



Ocean Farming AS, supported by Kongsberg Maritime AS, building the world's first automated 'exposed' aquaculture facility

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## Kongsberg Maritime: World's First 'Offshore' Aquaculture Development Project Receives Green Light from Norwegian Government

The Norwegian Ministry of Trade and Fisheries has approved Norway's first development concession enabling Ocean Farming AS, supported by Kongsberg Maritime AS, to build the world's first automated 'exposed' aquaculture facility. Situated outside of Trondheim, this innovative new facility introduces a paradigm shift in salmon farming now, and other fish

types in the future and is a significant step in Norway's efforts to deliver technical solutions to address the impending global food gap challenge.

The Ocean Farming facility is a new and innovative design, developed to overcome the challenges of more traditional inshore fish farming facilities by being located in deeper waters, further from the coast. The submerged, anchored fixed structure will float steady in the exposed ocean and is suitable for water depths of 100 to 300 meters, where the aqua biological conditions are more ideal for aquaculture on 'the fish's terms'. The benefits of offshore fish farms are numerous, with conditions more suited to nurturing healthy fish, such as steady currents that limit exposure to sea lice infection. The facility is fully automated with normal operation requiring a crew of just 3 – 4 people. It can also be remotely operated.

The project combines the best of existing technology and solutions from the Norwegian fish farming industry and the offshore oil and gas sector. KONGSBERG is playing a key role by leveraging its position as a turnkey supplier of technology and engineering services for complex oil & gas production units, offshore vessels, fisheries and sensor systems for oceans research and environmental monitoring. In addition to technology integration KONGSBERG is providing EIT engineering services, including delivery and installation of the gensets and aqualight systems.

The Kongsberg Maritime technology scope of supply for the fish farm itself includes the K-Chief 600 automation system controlling a large number of different systems. Other highlights of KONGSBERG's role in the project include an extensive telecoms and positioning package, covering a range of products such as the Maritime Broadband Radio (MBR) for communication between offshore sites and to shore and precise Motion Reference Units (MRU). In addition, KONGSBERG is responsible for the AIS requirements of the project, through delivery of the AISBS610 system and associated AIS infrastructure.

Below the water, sophisticated products from KONGSBERG will provide a clear view of the action. Leading the subsea delivery is the high-tech Simrad EK80 scientific echo sounder, a range of underwater cameras and an Acoustic Doppler Current Profiler (ADCP), velocimeter and O2 sensors. Other sensors include Tank Sounding and Water Ingress Detection. The subsea delivery is designed to accurately detect where the fish are in the vast water volume of the cage and how they move in order to ensure effective feeding. In addition,

advanced 3D display of the fish and relevant environmental parameters will be provided to the operators.

The project will be the first in the world to combine marine engineering, marine cybernetics and marine biology via a 'big data' approach fusing all the available underwater sensors and in this way offer decision support systems for the operators controlling and monitoring the feeding of the salmon and the overall physical environment of the sea.

“The Ocean Farming facility introduces a paradigm shift in salmon farming now, and other fish types in the future. With greater focus on biology and nurturing healthier fish, the concept delivers significantly improved yields that will prove important in the decades to come as part of Norway’s strategy to leverage its aquaculture and offshore expertise to meet the challenges of accelerating population growth and the pressures this places on the world’s food supply chain,” comments Egil Haugsdal, President, Kongsberg Maritime.

“To succeed in placing fish farming in exposed areas as a viable solution to address the food gap challenge, we need to integrate and harmonise a wide range of maritime and offshore technologies, for the fish farm itself and the new vessels that will serve it. This is a unique, highly technical project where we will transfer our technology base and knowledge of developing for oil & gas production units and the most sophisticated vessels to provide high levels of automation and control,” adds Thor Hukkelås, Principal Engineer Aquaculture Operations, Business Development, Kongsberg Maritime.

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## About Kongsberg Maritime

Kongsberg Maritime is a global marine technology company providing

innovative and reliable technology solutions for all marine industry sectors including merchant, offshore, subsea and naval. Headquartered in Kongsberg, Norway, the company has manufacturing, sales and service facilities in 20 countries and a total of 65 worldwide offices.

Kongsberg Maritime developed systems for vessels cover all aspects of automation, control, navigation, safety and dynamic positioning. Kongsberg Maritime also develops subsea solutions covering systems for Underwater Mapping (UMAP), Underwater Navigation (UNAV), Subsea Monitoring (SUMO) and Marine Robotics in addition underwater cameras.

Marine and offshore training simulators, LNG equipment, information management software, position reference systems, integrated aquaculture technology and advanced products to support seismic and drilling operations are also part of the company's diverse portfolio.

In parallel with its extensive technology portfolio, Kongsberg Maritime provides services within EIT (Electro, Instrument & Telecom) engineering and system integration, on an EPC (Engineering, Procurement & Construction) basis.

Kongsberg Maritime delivers solutions that cover all aspects of technology underwater and on the water, aboard new build and retrofit vessels, and on offshore platforms and rigs, often under a single supplier strategy called The Full Picture.

Kongsberg Maritime is part of Kongsberg Gruppen (KONGSBERG), an international, knowledge-based group that celebrated 200 years in business during 2014. KONGSBERG supplies high-technology systems and solutions to customers in the oil and gas industry, the merchant marine, and the defence and aerospace industries.

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