Naval Unmanned Surface Vessel (USV) Prototype Project

Project Description

Unmanned surface vessels (USVs) enable the Navy to meet strategic mission objectives while not putting any sailors in harm's way. In order to add capabilities to the USVs, the capabilities must first be developed and tested on smaller scale vessels. As a result, it is critical for Navy research labs to have access to small scale test assets.

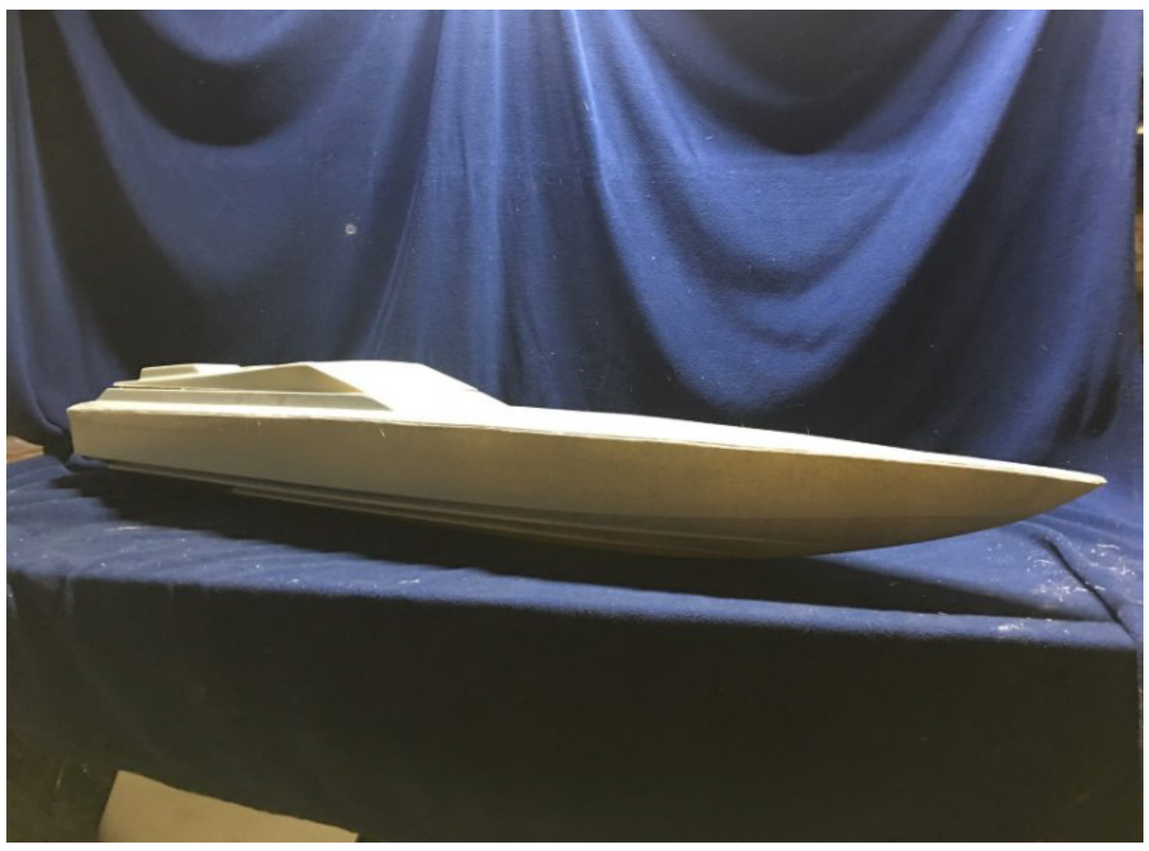
Systems

Hull
Propulsion
Steering
Battery
Radio Control

Deep V Monohull Design

Pros
Simple and Inexpensive
Plenty of Space Internally for Components and Equipment
Tighter and more Stable Turning
Resists Skidding During a Turn
Stable at High Speeds

Cons
More Sensitive to Heavy Loads and Load Balance
Less Stable at Slow Speeds
Deeper Draft, Sitting Lower in the Water
Higher Drag and Lower Fuel Efficiency



Propulsion Design Options

Electric Propellers

Water Jet Thrusters

Airboat Fan

Steering Design Options

Rudder Control Surface

Differential Thrust

Vectored Thrust

Battery Design

The battery will require a certain wattage and capacity, specifically depending on the thrust required, endurance required, and power usage of all other systems. Additionally, a lighter battery will decrease the thrust required.

Radio Control Design

A basic RC transmitter and receiver setup
requires a transmitter (controller), receiver, servos, electronic speed controllers (ESCs), and motors.
The transmitter will require at least 4 control axes to manage all required systems.

Semester Deliverables:
1. Final choice of hull
2. Present preliminary design of propulsion, steering, and controls
3. Present calculations, CAD, and parts for final design

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