# ABSTRACT

Autonomous Surface Vehicle (ASV) is an autonomous vehicle that can run autonomously and can be operated on the surface of the water. Researching or observing waters directly (involving human) in strong current and contaminated water is very dangerous for the safety of researchers. With ASV, humans can research or observe waters that are difficult to explore or contaminated. The ASV was build using the autopilot control from ArduPilot Mega 2.8 (APM 2.8) which was installed with the APM Rover firmware. APM 2.8 on the ASV was controlled by Raspberry Pi and Mission Planner through the MAVLink protocol. ASV was designed in the form of double-hull using 2 brushless DC motors with a differential thrust model. The ASV build weight was 5.6 kg and able to run at constant speed of $1ms^{-1}$. The ASV was able to run on 2 straight path waypoints with an average path error of 0.088 meter and the average distance berween ASV and waypoint when it reached the waypoint was 2.144 meter. The ASV also able to run on 6 waypoints with a winding track with an average path error of 0.285 meter and the average distance between the ASV and waypoint when it reached the waypoint was 2.3799 meter. By using the obstacle avoidance feature that already existed in the APM Rover firmware and with the help of ultrasonic sensor, the ASV managed to avoid a small obstacle with the closest distance between ASV and the obstacle was 1.43 meter.

**Keywords**: autonomous surface vehicle, ardupilot