

Abstract Submitted
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Thrust Optimization in Pulsatile Vortex Generators in Liquid Medium MIKE KRIEG, TORIN CLARK, KAMRAN MOHSENI, University of Colorado — Vortex rings are coherent structures effective at transporting momentum, circulation and energy across long distances through a fluid medium. An array of periodic vortex rings can be created by a series of pulsatile jets. Similar jet propulsion is the primary method of movement for Cephalopod such as squid. Inspired by the propulsion of squid and jellyfish we have designed and built vortex generators for propulsion and low speed maneuvering of small underwater vehicles. The vortex generator consists of a cavity with a moving diaphragm on one side and an exit orifice on the other side. The diaphragm or a plunger is activated by an electric motor. As a result, the amplitude, frequency, and profile of the actuated diaphragm are easily controlled. This investigation is focused on identifying the parameters that control the thrust generation in this mechanism and its optimization. A sensitive load cell is employed to directly measure thrust generation while these parameters are varied. It is found that the formation number, actuation frequency, and plunger profile are among the most relevant parameters that control thrust generation.

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