

HySeas III

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Consortium Partners



University of
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Networked Energy Systems



BALLARD



INTERFERRY



Introduction

Not long after the first newsletter in July 2019, one of our Consortium partners, Ferguson Marine, entered into administration. Although the shipyard was nationalised by the Scottish Government and continued to work on HySeas III, it eventually emerged that the new entity would be unable to continue in the project due to resource constraints. We wish our colleagues at Ferguson Marine all the very best.

In March 2020, the Covid-19 pandemic struck and the ensuing lockdowns, travel restrictions and uncertainty significantly hampered the necessary reconfiguration of the project and the preparations for the assembly of the full-sized drive train for string testing.

The decision was taken to move the string test from Scotland to Norway, however this necessitated a search for a suitable site, and a completely new procurement exercise. After significant preparatory work on design of the site, including critical safety systems, the first components began to arrive on site in Ågotnes, Bergen, at the end of October 2020. Once all the equipment arrived, including the two fuel cell containers in February 2021, system integration and component commissioning work began though still disrupted by travel restrictions. The start of the string test was marked by a launch event on 1 Dec 2021.

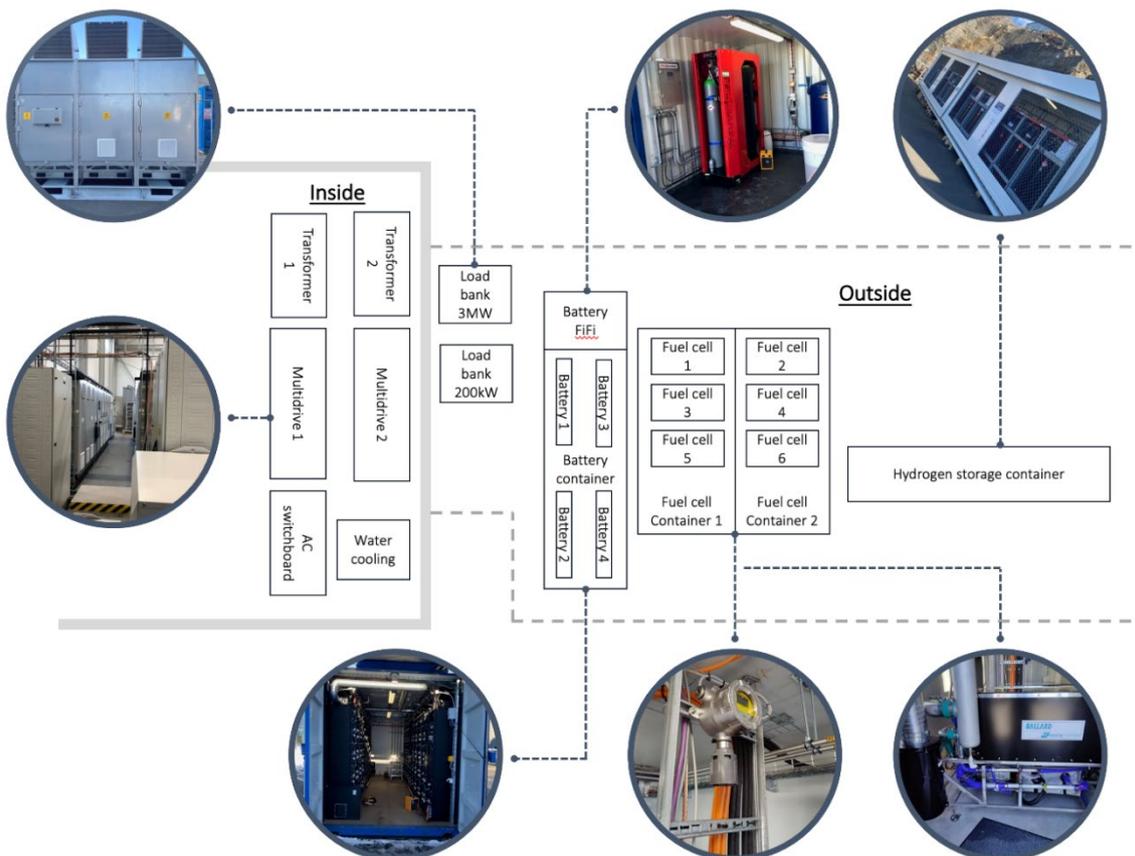
New partners were added to the consortium; Caledonian Maritime Assets Limited to take over the vessel design aspects in WP3 and Arcsilea Ltd to assist with communications and dissemination.

Site Construction

Construction of the string test site began to take shape with the arrival of equipment in October 2020. This was made up of equipment which was located outside the main building, which consisted of 2 fuel cell containers with 3 100 kW fuel cells each, a battery container with 720 kWh capacity, a container with battery firefighting equipment, a container with hydrogen storage cylinders together with the two load banks used to simulate the thruster loads.

Inside the building, there were 2 multidrives (containing the DC-DC converters), an AC switchboard, 2 transformers and a control room where the system could be monitored and controlled, and also including the critical action and alarm panel, which could be used for emergency shutdown of part or all of the system.

