Controlling unmanned surface vehicle rocket using gps tracking method

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Abstrak

An unmanned surface vehicle (USV) is operated on the water surface for specific purposes. USV can be used in waters that cannot be entered by crewed boats, such as environments with high levels of threat or that are contaminated by nuclear, biological, or chemical waste. USVs can also be used for surveys in shallow waters, escorting military weapons, collecting environmental data, and coordinating with other underwater vehicles such as automated underwater vehicles. This study designs and develops simple USV rockets for maneuvering on the water surface. First, a simple USV system is designed. Next, mechanical and electronic components are selected, and the control program is implemented using the Arduino Mega 2560 microcontroller. Finally, the USV motion kinematics are analyzed, rocket thrust force is tested, and torque generated by the electric ducted fan (EDF) motor is measured. Ultimately, a rocket system with weight of 3920 g and length, width, and height of 720 mm, 500 mm, and 420 mm, respectively, is developed. The USV rocket is driven by an EDF motor with voltage and current of 1600 kV and 160 A, respectively, an electronic speed control, 6X Turnigy FHSS remote control, and two 18.5 V Li-Po 5500 mAh batteries as a power source. The USV has a maximum thrust of 40.7 N with torque of 1.41 Nm. Kinematics parameters such as angular acceleration and linear acceleration were also determined.