



Sustainable HYdrogen
powered Shipping

sHYpS aims at supporting the decarbonization of the shipping industry, by developing a novel LH2 swappable storage solution, which can be adapted to multiple types of vessels, accelerating the transition to greener and more sustainable practices.

By pioneering hydrogen supply chain development and addressing safety needs, sHYpS is reshaping logistics by upgrading container technology to transform them into fuel tanks, enabling efficient hydrogen transportation.

sHYpS innovations include:

- Novel hydrogen swappable storage containers, easily loaded and unloaded onboard.
- Blueprint for a logistic network based on container swapping for green hydrogen delivery.
- Detailed design of modular containerized powertrains powered by optimized PEM Fuel Cells.

Want to know more?

Read this newsletter to discover the latest progress made within sHYpS!

Updates from the project!

Design of H2 aux. Systems and FSHS area

The LH2 tank storage area and the required connection box were defined from the very beginning of the project, with the aim to install the entire powertrain within a single main vertical zone of the ship (see Figure 1, Figure 2 and Figure 3), allowing widespread control on the system and limit possible escalation in case of failure.

The design of the space has been finalized after partial modification on the ship structure in order to be able to fit the handling system and all the ancillaries (ventilation, vent, inert, etc.) necessary to properly operate the alternative power plant.

