Contribution ID: **106** Type: **Paper**

Hydrodynamic noise from a propeller in open sea condition

Friday, 22 June 2018 15:00 (15 minutes)

In the present work simulations of an isolated marine propeller are carried out using Large Eddy simulation and the acoustic field is reconstructed by applying the advective Ffowcs-Williams and Hawkings equation. We reproduce a propeller well studied in literature (https://www.sva-potsdam.de/en/potsdam-propeller-test-case-pptc/) for a single value of the advance ratio.
We use the dynamic Lagrangian model for the closure of the subgrid-scale stresses and a wall-layer model to skip the resolution of the viscous sub-layer. A grid of about 5x106 cells is used for reproducing accurately both the stresses over the propeller and the wake, the latter responsible of quadrupole noise. The equations are solved in a fixed-to-the-body frame of reference.
The different noise generation mechanisms are investigated separately. Thickness and loading terms are related to the propeller shape and velocity, they provide significant pressure disturbance in the near field. The quadrupole noise component is obtained by integrating either the volume surrounding the propeller or an external permeable surface. Its contribution is investigated in relation to the presence of vortex persisting in the wake. A discussion of the results will be included in the paper.

Primary author: Mrs CIANFERRA, Marta (University of Trieste)

Co-authors: Dr PETRONIO, Andrea (IEFLUIDS s.r.l.); Prof. ARMENIO, Vincenzo (University of Trieste)

Presenter: Mrs CIANFERRA, Marta (University of Trieste)

Session Classification: Hydrodynamics

Track Classification: Numerical & experimental hydrodynamics