LATEST CONTRIBUTIONS TO GUANAY II

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Abstract
This work presents the last contributions incorporated into AUV Guanay II, these have been emerged after some test fields, tests in the swimming pool and in the ocean, such as Mar Menor and Mar Mediterrani.
These improvements are: First in the communication and control systems, for a more fluid communication a WiFi system has been incorporated, this allows access to PC-104 of Guanay II without disassemble it; second, a new RF system to connect and disconnect the electronics and a new method to charge the batteries have been designed; third, a new driver for lateral motor has been developed that allows control the motor in both directions; then the software of the vehicle and the base station has been upgraded to obtain a major and better user control; finally, a new ballast system has been incorporated.
All of new contributions have been tested in the laboratory and in the field.

Keywords – AUV,Full bridge, WiFi, buoyancy

I. INTRODUCTION

Guanay II [1] is an AUV designed for SARTI Research Group, from UPC, this project has gone through several processes of evolution in recent years. After performing various field tests and participated in campaigns a number of improvements have been incorporated.
This article aims to present the new contributions made in the vehicle, these improvements have been tested both pool and sea showing a satisfactory progress.

II. IMPROVEMENTS

A. Power system: Power on/off and battery charging

To obtain better access in on/off control a new antenna with AM receiver has been designed and incorporated. The bandwidth of AM receiver is 433 MHz. In the other hand, a new external system has been created in order to charge the batteries, allowing charging without disconnect all the electronics.

B. Control system: Communication unit

Other improvement introduced in the vehicle is a WiFi communication system. This system allows connect directly to the PC-104. With this connection the software can be modified and is possible to download vehicle data stored remotely in laboratory and in field tests. This avoids opening the sealed cylinder of electronics. Thus, greatly improves the preparation time.

C. Propulsion systems: Lateral thruster driver

A new driver for lateral thrusters has been designed. This driver allows control the motors in both directions, obtaining a better turn radius of Guanay II. For this purpose is designed a full bridge controller for each lateral thruster. The specific IC has been chosen is DRV8432, a dual full bridge from Texas Instruments. Figure 1 shows PCB prototype of this system.

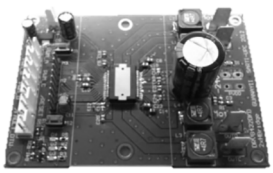

Fig. 1 DRV8432 dual full bridge driver for the two lateral thrusters

D. Ballast system

A new system for buoyancy and tilt adjustment has been added. This system consists of a mobile carriage in the bottom of the vehicle shell. Changing the weight of the carriage and position will change the buoyancy and inclination. A payload also can be added.
In the other hand, a new buoyancy module has been developed, using hard polyurethane capable of supporting high pressures.

III. RESULTS

All systems have been tested in the laboratory and in field. Figure 2 shows the output of thruster driver. Two signals can be seen, one with duty cycle of 80% (18.3V of mean voltage) and one with duty cycle of –80% (-17.8V of mean voltage). These signals can drive the thrusters in both directions.

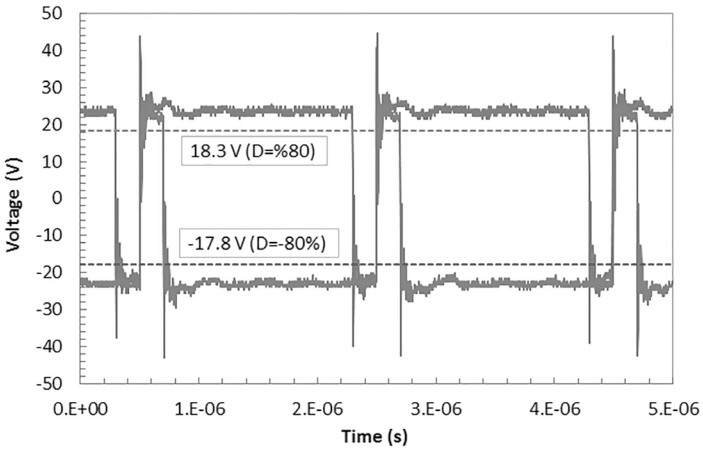

Fig. 2 Signals for the two laterals thruster driver

IV. Conclusions

All of new contributions have been tested in the laboratory and in the field, obtaining good results in both cases. Results show that the new contributions improve handling and performance of the vehicle.

REFERENCES

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