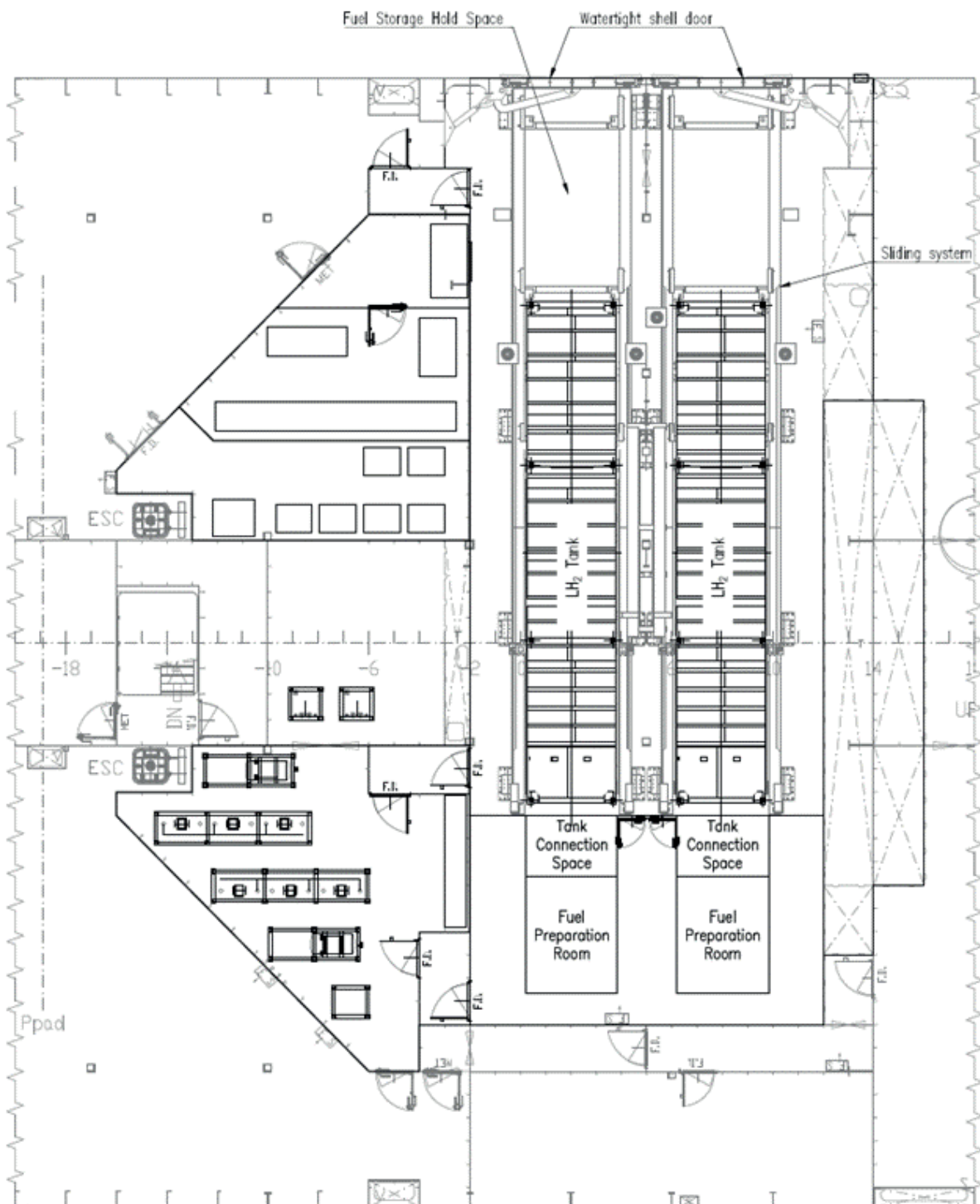


Figure 1 LH2 storage area and TCS room

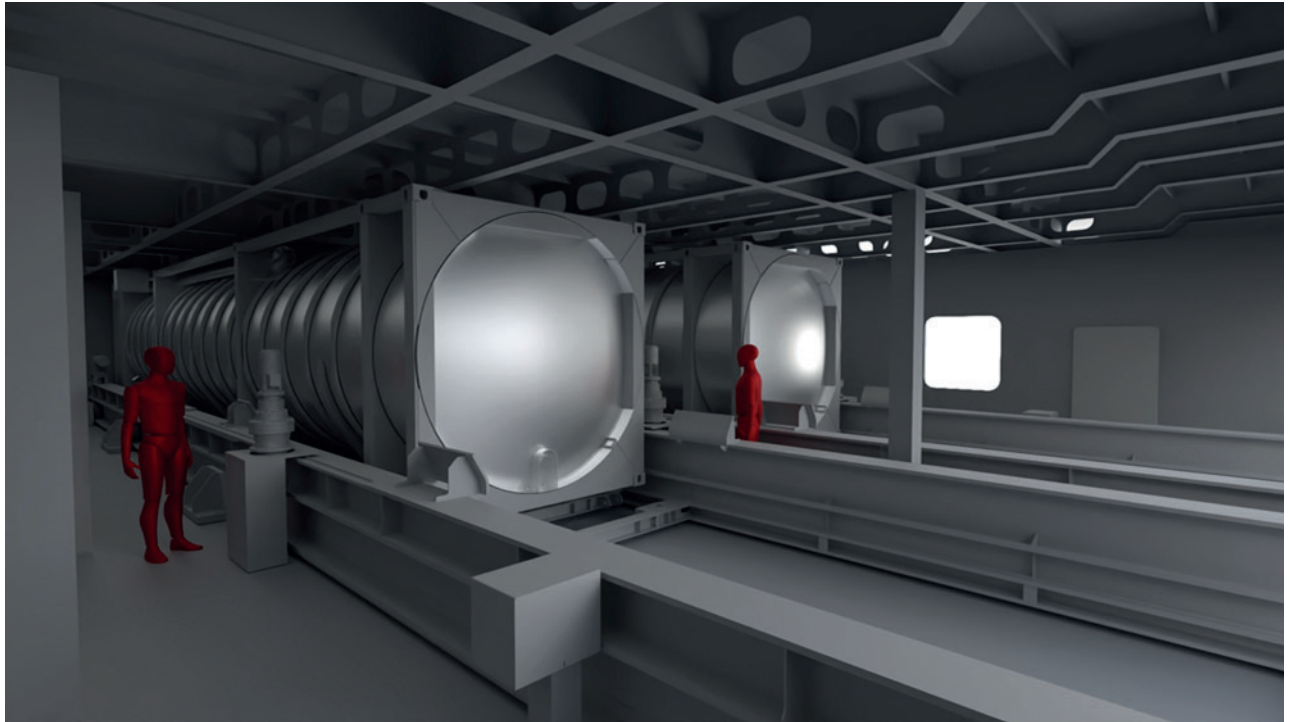


Figure 2 FSHS 3D view

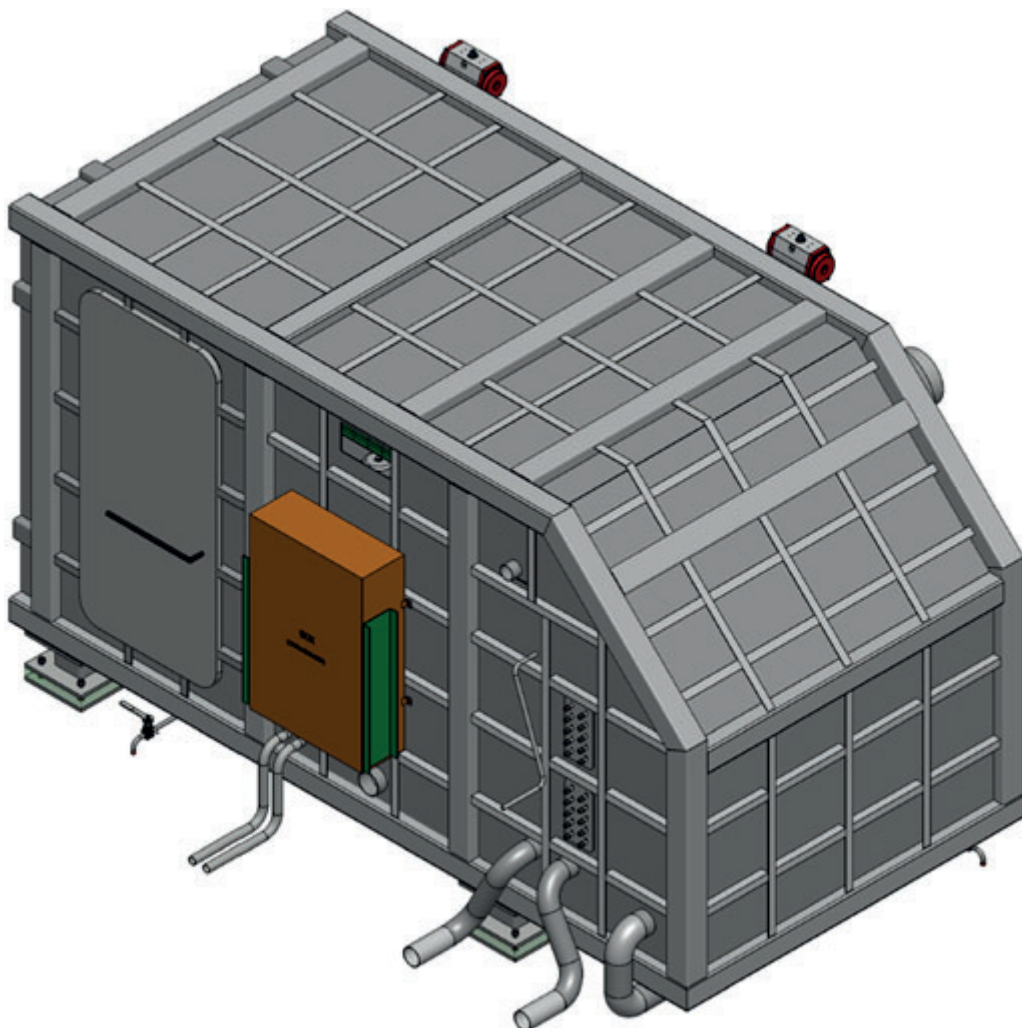


Figure 3 Connection box

The room and the systems in object have been developed to guarantee a high level of automation: the fuel storage hold space will be totally unmanned both during tank swapping and normal functioning, anyway the monitoring system (CCTV, sensors and transmitters) will always be activated and will allow the operators to closely monitor the operation of the plant.

Navalprogetti, together with involved partners and Class Society safety specialists, conducted a dedicated workshop to define and assess possible failure scenarios, in order to consequently implement the required mitigation measures: e.g. a CFD thermal assessment has been conducted to study the evolution of the cooling process in the remote case of a cryogenic leak. The outcomes (see extract on Figure 4) have been exploited for design optimisation and adequate means of protection were implemented.

