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Seminar

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Title

Acquisition of geophysical/oceanographic data using autonomous vehicles: a tool for marine geology, oceanography and environmental studies in ISMAR

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Abstract

The fast ongoing progress in the field of the "open content" technologies, i.e., those hardware and software resources designed and offered to a wide community by people belonging to the open-source culture movement, strengthen and fostered by the availability of low-cost, highly-performing electronic devices, is creating a "revolution" in the world of applied sciences. This is particularly true for waterborne geological-geophysical data acquisition in shallow–water environments, such as marine coasts, lagoon, lakes and rivers, sites that preserve, in general, relatively continuous recent geological records. We present some examples of geophysical data acquisition in different shallow-water environments carried out by means of *OpenSWAP*, a new class of Autonomous Surface Vehicle (ASV) entirely developed in ISMAR in cooperation with Proambiente. These vehicles are equipped with different transducers providing high-resolution images of the sediment-water interface and the subbottom, and are ready to easily install other instruments, such as current meters, water samplers, as well as physical and chemical sensors. First tests indicate that they can be employed to collect densely-spaced grids of high-resolution data, quickly, efficiently, and at a very low-cost, even in those area not accessible through conventional systems. Main characteristic of *OpenSWAP* vehicles, is their ability to follow pre-defined routes with high accuracy, within decimeter errors in acceptable meteo-marine conditions. These performances open the door to 4D, repeated surveys, which constitute a powerful tool to study rapidly changing environments, characterized by active sediment dynamics (erosion vs deposition), slumps and gravitative failures, earthquakes (slip along seismogenic faults and secondary effects of shaking), tsunamis, etc. The low cost and the "open" HW/SW architecture of these systems lead for their use in small fleets, performing cooperative and adaptive surveys.

Keywords: *Autonomous Surface Vehicles (ASV), Open Technologies, Marine Geology, Oceanography, Coastal Management, Geophysical Techniques*

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