



NEWSLETTER 4

LINCOSIM: A VIRTUAL TOWING TANK FACILITY FOR THE E-SHYIPS PROJECT

The e-SHYIPS project aims to define the new guidelines for an effective introduction of hydrogen in maritime passenger transport sector and to boost its adoption within the global and EU strategy for a clean and sustainable environment, towards the accomplishment of a zero-emission navigation scenario.

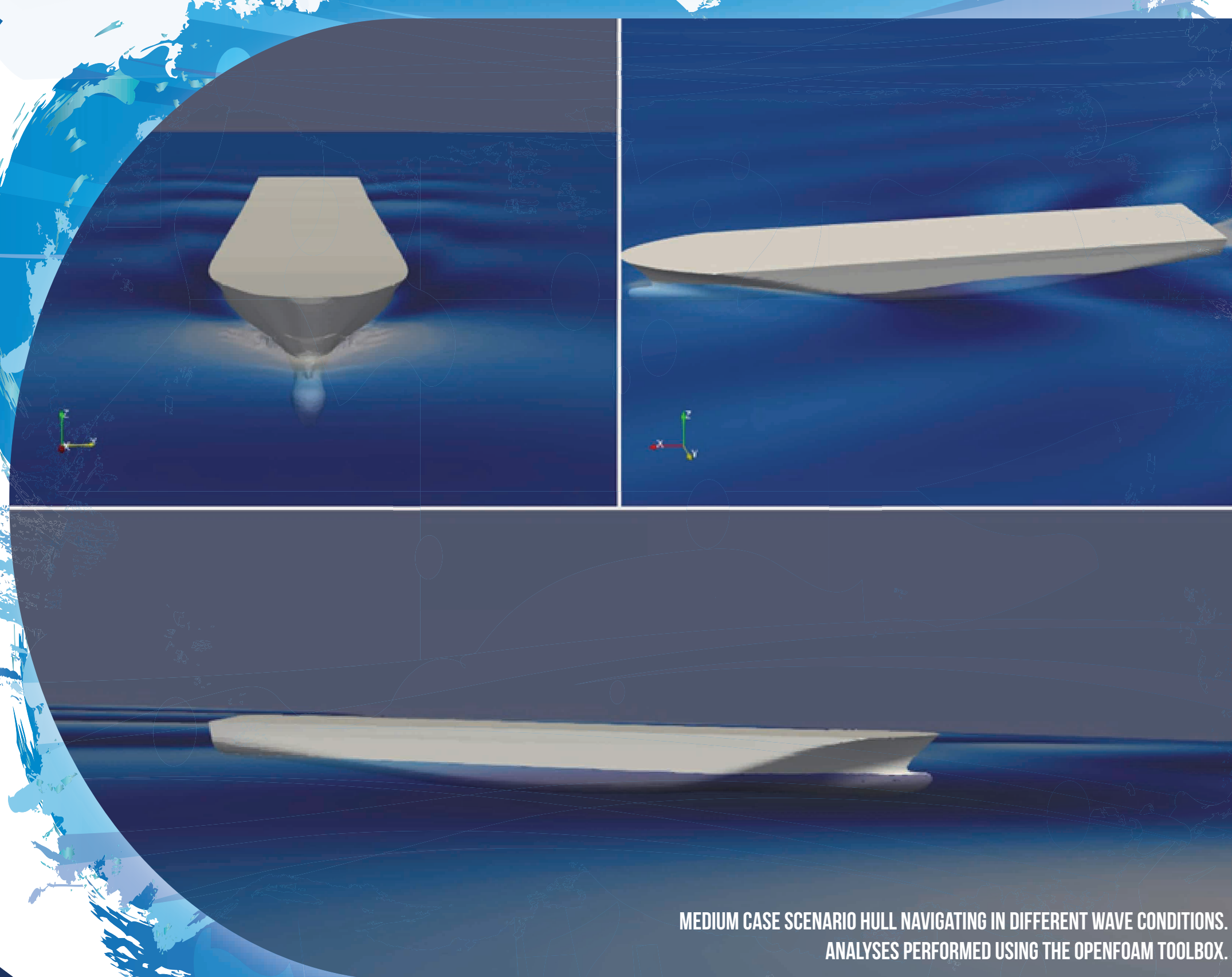
One of the main open points to the adoption of hydrogen in maritime passenger transport sector is related to the ability of evaluating in advance the ship performances in calm water and in waves. With this target in mind the project has been designed to have a fully virtual approach, in order to gain a large quantity of data on a wide set of case scenarios, in a reasonable time.

