Deliverable D5.1

State-of-the-art and future needs

Understanding the impacts of environmental change and human activity on farmed fish can be greatly enhanced by using electronic sensors. Indeed, many questions can only be answered through this approach. Electronic sensors are significantly improving our understanding of fish behaviour and are emerging as key sources of information for improving aquaculture management practices.

Enhanced environmental (e.g. oxygen, temperature, salinity, pressure) and biological (e.g. behaviour, activity, energetic, feeding physiology) sensor data, collected by a network of wireless electronic sensors, can provide accurate fine-scale measurements of environmental conditions, fish health, welfare and habitat use, average fish size and biomass, thus facilitating predictive modelling of the rearing performances and impacts.

The state of the art and future needs in terms of technologies, accessibility and integration is outlined in the present report.

The real-time wireless communication system and sensor network envisaged for the FutureEUAqua large scale demonstration activities will include a cloud platform that communicates wireless underwater, based on the technology offered by Real-time aquaculture (www.rtaqua.com). The system architecture includes “AquaMeasure” which is a family of compact, submersible environmental sensors with underwater and in-air wireless communications. While the “AquaHub” is the core of the system deployed in the field and can be easily mounted to existing aquaculture infrastructure or feed barges. Utilizing a digital receiver, communications modem and state of the art electronics, the AquaHub can support up to 100 AquaMeasure sensors (e.g. temperature, salinity, oxygen, turbidity, etc.) within a 500m radius. The AquaHub also supports the detection of signals from the family of VEMCO transmitters. Namely the V9AP & V13AP accelerometer pressure tags, which measure the fish activity, including swimming speed via tail beat acceleration, mortality through predation, seismic blasting, toxic spills, feeding events, spawning activity, nocturnal/diurnal activity, wave action and activity responses to changing oxygen, salinity and temperature in the rearing environment. The hub supports many telemetry protocols for cloud communications, including Cellular, Wi-Fi and Iridium. The wireless hub also supports third party sensors (e.g. weather stations, biomass monitoring, etc.) via its auxiliary sensor port and features internal memory for backup purposes.

About Work Package 5

In Work Package 5 we are committed to develop and test a multiplatform tracking system for simultaneously monitoring the impact of innovative diets on fish health and welfare, as well as the main parameters of the environment where they are farmed, by using a wireless communication system.

To know more, please contact the WP5 Leader: Giuseppe Lembo (e-mail: lembo@coispa.it)

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under Societal challenge, Blue Growth, Grant Agreement No 817737.