EXPERIMENTAL DETERMINATION OF THE EFFECT OF TURBULENT INTENSITY ON AERODYNAMIC CHARACTERISTICS OF REMOTELY PILOTED VEHICLE

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ABSTRACT

Remotely Piloted Vehicle (RPV) in our country Malaysia, still in an early stage. The development of unmanned vehicle by Composite Technology Research Malaysia (CTRM), encourage the local researchers and scientist to study the importance and the capability of RPV. The unique design of RPV is a new challenge for the design engineers and aerodynamicists. In present study, the aerodynamics investigations are carried out on a USM eFA-1 RPV using the computational and experimental methods. The computational analysis is made on a three dimensional model of RPV using computational fluid dynamics (CFD) code FLUENT 6.0. The experimental works are carried on a scale model and tested in an open circuit wind tunnel. The investigations have been carried out at three different Reynolds Numbers, i.e., 1.05×10^5, 1.26×10^5 and 1.60×10^5, at different angle of attack. The aerodynamics characteristics lift and drag coefficients obtained from the experimental work are compared to the simulation result. The results show that the lift and drag coefficients are increased with the angle of attack. The simulation result shows the fairly good agreement with the experimental result but at the stall angle it can't predict the stall phenomena. This is due to the limitation of turbulence model used in this study. The flow visualization helps in better understanding for the flow around the RPV with different angle of attack. The results obtained will provide an aerodynamic database of the eFA-1 RPV for the future use.