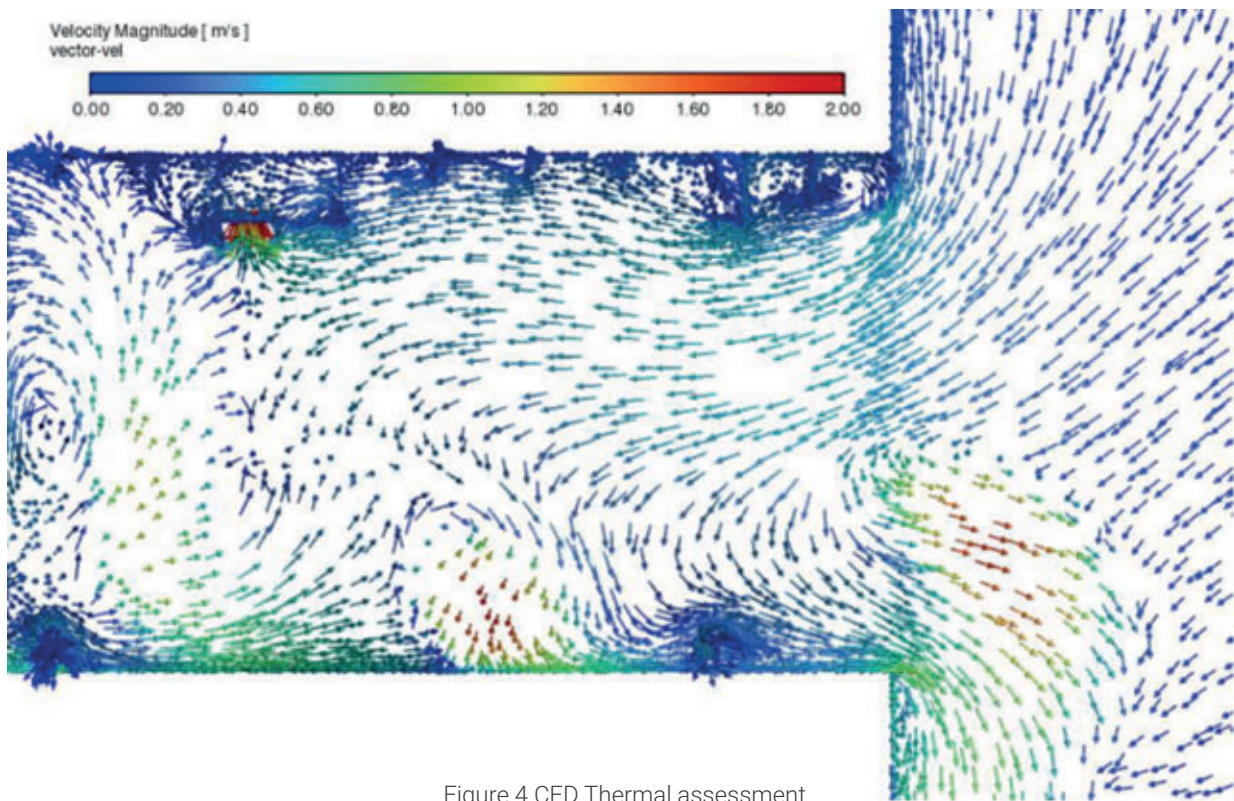


Figure 4 CFD Thermal assessment

Fuel cell module design completion

The Fuel Cell module design has been completed and reported in September 2023. All component specifications and required drawings for manufactured parts have been created, checked, approved and released for procurement. Parts have been ordered and received to allow inspection and preparation for module build. As part of the module design a full build book of assembly instructions have also been created to support the build process.

Fuel cell module building

Module build has been ongoing with good progress made against the build book requirements. Build has been impacted by some parts delays with intricate manufactured parts taking significantly longer to manufacture and supply, however the module is now approaching completion and preparations for transfer to the test environment are underway.

Completion of LH2 tank design

We completed the assembly of the TANK-TCS/FPR in the ship with all the components of the other WPs.

LH2 TANK and TCS/FPR: FEM analysis has been processed for the two components with good results. The design is almost completed. All the main items have been specified and approved by the Register.

The drawings for purchasing have been released. We are going to start procurement of the long LT items soon.

sHYpS showcased at the Transport Research Arena 2024

sHYpS joined the the Transport Research Arena (TRA), a major European event focused on transportation research and innovation. It serves as a platform for researchers, policymakers, industry professionals, and other stakeholders to exchange knowledge, share insights, and discuss the latest advancements in the field of transportation, including but not limited to: sustainable mobility, intelligent transport systems (ITS), urban mobility and smart cities, green transport and alternative fuels, transport infrastructure and planning, digitalization and automation in transportation, mobility as a service (MaaS), freight transport and logistics, road safety, aviation, maritime, and rail transport.

The conference, held in Dublin, Ireland, from 15-18 April 2024, included keynote presentations, panel discussions, technical sessions, poster presentations, and exhibitions showcasing innovative technologies and solutions in transportation, providing a valuable opportunity for stakeholders in the transport sector to collaborate, learn from each other, and shape the future of mobility.



CiaoTech – PNO Group participated in the event with its stand, serving as a project hub where the most important R&D projects in the field of transport, including sHYpS, in which PNO is currently involved, were showcased. Our colleagues from CiaoTech presented the innovative solutions of the sHYpS project to stakeholders and a broad audience, fostering connections with neighboring projects focused on waterborne transport.

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