The figure below shows the overall layout of the equipment on site.



COP 26 – Nordic Pavilion

Thanks for Kongsberg Maritime, the HySeas III project was included in a Nordic Pavilion side event at COP 26, together with the Maersk McKinney Møller Center for Zero Carbon Shipping. Our coordinator Dr. Martin Smith was able to present the project to his fellow distinguished panelists and high level guests.



String Test Launch

An in-person launch event was held on 1 December at the PSW Power AS site where the propulsion string had been assembled. It was originally planned to invite attendees from many countries, as well as consortium members, but a spike in Covid-19 infections forced the event to be scaled back to mainly local Norwegian participants.

The event started with a recorded speech by the Scottish Transport Minister, Graeme Dey, followed by a technical presentation on the innovative hydrogen fuel cell and battery powerplant, as well as the new DC-DC system architecture and power management system developed by Kongsberg.

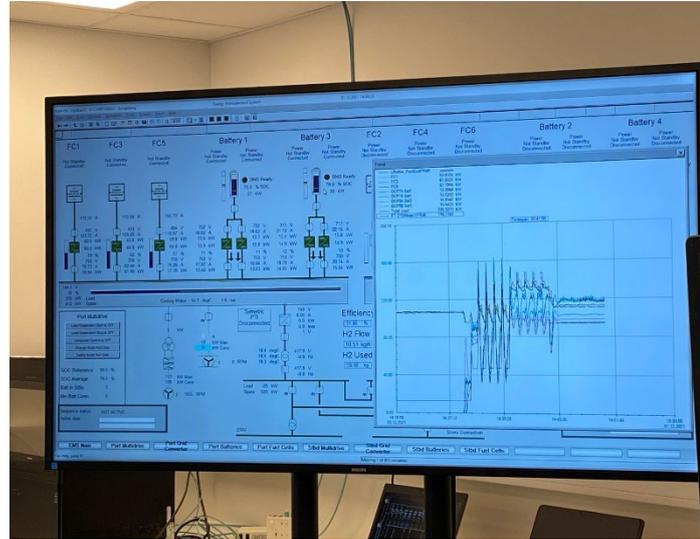
The participants were then invited outside to building to hear from the Kongsberg leadership, and Norwegian minister of Trade and Industry, Jan Christian Vestre who then pressed a button to start the fuel cell system. A guided tour of the site and the components was given to the enthusiastic minister, guests and media.



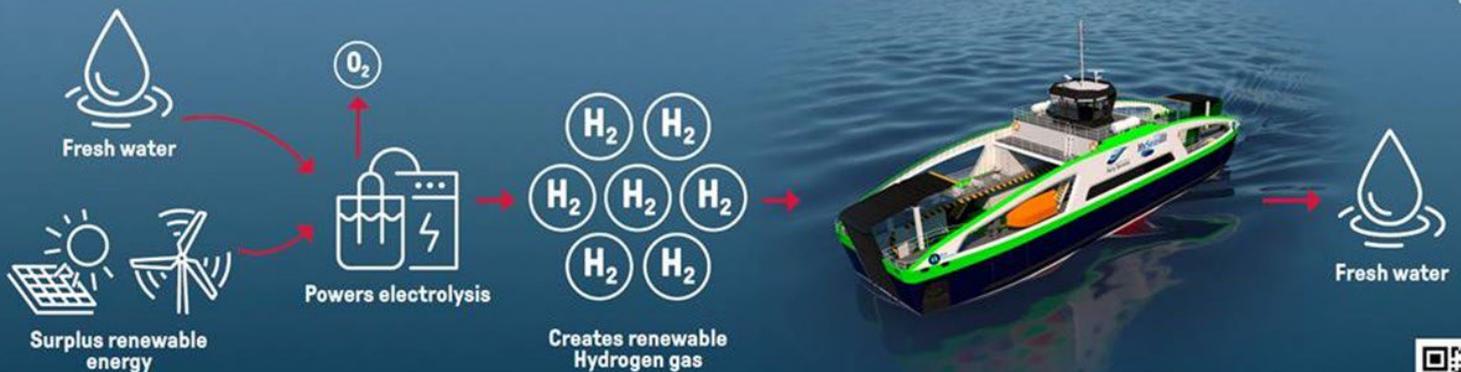
The system was run using the actual load profile of the Shapinsay ferry, which is also being used to run many of the tests. As can be seen in the picture on the right, this load profile includes a manoeuvring segment which requires extremely quick responses from the fuel cell and battery system.

As the launch event could only reach a limited audience, a technical webinar in association with the string test launch was delivered using Zoom on 8 December. The webinar started with an overview of the project, followed by an explanation of what a string test is (assembly of all the key power-train components and testing them as a system). Next the design and objectives of the system was presented together with some lessons learnt, and likely next steps was explained.

The webinar ended with a lively Q&A session and a recording of the webinar is on [Youtube](#).



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