CAGE REPORTER

DEVELOPMENT OF TECHNOLOGY FOR AUTONOMOUS, BIO-INTERACTIVE AND HIGH-QUALITY DATA ACQUISITION FROM AQUACULTURE NET CAGES

The main idea of the CageReporter project is to use an autonomous and tetherless underwater vehicle as a carrier of sensor systems for data acquisition, where the data are transferred from sea-based fish cages to a centralized land-based control station. The vehicle will use active motion control and acquire data from the cage environment while exploring the water volume. The main project objective is to develop technology for autonomous functionality for adaptive mission planning to achieve high quality data acquisition from the cage volume. One of the most important capabilities within this context is to operate in interaction with the biomass (bio -interactive) and the aquaculture structures.

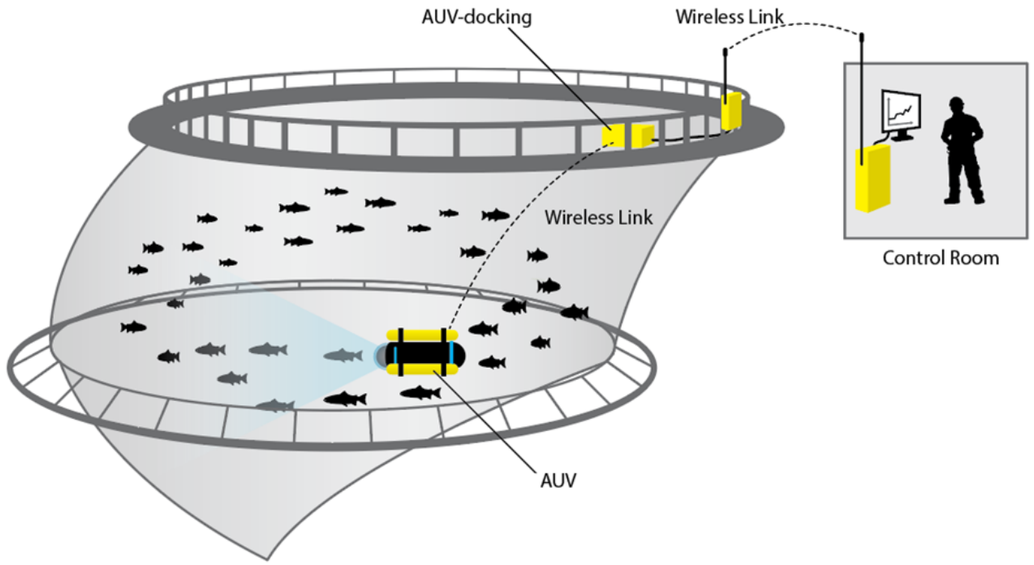

Figure 1 Resident (24/7), autonomous, non-tethered vehicle (AUV) for high quality data acquisition.

The project will address many challenges within the aquaculture industry related to poor accuracy and representative sampling of important variables that describe both details and the whole picture. CageReporter will provide continuous and close follow-up of the current situation and be the ''eye'' of the fish farmer inside the cage. The project idea is based on using low-cost technology for underwater communication, vehicle positioning and camera systems for 3D vision (Figure 1).

GOALS

Main Goal: The project will develop autonomous resident technology for high quality data capture associated with the fish, infrastructure and production environment.

Sub-Goal 1: Develop application-adapted underwater communications technology, position reference and 3D vision systems that reduce the cost by a factor of 5-10 compared to conventional technology.

Sub-Goal 2: The underwater vehicle will have autonomous functions that enable adaptive operation planning and bio-interactive data capture.

Sub-Goal 3: High quality data and metadata must be obtainable from the entire cage volume.

Sub-Goal 4: The integrated system will be validated in full-scale trials for the following case studies: A) FISH CONDITION, B) CAGE INSPECTION, and C) PRODUCTION ENVIRONMENT.

The following research areas are addressed in the project:

H1: Underwater Communication and Location Reference System

H2: Data capture and real-time data quality analysis

H3: Autonomous Systems

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CONCLUSION

Underwater robots are used today in a variety of different applications in different industrial segments. This project targets a novel research area by investigating the challenges of using underwater robots in "application-realistic" environments such as fish farms, where structures are flexible, and robotic systems must interact with animals during operations.