

Sørkedalsveien 6
PB 43 Majorstuen
NO-0330 Oslo

T: 23 36 61 20
www.nucleus.no
NO968749498MVA



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Developing an environmental buoy for the fish farming industry

Reliable monitoring of oxygen levels and currents is a decisive economic factor for the fish farming industry. The FNS project ENVI-BUOY, Nortek AS is developing an environmental buoy that will simplify and automate these measurement processes.

Partners in the project, which runs from 2012 to 2015, are Nortek AS, AKVA group ASA, AquaCulture Engineering AS (SINTEF) and the French technology company NortekMED AS. Within the first 18 months, the project already has developed a commercially viable product that has attracted considerable industry attention.

– So far, we have received orders for NOK 500 000 (app. 62 500 €), and indications are there will be more coming in, also internationally. We believe there will be demand for this solution in the French market. There is increasing awareness within the industry of the profitability of better monitoring key environmental parameters like oxygen, currents and waves, says Tore Hofstad, CEO of Nortek AS.

Creating profitability

The main objective of the ENVI-BUOY project is an environmental buoy providing real-time online measurements of key parameters for the fish farming industry, thereby optimising fish production. In fish farming, fish feed represents a considerable part of the cost, and using fish feed in the best possible way is important. Oxygen and current levels in the water play a big part in deciding the quality and volume of farmed fish returned per kg fish feed.

Measuring water salinity as well as wave loads on the fish farm can also be highly useful. Using satellite communication, decision-ready live data from even the remotest locations can be monitored online.

– The solution is very user-friendly. By the push of a button, all the important information is accessible online. These data then can be automatically transferred to feeding systems. Until now, much of this monitoring has been done manually, but there is an increasing industry focus on automation and sensors – particularly among the major industry players, says Nortek's Project Manager, Jardar Maatje.

Robust prototype

So far, the monitoring systems for oxygen and currents have been developed the furthest. A data collection unit that measures and transmits oxygen data has been tested at AquaCulture Engineering's test facility outside Ørlandet, and a prototype for the buoy was launched in April at AKVA group's facility near the island of Hitra.

– The buoy must be robust and require very little maintenance. Battery capacity needs to be high, and it must be entirely water-proof. Two drops of water would be enough to destroy the data. We have experimented with

different types of buoys during the process, including traditional buoys. However, these are usually quite expensive, and our aim has been to deliver a reliable off-the-shelf product which can easily be used without the fish farmer having any special prior knowledge, Maatje explains.

New possibilities

Scientific and industry partners have played an important part during the development process, among them AquaCulture Engineering, an international test centre for aquaculture technology. CEO Finn Victor Willumsen finds the project very exciting.

– ENVI-BUOY offers new opportunities in transferring data from offshore fish farming facilities to the mainland. Oxygen and currents are decisive parameters for the aquaculture industry, and we are experiencing an increased industry interest in automation, Willumsen says.

– The buoy has now been moved, and will be subjected to further testing at our new facility by the island Frøya – one of the world’s largest sea-based salmon farms, he adds.

Optimised feeding

– As a major technology and service provider for the aquaculture industry, we find the environmental buoy very interesting, states Morten Malm, Manager of Strategic Projects at AKVA group ASA. Active cooperation with professional science and knowledge based companies like Nortek AS is an important part of AKVA group’s strategy for strengthening its position as a leading supplier of solutions and services for the aquaculture industry worldwide.

– The data can be integrated into our AKVAconnect software, offering fish farmers the opportunity to optimise feeding when using our feeding facilities. Being able to document the environmental aspects of industry operations is important, and the buoy can easily draw upon historical accounts and use these during on-going operations. For valuable analysis in the Fishtalk Control software, access to data with good quality is crucial, Malm points out.

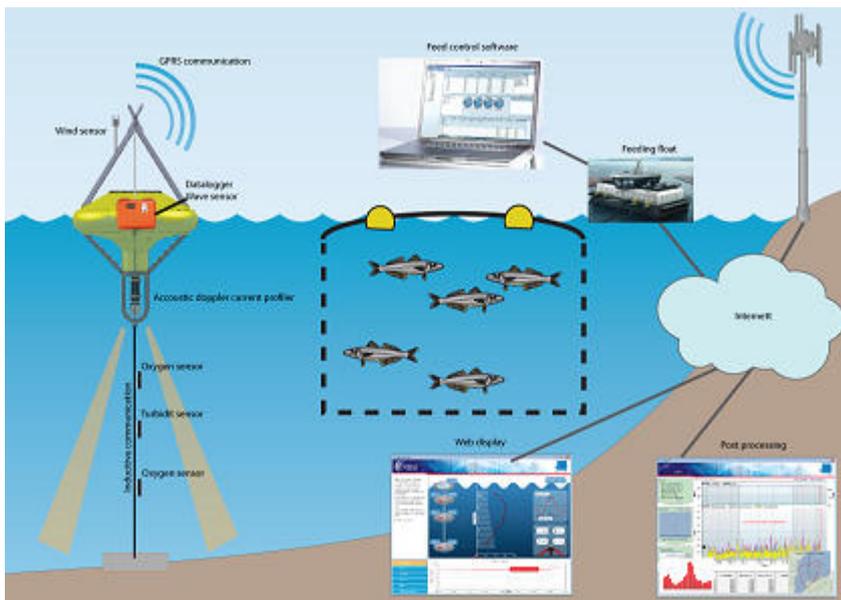
FNS has been important

In France, technology company NortekMED AS has developed necessary software for the system.

– Over time, they have established core competency on firmware development, and they have played an important part in creating the software that constitutes the brain of the data collection unit. They have also been conducting some of the practical tests, in collaboration with the University of Toulon.

– There is considerable international interest for the solution, and we are also looking at different spin-off products using the same technology, Tore Hofstad says. He emphasises the importance of the support from The French Norwegian Foundation (FNS) and The Research Council of Norway.

- Strategically, they have played an important part in opening doors for our cooperation with the aquaculture industry. Without the stamp of quality the FNS project gives us, I believe this would have been much harder to obtain.



This drawing shows how the buoy is placed in the water and collects the data, which is transferred to land-based software via satellite. (Illustration: Nortek)



A data collection unit placed at a fish farm. The data is collected via the black cables. (Photo: Nortek)



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Tore Hofstad (left) and Jardar Maatje with some of the components in the environmental buoy