

HOMEMADE ROVs – MAKE YOURS OWN

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Abstract

Remote Operated Vehicles (ROVs) are a useful tool for inspection and sample collection in coastal areas and ports, but their main limitation for an extensive use is their high cost.

Based in handy material, available in local stores, it can be build a ROV fully operative, with the specification that user needs. The total cost of a homemade ROV is between 80 and 400 euros, variable according to installed accessories. The vehicle limitation will be the ability on the construction and seawater pressure. These ROVs can be used only in the first meters of the water column, but it can be coupled different accessories as camera or a robotic arm with the same applications than commercial ones with a price one thousand times lower.

Keywords

ROVs, economic, handy material, own production.

INTRODUCTION

Marine technologies and underwater vehicles have a limited distribution and use at oceanographic research due to their high cost. Few groups can use these systems on their research activities and for small companies underwater vehicles are inaccessible equipment due to their high price.

Specifically remote operated Vehicles (ROVs) are a useful tool for inspection and sample collection in coastal areas and ports, but their high price makes that their use were very limited.



Fig. 1. Own production ROV (without accessories)

Three years ago started in the Oceanic Platform of the Canary Islands (PLOCAN) an educational project called “Taller ROV” (ROV Workshop). It is the building of an underwater remote operated vehicle (ROV) by secondary school students from handy material, as PVC tubes, wood, wires or small motors [1-4].

PLOCAN has developed during this period a virtual training platform, books and videos to make easy the building of the ROV ([5-7]). With the support of a sponsor (Obra Social “la Caixa”), PLOCAN provides to educational centers assigned to the project, a material kit (with a cost around 80 euros each), building manual and access to training platform (open to anyone interested). It has been built more than 140 ROVs with the participation of 1500 students.

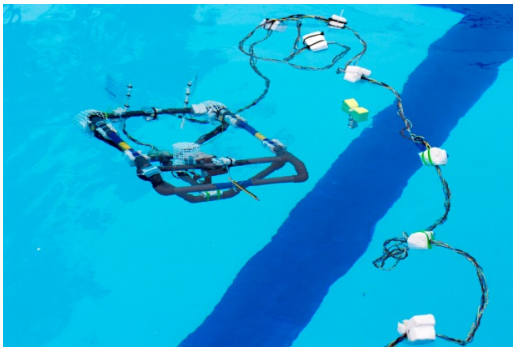
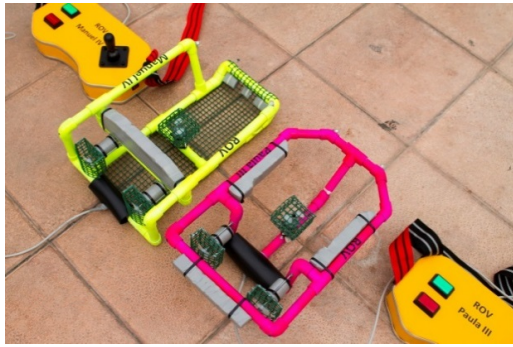


Fig. 2-3. ROVs examples made by secondary school students

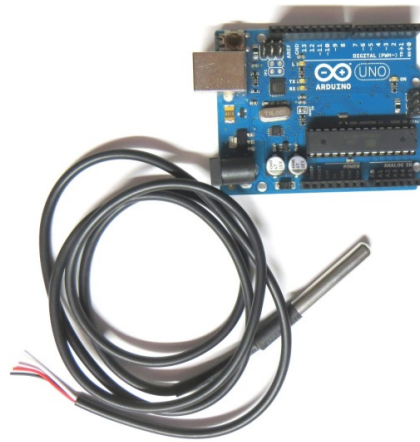


Fig. 4. Arduino microcontroller and temperature sensor accessory

RESULTS

The project has had high impact on the student, teachers, but also in other sectors related with technology and specifically in marine and maritime technology.

The idea of building a ROV with a price lower than 200 euros (camera not included in the budget), has developed a new parallel project with research aims, including to the work group some specialist in Arduino. *Maker space* members have been involved also to the project, but not only with educational objectives, but also to build up fully operative ROVs with a low price.

The ROVs can be controlled by a console connected with a network cable to three motors (one vertical and two for horizontal movement), it let a better control and power; but it can be done cordless by bluetooth. Motor isolated, cable connection, control console, and other details needed for the construction can be obtain from the instruction manual made for the students [5-7], but introducing the needs that each researcher can have.

The installation of a camera it is basic for any application, being recommended the use of real time images. In this project it was installed to the ROV a car camera, made for parking assistance.

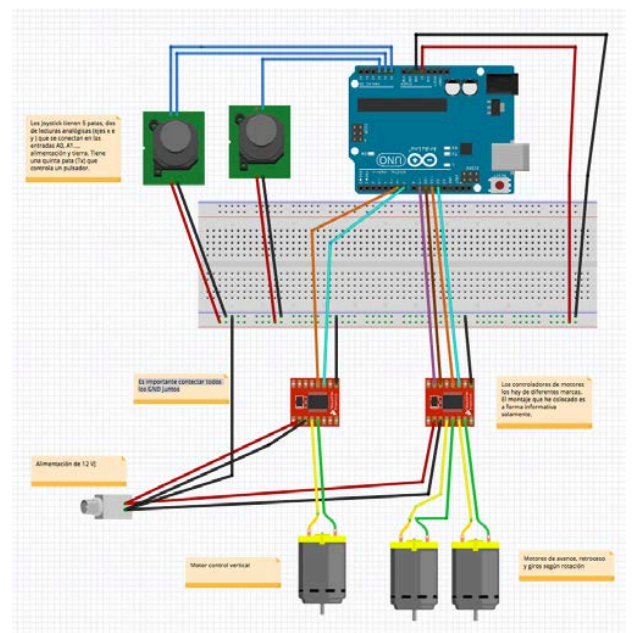


Fig. 5. Use of Arduino for the control of the vertical and horizontal motors (squema from IES Tony Gallardo)

The use of 3D printers and the increase of the numbers and applications of Arduino accesories give the opportunity to develop prototypes and own design with high quality finished.

An operating and useful ROVs it can be built for anyone, including non-specialist on technology or electronic using economic materials with low total cost.

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