Deployment of offshore Mussel-System next to the FINO3 platform

Preparation has taken a full year, amidst delays caused by COVID19, a long permission procedure and bad weather, but the German Pilot team finally succeeded: the semi-submerged EasyFarm mussel cultivation system was deployed at its offshore location, next to the FINO3 platform.

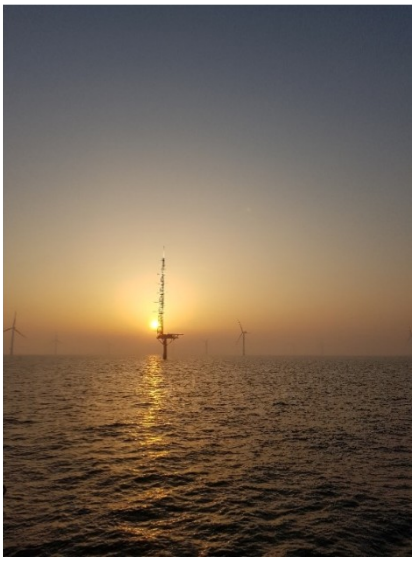

Figure 1 Sunrise above research platform FINO3

The team reached the installation site at 7 am in the morning; the sky was blue, the sea perfectly calm, with waves below 0.5 m, and a light breeze was blowing from the east – such perfect weather conditions are not easy to find I the North Sea, 80 km away from the coast. "*My colleague Julian Pforth and I can not believe that this big milestone is finally going be accomplished*" said marine biologist and German project lead Eva Strothotte, arriving to the site, "*The night was short, but totally worth it, with the prospects of a successful operation*".

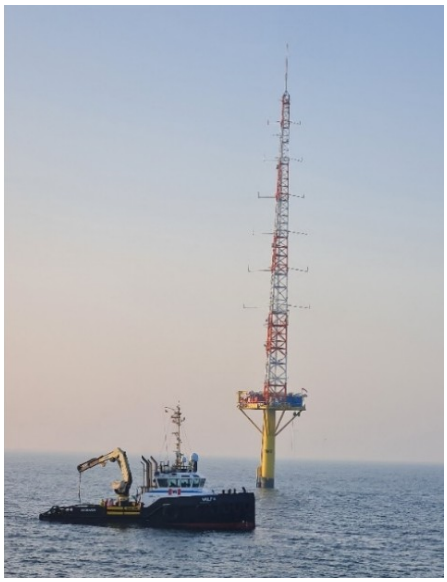

Figure 2 Installation vessel WULF4 placing the first anchor

Nothing good comes with an empty belly, so the installation started at 7:30 am after a short breakfast and a strong coffee together with the vessel crew. "*We started by placing the eastern anchor of the mussel system*" explained offshore engineer Julian Pforth; "*Setting the anchors at the exact location is the first important step in installing the system accurately and ideally*".

The entire deployment of the system did not take more than three hours, and before noon the FuE team started their twelve-hour journey home, back to the Cuxhaven port, with a bright smile and a beautiful sunshine.

Mussel cultivation online-systems on submerged or near-surface aquaculture systems are still in their infancy in highly exposed offshore locations. Especially, behaviour of the whole system in the stormy wintertime has never been tested in such a harsh location, and data from this project will enable the future use of until now untapped marine offshore resources.

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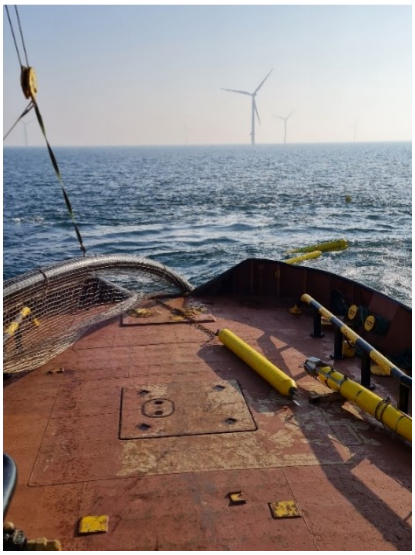

Figure 4 Mussel-System partly deployed and partly on deck of WULF9

Figure 3 Fully installed Mussel-System (Windfarms of DanTysk in the background)

Outlook and current status of the Mussel-System

The Mussel-System has been in the water for about five months now and has been monitored throughout the whole period via web-cam. During this time, two field trips have been carried out and the system was continuously exposed to the harsh North Sea conditions. For example, a medium strong storm swept over the site, generating waves with a significant height of up to 4.3m, leading to maximum waves of about 8m high.

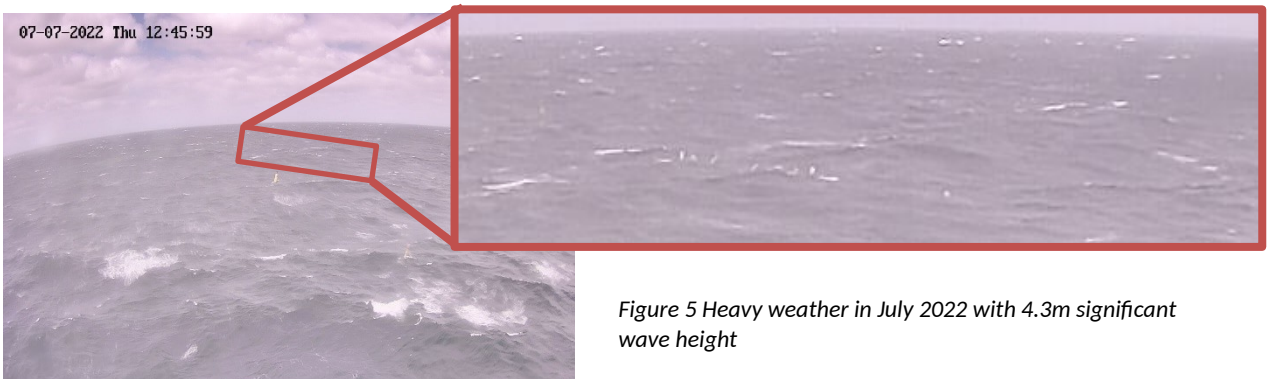

Figure 5 Heavy weather in July 2022 with 4.3m significant wave height

Despite these conditions, the system is still in its original position and functioning optimally. Extensive monitoring is accompanying the whole project. This data will help to advance the design of future offshore aquaculture systems and will give insights into possible positive and negative impacts on the environment. Installed load-cells will give an insight into the maximum loads during the storms of the system at the end of the project. An installed data buoy with a multi-parameter probe gives insight into the most important water parameters for mussel cultivation and is connected via wireless network to the FINO3 tower.

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So called CPOD-systems are used to monitor the harbour porpoise activity in the area (Figure 6). With the help of divers, the German pilot team was able do detect the first growth on the mussel net only 4 weeks after the installation (Figure 7).

The German Pilot team is looking forward to the results of this year's mussel season. The next field trip for inspection and maintenance of the Mussel-System will be combined with the installation of the Seaweed-System and is scheduled for the beginning of October, when there is still some good weather for installation but also the water temperature will be cold enough for the tiny and freshly cultivated algae seedlings.

Figure 6 CPODs for harbour porpoise monitoring

Figure 7 Mussel-system with growth in May 2022 at FINO3

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