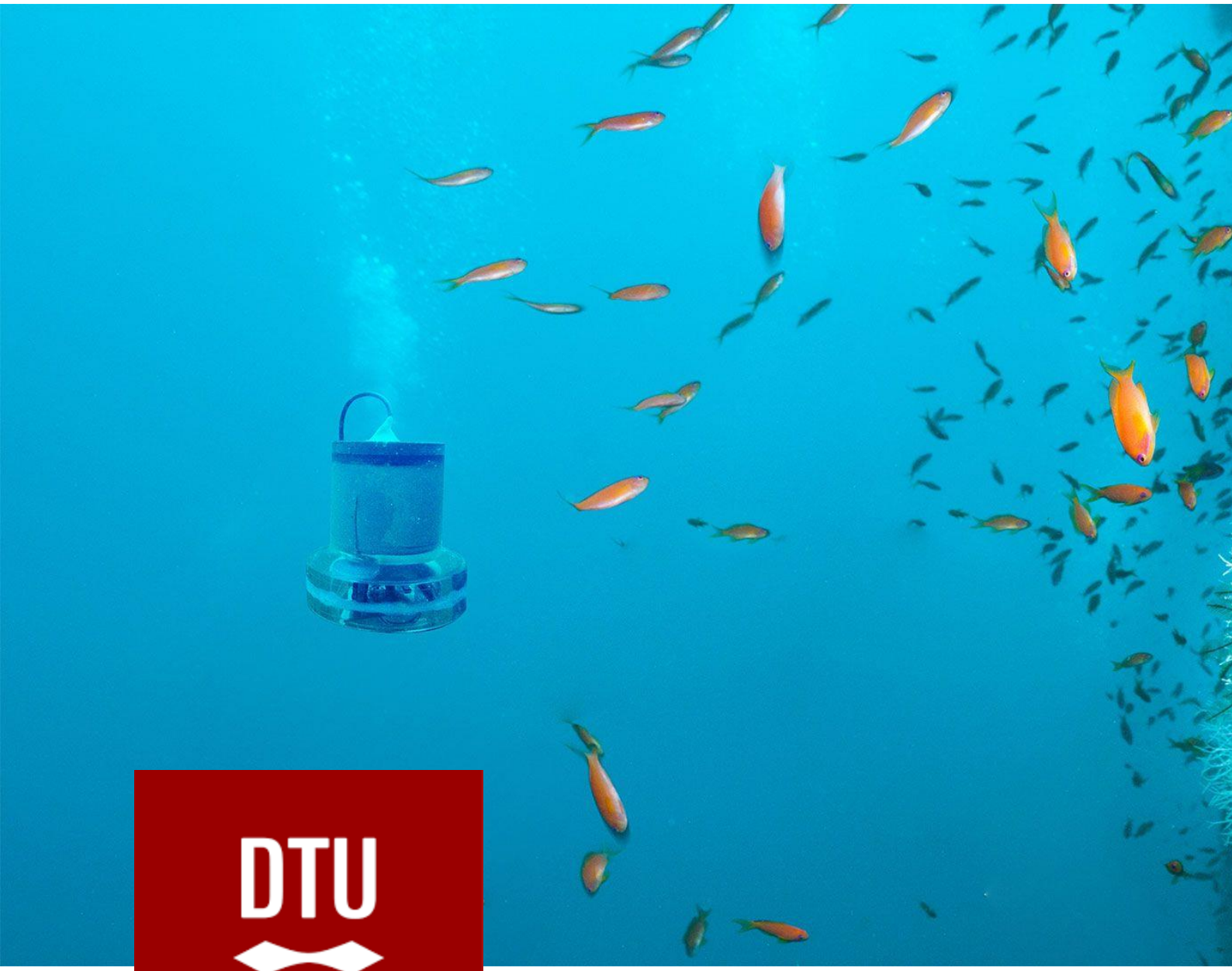
Bachelor Project: AquaComm Testbed

Morten T. Henriksen, s225183

Mathias Markvardsen, s225182

Felipe Bahamondes, s221516



DTU

Motivation

Society has become increasingly connected through the Internet of Things (IoT), linking devices and systems across the globe, both on the ground and in space. IoT improves daily life in a wide area of industries: healthcare, industrial connection, Harbor, Cisco, wearables etc. In total the entire industry is expected to reach a market cap of $1.06tn USD in 2025. However, only a small portion of this market is focused on IoT applications in underwater environments. Advancements in technology could enable continuous and cost-effective monitoring of the oceans, facilitate safe shipwreck surveys, support pipeline repairs, enhance military surveillance, and more.

In this context, our project aims to facilitate a test-bed that will act as reference frame for researcher to compare their innovations.

Project Plan

	Activities/Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Write report															
2	Receive, understand, test and document equipment															
3	Transmit and recieve sinus wave underwater in small setup															
4	Create API to signal generator in order to modulate with our own data															
5	Transmit and recieve our own data in small setup															
6	Transmit and recieve our own data in larger setup, such as the pool at DTU or Bryggen.															
7	Investigate ways to optimize data transfer both on transmitter and reciever side.															
8	Substitute components in the setup with cheaper and less power demanding components.															

Description of activities:

1) Throughout the process we will report on our findings and conclusions from the different activities.
2) We establish the devices that will function as transmitter and receiver. This will consist of a hydrophone (receiver) and a signal generator (transmitter) along with computers on each side processing the input and output.

3) We create a small setup that can verify that our transmitter and receiver works properly. We do not add our own data in the communication yet.
4) Here we investigate how we can use the signal generator to modulate a carrier wave with our own data and create API to ease the process.
5) Now we send a wave with our own data encoded in the small setup.
6) Once we can send our own data, it is time to make communication efficient. Thus, we move the setup to something larger in order to see how it performs.
7) Here we investigate different schemes to optimize communication, e.g. different modulations and encodings.
8) The components we are given will be large and expensive compared to existing cheap IOT. Thus, we would like to swap out these components and see how it affects the performance of the system.