INTRODUCTION

Over the past school year, Project Nautilus has focused extensively on the design of an unmanned surface vessel (USV) to house communications equipment, docking, and charging capabilities for the ROV the project constructed in the 2017-2018 school year. The USV, also called the Home Unit Base (HUB), has proven exceptionally difficult to design. Ocean currents, rough surface conditions, as well as limited communication options are some of the numerous obstacles the project has worked to overcome. The solutions to these obstacles will be developed and explored in further detail in the coming school year.

CHALLENGES FACED

DOCKING

Traditionally, when docking an ROV or submarine, an operator guides the entire process and accounts for any issues that arise in real-time. However, with the goal of automating the process, Project Nautilus encountered significant challenges designing a dock for the HUB. Initially, a dock suspended several feet below the surface of the ocean from the bottom of the HUB was designed. After some review, this design was rejected due to the inability to fully control the position of the dock. The current design is something similar to a resident ROV with the dock resting on the ocean floor. The dock resting on the ocean floor also provides the added benefit of serving as an anchor for the HUB above it.

COMMUNICATION

Originally, it was believed that satellite communication via a satellite phone would be sufficient to send data from land to sea. Upon further review, it was discovered that satellite communication did not send data quickly enough to meet our requirements. Satellite communication equipment is also prohibitively expensive. While, there is no system that excels at data intensive communications at sea, wireless point-to-point communications are being investigated for the HUB prototype.

REFERENCES