

# **Co-Navigational Aquaculture Vehicle System Design**

(Technical Report)

# **Social and Cultural Obstacles to Sustainable Food Systems**

(STS Research Paper)

An Undergraduate Thesis Portfolio  
Presented to the Faculty of the  
School of Engineering and Applied Science  
In Partial Fulfillment of the Requirements for the Degree  
Bachelor of Science in Mechanical Engineering

by

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May 11, 2023

## **Preface**

Feeding over 8 billion people is a monumental feat of technology and logistics. Changing climate and a growing population necessitate the reform of food production systems.

Coastal aquaculture is known to damage coastal ecosystems. Offshore aquaculture facilities capable of handling conditions of the open ocean would allow these operations to move far away from sensitive ecosystems. Maintenance is costly for these facilities. Typically, they require trained divers or machinery piloted by operators. The remote location of these facilities and the hazardous conditions make them a candidate for autonomous robotics. Our team produced a surface vehicle and modified a commercial ROV to produce a two-vehicle system capable of navigating bodies of water and cleaning submerged nets. Our work this year served as the first installment of a multi-year endeavor to develop a co-robotic aquatic system. Our system includes many sub-systems that will be the foundation of future years work in autonomy, and robotic navigation.

Proponents of agriculture reforms will need to interface with various aspects of society and food culture. What are these problems and how will they affect the advancement of sustainable agriculture reform? A survey of three aspects of this reform: organic food, veganism, and local food production, focusing on producers and consumers. Proponents of food system reforms face challenges such as entrenched industrial agriculture and deeply rooted food culture.