CINECA partner is involved in the implementation of the CFD modelling platform, named LincoSim, that represents the virtual towing tank of the project.

LincoSim has been developed and validated to study hull performances in calm waters [1-4]. To take advantage of the large availability of computational resources within the **CINECA HPC cluster**, **LincoSim has been designed to use a software stack fully based on open-source software's**. The computational/numerical engine is based on the **OpenFOAM toolbox**.

A deep refactorization activities has been planned within the e-SHYIPS project, and it is still ongoing, to allow for an effective support of the modelling of hull in waves.

The virtualized experimental campaign based on the adoption of the LincoSim platform utilities **is planned to start at the end of this year, while preliminary tests of hull in waves have been already performed** to assess the feasibility of the required analysis.



REFERENCES

1. Salvatore, Francesco; Ponzini, Raffaele; LincoSim: a web based HPC-cloud platform for automatic virtual towing tank analysis, Journal of Grid Computing, 17, 4, 771-795, 2019, Springer.
2. Salvatore, Francesco; Ponzini, Raffaele; Arlandini, Claudio; Improving the productivity of hull designers with HPC in the cloud: the LincoSim experience, 2019 IEEE International Conference on Systems, Man and Cybernetics (SMC), 2077-2082, 2019, IEEE.
3. Ponzini, Raffaele; Salvatore, Francesco; Begovic, Ermina; Bertorello, Carlo; "Automatic CFD analysis of planing hulls by means of a new web-based application: Usage, experimental data comparison and opportunities", Ocean Engineering, 210, 107387, 2020, Pergamon.
4. Salvatore, Francesco; Ponzini, Raffaele; Duque, Javier Hernández; Reinaldos, Cristian Alcántara; Soler, Jordi Mas; CFD analysis of a multiplatform catamaran by means of a web-based application: Experimental data comparison for a fully automated analysis process, Applied Ocean Research, 116, 102886, 2021, Elsevier.

