PRELICA (Advanced methodologies for hydro-acoustics design in the naval propeller.)

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1 Introduction.

Generation and propagation of hydrodynamic noise in maritime environment is an active research field of investigation due to its own impact on several numbers of engineering applications including among others, the maritime propeller design (add.picture).

A key point is the reduction of underwater noise induced by shipping activities to protect the maritime fauna (the ecosystem life). For instance, in [2], preliminary results of a numerical study for noise prediction of a benchmark propeller in open water/ uniform flow conditions is presented. The main aim of this study is to predict propeller hydro-acoustic performance under cavity conditions.

2 What's PRELICA?

PRELICA (Advanced methodologies for hydro-acoustics design in the naval propeller) was a project co-financed by the European Regional Development Fund, Fruili Venezia Gulia (FVG) region located in Trieste (Italy) in 2014 -2020. The stressed on the development of innovative numerical tools and methodologies aimed at improving prediction of the underwater noise radiated by ships propeller since the early design stage. In this project two SMEs (Small and Medium-sized Enterprises) were involved: IFLUIDS and ENGYS. In addition, the University of Trieste, SISSA and the wide enterprise CETENA.

The starting point of this experimental research was the potsdam propeller test case (PPTC) made available by the SVA (Schiffbau-Versuchsanstalt). Among many methodologies such as RANS, LES and DES. LES are recognized from scientific community as the best models for prediction of hydrodynamic noise especially for the one originated from turbulence [1].

References

[1] Angélique Delafosse, Alain Line, Jerome Morchain, and Pascal Guiraud. Les and urans simulations of hydrodynamics in mixing tank: comparison to piv experiments. *Chemical Engineering Research and Design*, 86(12):1322–1330, 2008.

[2] Savas Sezen, Mehmet Atlar, Patrick Fitzsimmons, Noriyuki Sasaki, Giorgio Tani, Naz Yilmaz, and Batuhan Aktas. Numerical cavitation noise prediction of a benchmark research vessel propeller. *Ocean Engineering*, 211:107549, 2020.