CAGE REPORTER

H1: UNDERWATER COMMUNICATION AND LOCATION REFERENCE SYSTEM

UNDERWATER COMMUNICATION

Based on the wLink technology, a low-cost, hydroacoustic subsea communication system has been developed that is adapted for use in fish cages. The acoustic modem named Water Linked Modem M64 is developed, tested and validated in full scale farming with different biomass densities (Figure 1).

The Modem M64 uses Water Linkeds own transducer and electronics. What makes the M64 modem unique is its small physical size and its highly robust datalink that is provided to its user. The Water Linked technology is developed specially to work in demanding and challenging environments like a fish cage with multiple hundred thousand fish inside. With Water Linkeds Modem M64 real time communication inside fish cages is possible (Figure 2).

Figure 1: Water Linkeds Modem M64.

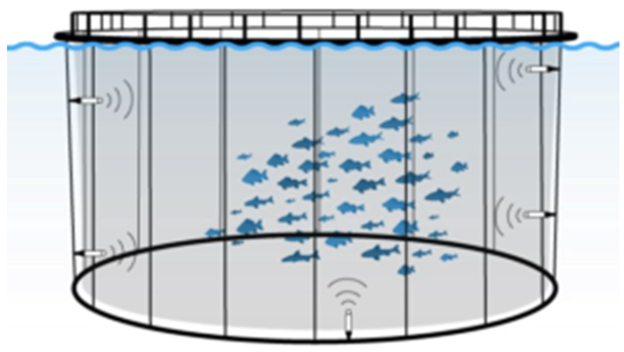

Figure 2: Communication inside the fish cages.

Figure 3: SINTEF ACE Rataren site.

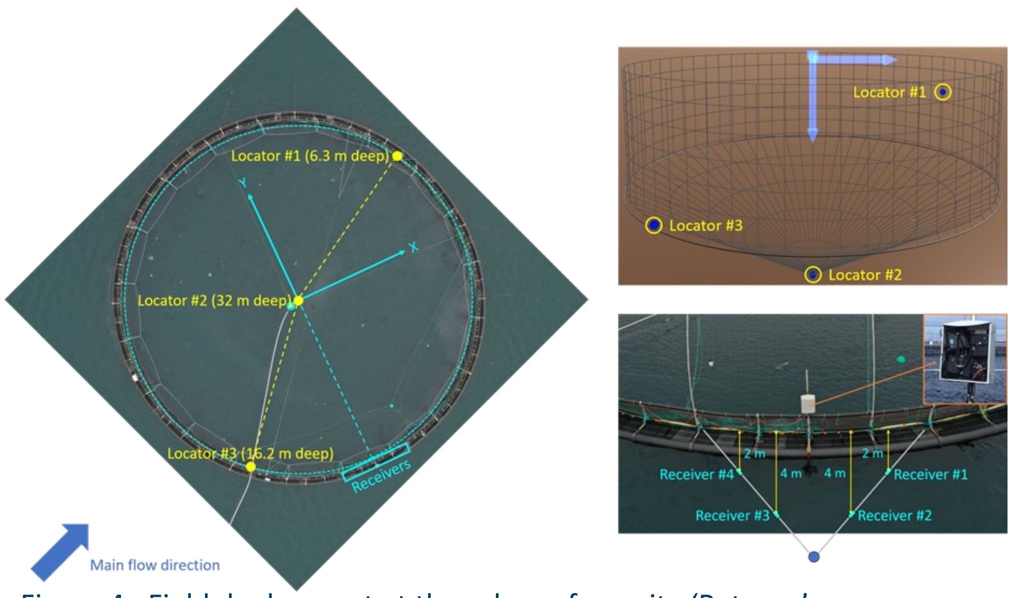

Figure 4: Field deployment at the salmon farm site ‘Rataren’.

POSITION REFERENCE SYSTEM

This activity developed a relative position reference system where the main challenge was to develop a realistic real-time map of the cage net, which is the frame of reference for vehicle positioning.

The Water Linked positioning system consists of a topside positioning computer and a certain number of locators and receivers. This system has been tested at two commercial salmon farm sites (Korsneset and Hosnanøya) in 2018. Based on the test results, the WL-21009 Locator-A1 and WL-21005 Receiver-D1 were chosen for the final deployment at the commercial farm site ‘Rataren’ in 2019 (Figure 3). Here, 3 locators were installed in one cage (Figure 4).

Using SINTEF’s FhSim software, a simplified net cage model with an adaptive current field is used to estimate net cage deformations based on the measured positions of the net (Figure 5). Error signals are used to adapt the magnitude and direction of the current at various depths. Figures 6 shows an example of the estimated current velocities, which demonstrates the potential to use two measured positions for the estimation of net cage deformations by adapting the current profiles.

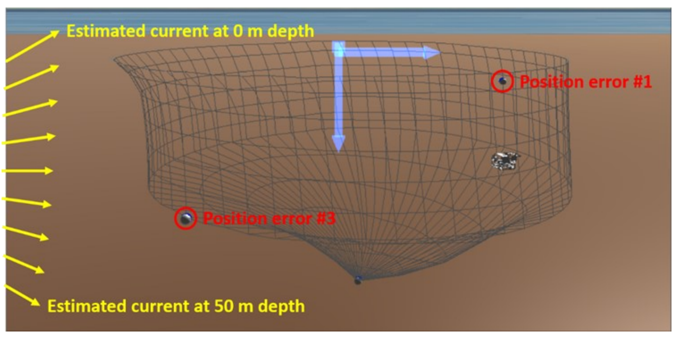

Figure 5: A simplified net cage model with an adaptive current field based on two measured positions of the net.

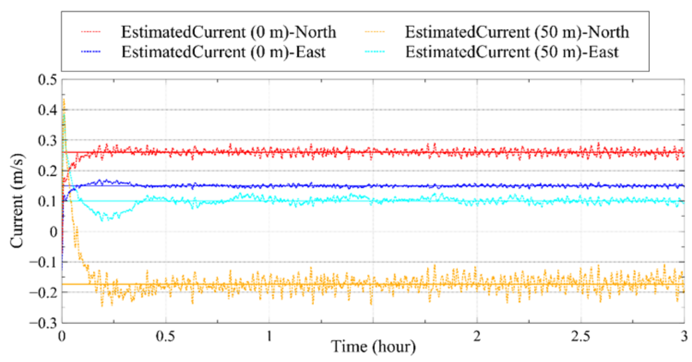

Figure 6: Errors of the estimated current compared with the measured ones.

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