EUROPEAN CEN-CENELEC PLENARY MEETING

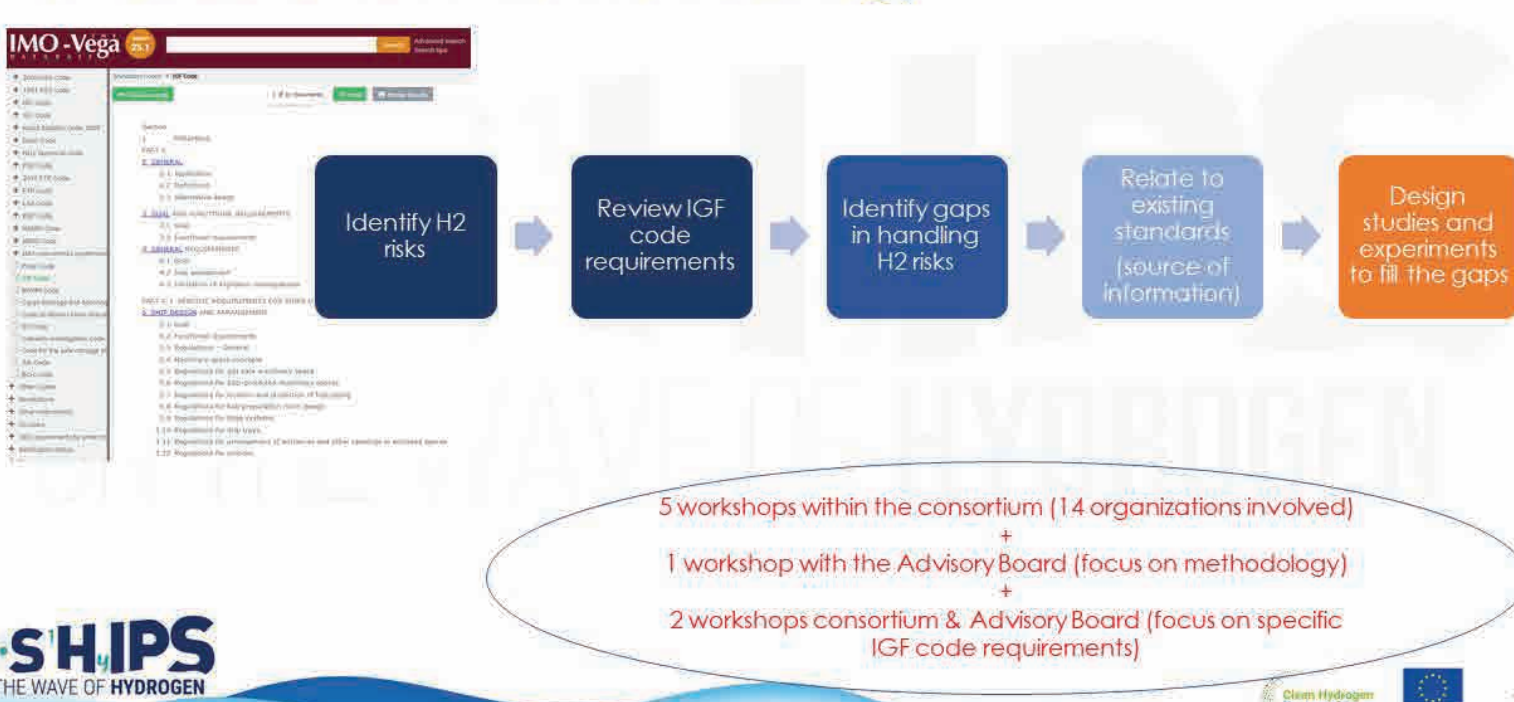
On **June 22nd**, it was held virtually the plenary meeting of the **European CEN-CENELEC Joint Technical Committee 6 'Hydrogen in energy systems'** which is dealing with devices and connections for the production, storage, transport and distribution, measurement and use of hydrogen from renewable energy sources and other sources. The technical committee is chaired by **Dr. Bernard Gindroz** which is also involved in **e-SHYIPS Advisory Board**.

During this plenary meeting aimed at promoting a discussion among the technical experts, UNI, the Italian Standardization Body, in collaboration with Politecnico of Milan and DNV GL, has had the opportunity to present e-SHYIPS.



It was firstly presented an overview of the project with its main pillars and then the activities run for the review of the IGF Code, the International Code of Safety for Ship Using Gases or Other Low-flashpoint Fuels aimed at providing an international standard for ships, other than vessels, operating with gas or low-flashpoint liquids as fuel.

IGF code review: the methodology



In particular, **UNI has presented the methodology used for the review of the IGF Code and the preliminary considerations emerged from the analysis in terms of hydrogen hazards, common causes and consequences.**

The plenary meeting, attended by experts from all over Europe, different types of organizations (consultancy, enterprises, non-profit, research centers), has been a very important experience to let technical experts be aware of what's going on in research projects, in particular when this may have potential relevant implications in terms of standardization activities.

Indeed, given the interest for the activities run in e-SHYIPS which may have potentially relevant standardization implications, **the Secretariat of the technical committee (NEN, the Royal Netherlands Standardization Institute) has invited UNI to join again a plenary meeting of the CEN JTC 6** when also the two incoming project documents deliverable "D1.3 State of the art of safety standardization framework" (expected by December 2022) and "D1.4 State of the art of safety technical framework and updated risk & safety assessment and plan" will be finalized.