

Smart Hydrophone FAQ ^[1]

Submitted by Rory Lattimer Fri, 2013-03-01 00:00

What is a smart hydrophone?

A hydrophone is simply a microphone that is designed to work underwater. A smart hydrophone also has many of the capabilities of a recording studio built into it. It can digitize the sound, calculate the energy at each frequency, send the data out via the Internet and even send alerts if it detects a specific event such as a whale call. This new technology makes listening to the ocean easier than ever before, scientifically accurate, and it all comes in a package smaller than a water bottle.

Why do we want to listen to the ocean?

Sound is the most effective energy for making observations in the ocean. That is why navies and ocean surveyors rely so heavily on sonar. Sound is used to detect illegal fishing techniques, illegal nuclear tests, locate plane crashes, monitor the ocean temperature, and track marine animals. Marine mammals and fish also rely on sound; in fact some whales can communicate over hundreds of kilometres with their calls. Like humans, ocean creatures are affected by noise. If the background noise increases, marine animals struggle to "shout" over the noise. If the noise increases further it becomes painful and in extreme cases - such as nearby pile driving sound - can cause death. The soundscape of the oceans is changing as we increase the industrialization of the oceans. We need to understand what effect this will have on marine life to ensure we have sustainable ocean resources for our children.

Why do we have to calibrate hydrophones?

To determine how the ocean soundscape is changing we need to accurately measure the sound energy over long periods of time. We must also do this at many locations, especially those locations with critical habitats for our ocean species. To compare global changes, both spatially and temporally, and to assess the noise impact, we need all hydrophones calibrated to the same sound reference.

What is the Ocean Innovation Centre's acoustic calibration facility?

In order to verify the ability of the IcListen LF smart hydrophone to perform on an ocean observatory, the Ocean Innovation Centre needed to perform some intensive testing. This testing included end-to-end system testing and verification of the manufacturer's calibration. There were no digital hydrophone calibration facilities that could perform the tests. Nor were there any analog calibration facilities that calibrate to the low frequencies that this smart hydrophone is capable of registering. So the Ocean Innovation Centre developed the world's first automated, low frequency, digital hydrophone calibration system. The Ocean Innovation Centre's low frequency system is capable of calibrations from 0.01 Hz to 100 Hz.

The Ocean Innovation Centre also has a mid frequency open water calibration facility which covers the 100 Hz to 2000 Hz range. In preparation for testing a broadband smart hydrophone, the Ocean Innovation Centre is in the process of building a 100 Hz to 100 kHz digital hydrophone calibration system.

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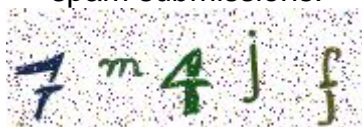
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