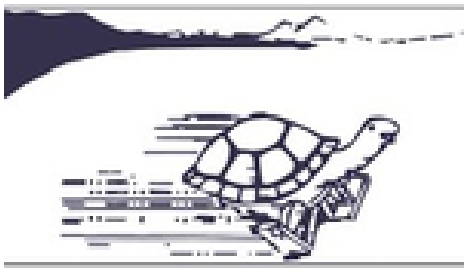

Contribution ID: **38** Type: **Paper**

Advance speed-hull-Pump-Jet interactions in small ASV

Friday, 16 October 2020 12:45 (30 minutes)

This paper is related to the technological development of an innovative small-size Autonomous Surface Vehicle designed to meet the requirement of accessing, monitoring and protecting the shallow waters peculiar of the Wetlands. Surveys in these peculiar environments is reduced due to the absence of suitable tools expressly addressed to work in extremely shallow waters. The first prototype of a fully electric, modular, portable, lightweight, and highly-controllable Autonomous Surface Vehicle (ASV) for extremely shallow water and remote areas, namely SWAMP (Shallow Water Autonomous Multipurpose Platform), was developed by CNR-INM and DITEN-Unige. This catamaran is equipped with four azimuth Pump-Jet modular (PJM) actuators expressly designed for small-size (1 to 1.5 m long) ASV. The main advantage of Pump-Jet thrusters is that they are flush with the hull, thus minimizing the risks of damages due to possible grounding. This system is used to increase the manoeuvrability in narrow spaces and to increase the spacial resolution also in extremely shallow waters. The knowledge of the hydrodynamic characteristics of the thruster and of the vessel allows to partly or fully identifying the vessel for a better controllability. With this aim a series of tests have been conducted in the DITEN towing tank. In particular advance resistance on the SWAMP hull in deep and shallow water and bollard pull and self-propelling tests with the PJM working have been conducted. The results of the tests with the effects of advance speed on the PJM performance is reported in this paper together with the description of the modelling of the thruster itself and the results of at-sea self-propelling tests.

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Session Classification: Propulsion, Ship Machinery