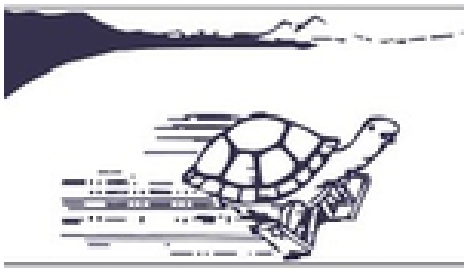

Contribution ID: **37** Type: **Paper**

# Design of a close power loop test bench for contra-rotating propellers

*Friday, 16 October 2020 12:15 (30 minutes)*

The aim of the research is to study an azimuthing contra-rotating propeller with a power of 2000 kW. The topic is very useful because the azimuth thruster solutions currently do not find commercial applications in naval units for passenger transport because not very hydrodynamic efficient. The thruster system is studied especially to be installed on High Speed Crafts (HSCs) for passenger transport with a cruising speed of about 35-40 knots. The study is interesting because among the advantages that these solutions provide are the possibility of transmitting very high torques and to guarantee a much longer life cycle. In more detail, the propulsion is design by using a C-drive configuration, with a first mechanical transmission realized by using bevel gears mounted in a frame inside the hull, and a second transmission realized by bevel gears housed in a profiled hull at the lower end of a support structure. In the profiled hull will be installed the shafts of the propellers, in a contra-rotating configuration. In order to optimize the system before its industrial use, a close power loop test bench has been studied and designed to test high power transmissions. The test configuration allows to implement a back-to-back connection between two identical azimuthing contra-rotating propellers. Moreover, the particular test bench allows to size the electric motor simply based on the dissipated power by the kinematic mechanisms. Since the efficiency of these systems are very high, it is not necessary to use large electric motors, thus managing to contain the operating costs of the testing phase. The most significant disadvantage is the need to have two identical transmissions with consequent increase in installation costs. Through the back-to-back test bench it is possible to study the increase in efficiency compared to traditional systems.

**Primary authors:** Dr GIALLANZA, Antonio (University of Palermo); Mr MORACE, Ferdinando (Liberty Lines Spa); Dr MARANNANO, Giuseppe (University of Palermo)

**Presenter:** Dr GIALLANZA, Antonio (University of Palermo)

**Session Classification:** Propulsion, Ship Machinery