

## ABSTRACT

*Indonesia, as a maritime nation rich in marine resources, boasts an extensive ocean territory spanning 5.8 million km<sup>2</sup> and a coastline of 81,000 km, indicating substantial potential wealth from its seas. To optimize the utilization of these resources, adequate maritime technology innovations are crucial, especially in the context of Autonomous Surface Vehicles (ASVs).*

*This final project focuses on the design of a Hardware Boat using Raspberry Pi and Arduino Uno as the primary control systems, equipped with a camera for color detection in its surroundings. Data collected from these sensors serve as inputs for the microcontroller to regulate steering (direction) and speed via Electronic Speed Control (ESC) and Brushless motors.*

*The testing results of the Boat demonstrate that the manual control system operates effectively, and the autonomous mode successfully navigates through waypoints marked by red and green buoys. The variance between measured and calculated voltages ranges from 2-14%, indicating the ESC functions with good accuracy, and the power output meets expectations. The use of a 4S Li-ion battery with a capacity of 5200mAh and voltage of 16.8V provides sufficient power for all components used on the Boat. All major components such as Raspberry Pi, Arduino Uno, battery, ESC, and Brushless motors function well both individually and as part of the overall system.*

**Keywords:** *Autonomous Surface Vehicle, microcontroller, Raspberry Pi, Arduino Uno, Brushless motor, Electronic Speed Control, Control System.*