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Advances in the Development of a New Medium Depth Underwater Glider

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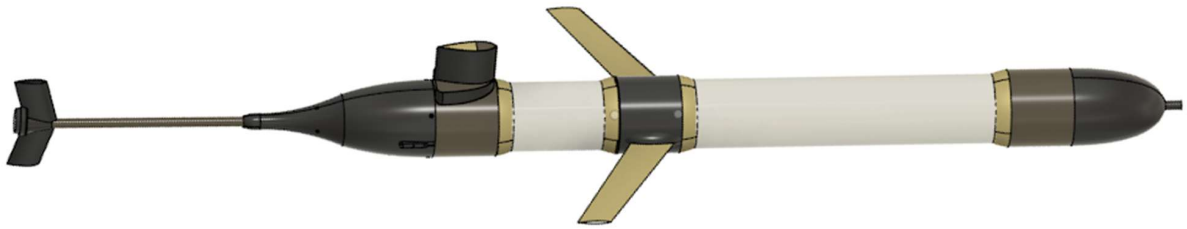
Abstract – Ocean exploration is becoming more and more demanding, especially with respect the technology required for surveying medium deep ocean zones. The exploration of zones between 1000 and 2500 m especially challenging due to the difficulty associated to place instruments and sensors in such deep areas. For closing the gap of knowledge in these areas, a new medium size underwater glider has been developed for allowing toe to reach most areas of the occidental mediterranean basin. The vehicle is designed to reach 2500 m of depth that allows it to reach mostly all seafloor zones in this area. Different tests have been conducted to validate the capability of the vehicle for conducting long term survey and experiments. In addition, due to the modular configuration of the vehicle, it is suitable to include different sensors or user ad-hoc instruments with a minimum process of adaptation, which provide the vehicle with an additional grade if versatility and usability. In this paper, the description, and features of the vehicle as well as the result of the last tests in the real environment are presented.

Keywords *– underwater glider, AUV, ocean exploration., marine robotics.*

I. MAIN DESIGN NEW OF A NEW VERSION OF THE GLIDER VEHICLE

The present design of the vehicle is an evolution of previous design of the Alba series of underwear vehicles carried out by then author. This series of vehicles started in 2014 with the first version of the Alba 14. The vehicle was intended for carrying test and demonstration of the operability of the different subsystems [1].



II. NAVIGATION CONTROL SYSTEM

The design is based on off the shelf components to allow their quick replacement and easy vehicle replication. The moderate resolution and accuracy of IMU and underwater direct velocity measurements are compensated with AI based protocol in dynamic vehicle estimations applied during the underwater navigation of the vehicle in absence of GPS signal.

Aligned with the interest in in multiagent survey schema ocean survey [2], the results of real field test promised the accuracy in long term mission. In such a mission a moderate cost is an important figure of merit in order to allow simultaneously multiple vehicle deployments in extended or mesoscale areas for the synchronous monitoring of oceanographic parameters or other studies.

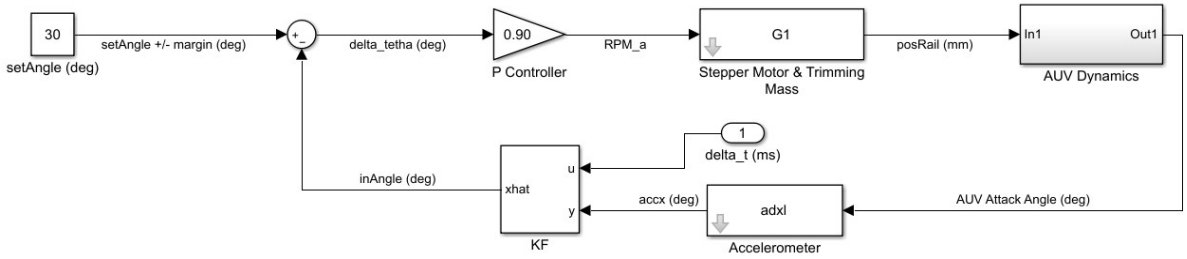


Fig 1. Essential functionality and configuration for the attitude control of the vehicle

Fig 2. First test of the first version of the Alba glider vehicle showing the capabilities of the hybrid buoyancy engine system incorporated in the last version of the glider

Main features	Value 1	Tested In
Maximum depth	2500 m	2024 (1000 m)
Vehicle Length	2.35 m	--
Weight	35-55 Kg	
Propulsion mode	Hybrid gliding	--
Range	1500 Km	2024

Table 1. Vehicle main features

III. CONCLUSIONS

The development of the alba22 glider has showed the capability of such vehicle to reach medium depth ocean areas for conducting different kind of ocean survey. The present applications of the vehicle have been focused on the application and goals of the project EU LIFE project INTEMARES, devoted to demonstrating the feasibility of application of this innovative design in combination with other technologies for surveying and monitoring ocean protected areas in all the mediterranean western basin.

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