Low-Cost Underwater Sound Recorder for coastal applications

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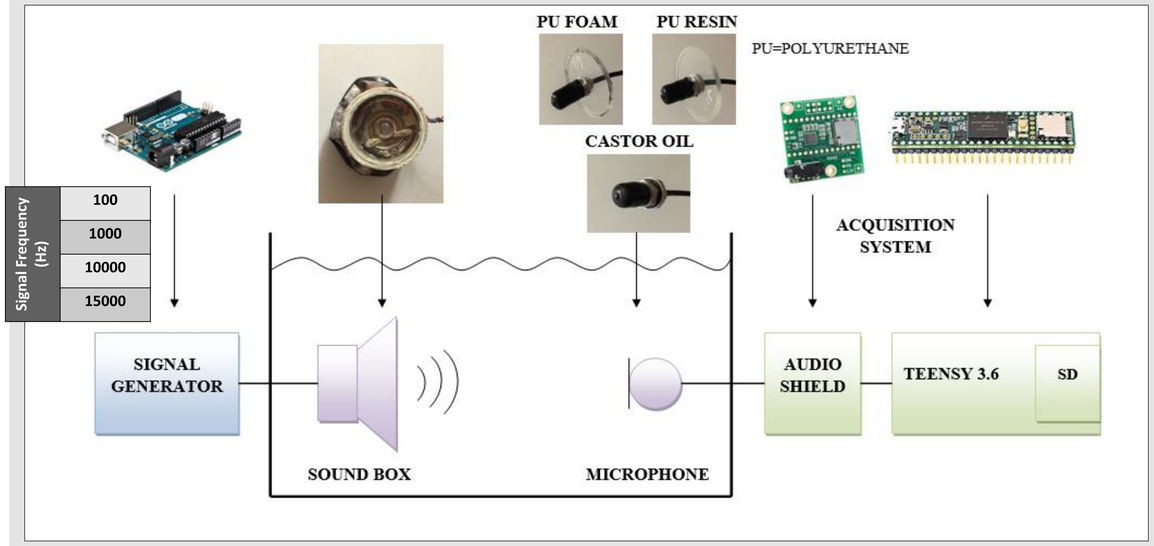
GENERAL CONTEXT

Sound is the most widespread and pervasive kind of anthropogenic energy that human activities introduce into the marine environment. With the Marine Strategy Framework Directive (MSFD) (2008/56/EC, EU 2008), **underwater noise** has been recognized as pollution and included in the qualitative high level descriptors to achieve the good environmental status, GES. During recent years, passive acoustic monitoring in the ocean has become a standard technique across the oceanographic community and is used to address biological, geological and meteorological issues. Due to the high spatio-temporal variability of the ocean noise, a large number of observing systems would be needed. Extended marine monitoring would require a reduction in the cost of platforms and instruments, without compromising data quality. Despite, a significant effort has been invested by the scientific community in the development of low-cost PAM recorders, much work still remains. Most of the problems are related to the pressure to which the devices are exposed, the battery pack limits, storage memory limits, and sensibility of the sound sensor once waterproofing and so on.

