ID6- IMPROVING OCEAN-GLIDER'S PAYLOAD WITH A NEW GENERATION OF SPECTROPHOTOMETRIC PH SENSOR

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Abstract- *Ocean gliders have clearly become nowadays useful autonomous platforms addressed to measure a wide range of seawater parameters in a more sustainable and efficient way. This new ocean monitoring approach has implied the need to develop smaller, faster and more efficient sensors without reducing key features like accuracy, resolution, time-response, among others, in order to fit the glider operational capabilities. This work is aiming to present the latest development stages of a new spectrophotometric pH sensor, its integration process into a Wave Glider SV3 platform and the preliminary results derived from an offshore mission performed in subtropical waters between the Canary Islands and Cape Verde archipelagos*

Keywords- *Glider, ASV, sensor, ocean, marine.*

1. INTRODUCTION

The overall goal of this challenging initiative is to improve ocean-observations capacity in the area of interest by using cutting-edge technologies in a cooperative and synergistic way between partners from different disciplines, by using new and existing resources provided by ongoing projects and initiatives at regional, national and international level, in order to cover the widest number of specific and common needs and requirements from each one of them, as well as additional stakeholders joining the initiative at a later stage. The work is done in the framework of H2020 AtlantOS EU- Project. It is a BG 8 (Developing in-situ Atlantic Ocean Observations for a better management and sustainable exploitation of the maritime resources) research and innovation project that proposes the integration of ocean observing activities across all disciplines for the Atlantic, considering European as well as non-European partners, such as The Oceanic Platform of the Canary Islands (PLOCAN) and the Center for Marine Environmental Sciences (MARUM). PLOCAN is a Research Infrastructure labelled by the ICTS (Unique Scientific and Technological Infrastructure) Spanish National Roadmap. It is a multi-purpose technicalscientific service infrastructure that provides support for research, technological development and innovation in the marine and maritime sectors, available to public and private users. The main purpose of MARUM is achieving a better understanding of key processes in the marine environment in order to provide information for sustainable use of the ocean. MARUM studies past and present environmental changes from coast to deep ocean at a global scale. Processes at and below the sea-floor are a special research focus.

II. MATERIALS AND METHODS

To achieve these objectives, PLOCAN and MARUM have explored the operational capabilities of the Wave Glider SV3 manufactured by the company Liquid Robotics to use the platform as a test-bed for new sensor developments, always in line with the end-user's goals for every single mission. These autonomous surface vehicles are the best option to perform this task, as base their propulsion on external factors such as wave motion, its real-time communication availability, it is always visible on the sea surface so always ready to transmit and receive satellite communications and it is equipped with solar panels, this way the vehicle can power all its systems and payloads by this mean [1]. The surface part (Fig. 1) is a versatile platform equipped with GPS, Iridium satellite communication systems and payloads with state-of-the-art ocean sensors to monitor the environment around it. On this occasion, the sensor installed in there is the Turner C3 fluoremeter to measure chlorophyl, turbidity and oil data. The sub part of the glider is tethered under the sea by a 6 m umbilical cable. It has articulated wings that vary its position with the sea motion propelling the vehicle so it does not need refuelling and is fully free of emission, encouraging the use of sustainable energy [2] A submarine payload has been developed to integrate a set of brand new basic sensors. It is enclosed in a custom subsea housing physically attached to the Wave Glider sub part and is powered and communicates with the float through the Wave Glider umbilical

Fig. 1. Wave Glider SV3 around PLOCAN facilities.

cord. It has neutral buoyancy and has been designed to minimize drag (Fig. 2). The sensors integrated in this payload are, a Seabird GPCTD for measuring conductivity, temperature and pressure, Seabird 43F for dissolved oxygen and a new generation of spectrophotometric pH sensor design by SensorLab. The pH

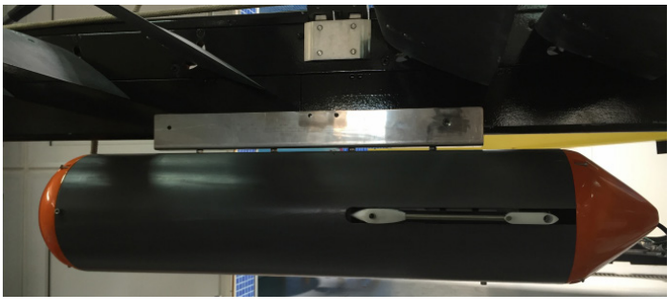

Fig. 2. Submarine payload design by SensorLab.

sensor is a SensorLab SP200-SM, a high accuracy and low drift sensor capable of very long deployments. All of this sensors will be connected through a parallel telemetry system, probably Iridium Rudics to a data logger with several web services to improve the data processing and storage. On the long run, it is expected the integration of further and innovative sensors, like an ADCP or a dust sampler developed by MARUM with the purpose of developing new lines of research.

III. EXPECTED RESULTS

PLOCAN and MARUM have been working on sensors integration into the Wave Glider during 2016 from January to March. In addition to the various laboratory tests that have been performed to verify the proper development of the whole process, couple of acceptance tests in saltwater have been conducted both in a confined tank located at PLOCAN land facilities and offshore in the test-site area placed in the East coast of Gran Canaria Island. Before long it is expected to carry out a biochemical science mission of several days in subtropical waters between Canary Islands and Cape Verde archipelagos in order to check the system in real conditions. Based on the results of this test mission, some other public and private stakeholders from marine and maritime sectors could be interested in joining further missions.

REFERENCES

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