

ABSTRACT

A propulsion system is the most important aircraft system in drones and UAVs, especially propellers. Optimum propellers provide well performance for the aircraft because they could produce thrust forces that affect the duration of endurance of the UAVs. Each propeller has its own geometry specifications, which will provide different performance and thrust forces. The type of propeller needs to be well-considered to suit the objective of the aircraft.

This study uses Computational Fluid Dynamic (CFD) software (ANSYS 19.1) to analyze the propeller before optimizing the thrust force of the propeller using Blade Element Momentum Theory (BEMT). Propeller diameter, pitch angle, and twist angle parameters are calculated using BEMT to determine the optimum parameter of the new propeller. The thrust force generated for the final propeller selected is calculated using the BEMT and simulated on CFD software and this study obtained that the optimum propeller for the Quadcopter UAV is APC 1455 propeller with twist angle of 12.776° .

Keyword: UAV Propeller, Propeller Thrust, CFD Analysis, BEMT, Propeller Optimization.