Improving Autonomous Underwater Vehicle (AUV) Glider Efficiency: Wingspan

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Autonomous Underwater Vehicles (AUVs) are becoming useful tools for maritime researchers due to their cost-effectiveness, low-maintenance, and ability to access dangerous areas. An AUV's accuracy is crucial for reliability and energy efficiency. The class of AUV in this project is a SeaGlide, a small vehicle designed for oceanic exploration and data collection. This project's objective is to determine the effect of wingspan (25cm, 45cm, and 65cm) on the accuracy of an AUV to reach a specific point for two different dive cycles: 1m and 2m, in two environments - a pool and the ocean - to get data with and without external variables. Additionally, a pH tester was affixed to collect data to show a possible application. The ocean pH level appeared to be lower with decreasing depth, whereas the pool pH level appeared to be relatively consistent (Figure 1). While aerodynamic studies have been conducted on wingspan and wing aspect ratio, there are no studies that discuss the effects in underwater mediums. The data showed that as the wingspan increases, the AUV's accuracy also increases. The highest wingspan, 65cm, exhibited the highest accuracy across all trials, being 37.6cm away from the target point, while the lowest tested wingspan, 25cm, exhibited the lowest accuracy across all trials, being 107.1cm away. The findings from this data can be used to improve the accuracy and energy efficiency for AUVs, along with other oceanic vehicles that involve wings, and discover a connection between aerodynamics and fluid dynamics, as their mediums differ greatly.