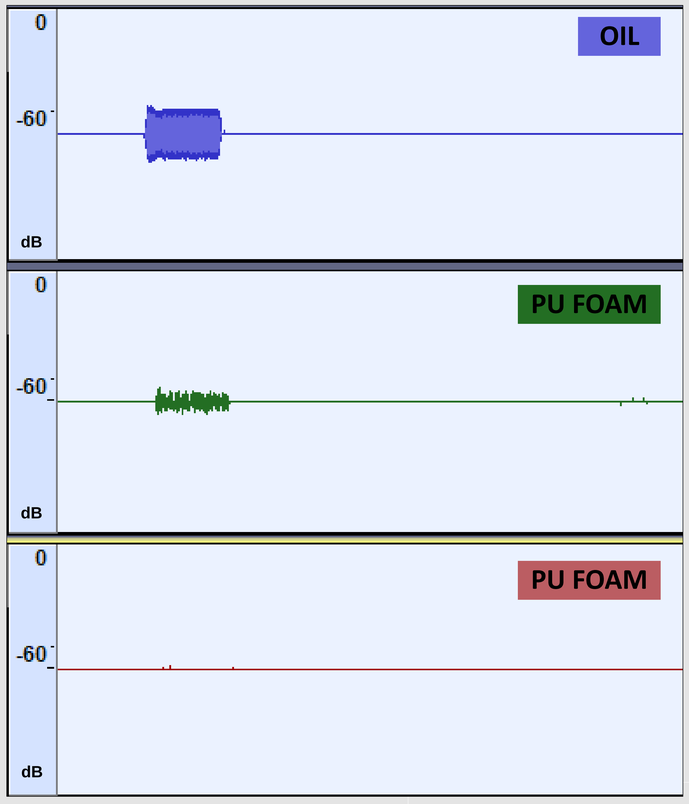
FOCUS

We present a low-cost underwater sound recorder for coastal applications developed to be applied in both background noise monitoring and bioacoustics monitoring. This recorder consists of a high-performance USB-based microcontroller development system with audio adapter which guarantees high audio quality. Compact and small in size, it can be easily installed on various oceanographic platforms for different types of sampling. Here we present the first results of the laboratory and field tests, comparing our assembled device with a commercial recorder and a pre-calibrated hydrophone.

EXPERIMENTAL DESIGN



FIRST RECORDINGS RESULTS

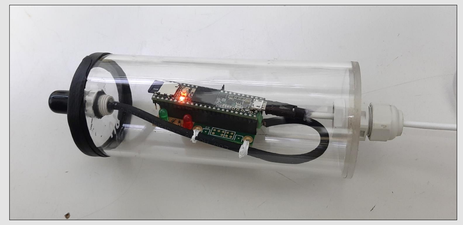


First results indicate that OIL microphone waterproofing could be the better option.

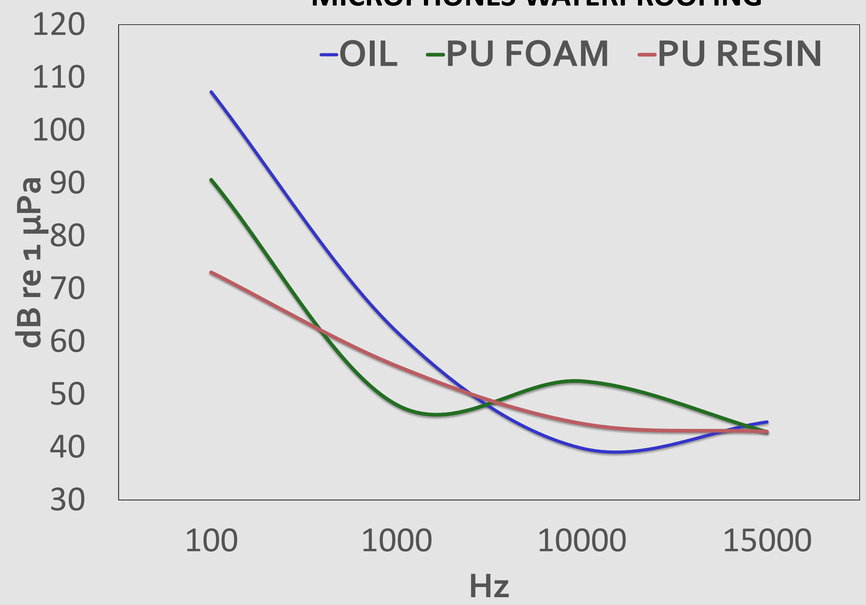
COMPONENTS FEATURES

Electret Condenser Microphone
Omnidirectional
Frequency range 20-20000 Hz
Sensibility in air -38 dB ± 3 re
Audio adaptor
16 bit
Sampling rate 44.1 kHz

UNDERWATER SOUND RECORDER LABORATORY PROTOTYPE



COMPARISON BETWEEN DIFFERENT MICROPHONES WATERPROOFING



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