IMPAQT acoustic telemetry platform

IMPAQT
Intelligent Management System for Integrated Multi-trophic Aquaculture

As a part of IMPAQT project, a novel miniaturized low-power, low-cost acoustic Underwater Transmitter Node (UWTN) and gateway buoy have been developed to provide an underwater sensors networks platform to monitor and analyze marine environments. Each UWTN is integrating accelerometers and temperature and pressure sensors and a unique ID tag, that can be immersed in water and IMTA sites to monitor water flows, seaweeds movements and marine animals' activities. It also has an auxiliary sensors interface that can be used to record the external sensors data, developed by other partners in IMPAQT project, such as Nitrite, Phosphate, and oxygen level sensors. The recorded data from internal and external sensors then will be transmitted at regular intervals based on the TDMA scheme to the gateway buoy using ultrasonic piezoelectric transducers. By utilizing sub-centimeter ultrasonic piezo transducers, unlike RF solutions, it is possible to transmit data at relatively long distances regardless of salinity of the water with a reasonable data rate. Each UWTN is also capable of performing pre-processing of the data using an ARM microcontroller onboard. The gateway buoy logs the received data, performs edge-processing and pushes the results to the cloud. The proposed platform enables the collection of sensors data in real-time from an underwater environment which can lead to further knowledge about what is happening beneath the water surface and result in the further development of IMTA sites.

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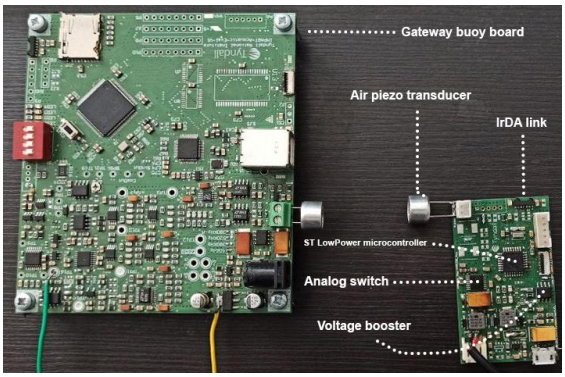
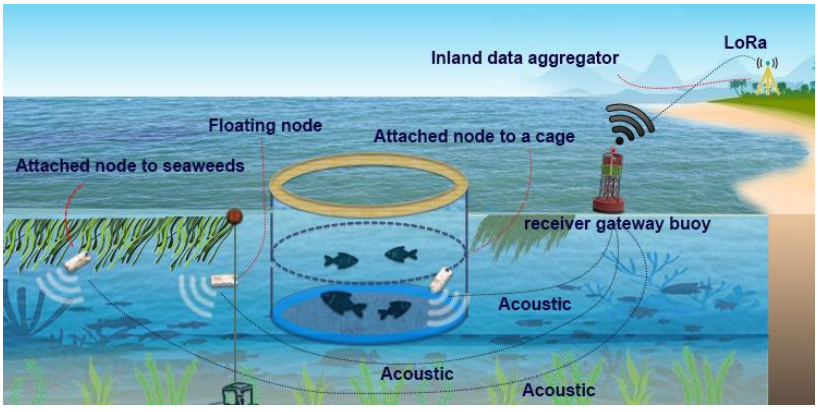
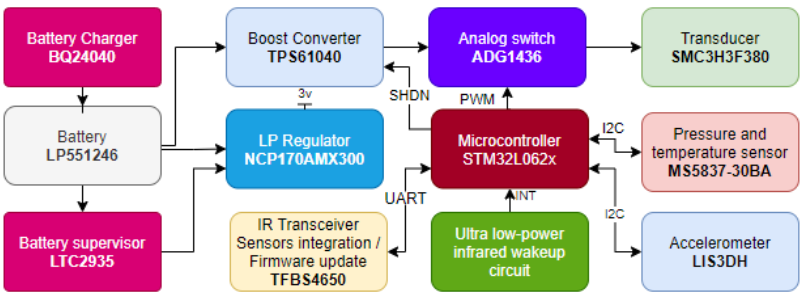


Outcome

- A miniaturized tag to monitor and collect sensors information in real-time
- An extension for already developed novel sensors to transmit their sensor data underwater
- A floating sensor to monitor cages and seaweed or water flow.





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