A Novel Environmentally Friendly Approach to Controlling Marine Growth Using Complex Ultrasonic Waveforms

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In order to develop a novel approach that improves on the state-of-the-art in ultrasonic marine growth control, the function of the leading commercially available device was analyzed. The device called “SOANAR Ultrasonic Antifouling System” was acquired and placed on a lab bench for analysis. It was found to produce nothing more than a repeating single frequency square wave pulse/burst which is produced by the output of a single binary pin of a computer circuit toggling between logical zero and one repeatedly. In order to better simulate signals produced in nature, it seems desirable that the new state-of-the-art system would be able to produce signals other than square waves. To achieve this, a digital to analog converter was attached to a Raspberry Pi. A D/A converter converts a digital signal to its analogue counterpart. The D/A converter selected takes a pattern of twelve binary values and produces an analogue output with a resolution of 4096 points and allows the system to reproduce far more complex wave shapes than a square wave. In addition, the selected D/A converter can operate on a high enough sampling rate to properly reproduce ultrasonic frequencies. The 2 systems were compared side to side resulting in a significantly better response from the novel complex waveform system of approximately 26%. Considering the cost effectiveness of this system and the multiple uses that can be tied to it, such as doubling as the on-board entertainment/media/sound system, the scientist has made an extraordinary discovery. Scientist has secured a Provisional Patent.

Awards Won:

University of Arizona: Renewal Tuition Scholarship

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