbus network output and input devices such as pressure sensors, motors, internal measures voltage and current, inclinometers and depth gauges are connected. On the Ethernet network optical cameras, sidescan sonar, imaging sonar and sub-bottom sonar and the CPU of the vehicle are connected. The umbilical cord is part of the same Ethernet network and integrates surface monitoring equipment with on-board equipment. This new electronic control system integrates the AUVs own features such as automatic scanning of areas according to pre-programmed paths. The control system integrates acoustic positioning systems based USBL. Acoustic positioning information is sent through specific software tools to the Neptus software, in such a way the position of the vehicle under water are shown.

III. SEA TRIALS AND VALIDATION.
The electronic control system has been tested in various scenarios, in a water pool at LVS installations, in controlled trials in the artificial lagoon in the Technological Park of Fuente Alamo, on the Mar Menor lagoon and out in the bay of Cartagena. In this section the results of validation performed on the vehicle is shown. In this test, the manual, semiautomatic and automatic control modes were verified, and also the perception system and acoustic positioning systems were tested.

REFERENCES

Fig.1. Test in Cartagena bay.