

A novel and multi-purpose ASV for the Basque Coast: design, experimental testing, and main challenges

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Abstract - Autonomous Surface Vehicles (ASVs) have become a powerful tool for marine research due to their capability to make observations over a wide range of temporal and spatial scales. ASVs provide accurate, high-resolution, continuous data, benefiting environmental monitoring by decreasing the costs when compared to fully manned vessels. In the framework of Oarsoaldea Blue Hub project, a 6 m length electrical ASV equipped with acoustic sensors for measuring water currents and fish biomass has been designed and developed as a solution for more efficient oceanographic observations in the coastal area.

Keywords - Autonomous surface vehicles, marine monitoring, Basque Coast

I. MOTIVATION

Oarsoaldea Blue Hub project seeks the development of an observatory in the Port of Pasaia (Spain), which will provide Marine Ecosystem Data (both historical and in real time) to tackle the needs associated with integrated coastal management. The adoption of new technologies is changing the way ports operate, driving new efficiencies and creating an advanced ecosystem that will eventually span the entire supply chain. For this reason, the Oarsoaldea Blue Hub project is firmly committed to promote the blue economy in the area, betting on the development of information and services oceanographic observation based on autonomous observing technologies, including autonomous underwater vehicles and autonomous surface vehicles (AUVs and ASVs, respectively). The data for the Oarsoaldea Blue Hub should be used to respond to needs in the areas of fishing activity management, the conservation and recovery of Biodiversity and Habitats, the challenges faced by Climate Change and Global Change, the implementation of Policies and Directives on the management of the marine environment, in particular, the European Marine Strategy Directive (DEME) and, in general, the integrated management of coastal zones.

II. RANGER PROTOTYPE DEVELOPMENT AND FIELD TESTS

Despite the benefits and capabilities of ASVs, their uptake for research purposes is still limited due low consumer confidence and barriers from legal and regulatory frameworks. There remain also complex challenges from a technical perspective. In terms of navigation, experimental field testing has been identified as a prerequisite and crucial step to ensure a safety performance of ASVs. In this work, we present the design and testing process of the RANGER, a novel and multi-purpose ASV, with a modular sensor payload devoted to marine environmental monitoring. Two field testing campaigns in the Basque Coast are planned to assess the feasibility of the RANGER and its performances in terms of operation, scientific equipment, and communications. Aspects related with the compliance with the regulatory guidelines for operating autonomous platforms particularly in coastal areas are also discussed.