

Micro Air Vehicle : Flight Control Analysis

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ABSTRACT

Flapping Micro air vehicle (MAV) shows good potential for further development because it has greater survivability in different environment and better manoeuvrable compare to fixed wing and rotary wing. The objectives of this research paper are to develop a prototype of MAV and analyse its behaviour. Literatures on aerodynamic and operation mechanism of flapping vehicle, or bird, were studied to gain the knowledge in designing a flapping MAV. In the designing stage, the key consideration is to minimise the load of MAV. The design components were tested out by the stress analysis to avoid break of the part. The prototype of MAV was done in weigh of 13.5g with 200mm wing span to analysis and experiments were conducted to study the MAV. High speed camera was used to capture the flapping motion and the frequency was determined which is 13.04Hz. According to the equilibrium theory, an experiment was conducted and the lift force of the MAV is calculated as 0.1176N. Thus, further experiment was also conducted to prove the MAV generated lift force but this lift force was insufficient to lift the MAV. The dynamic law of motion theory is applied in this experiment and determined the lift force is 0.103N. The result of this experiment shown the powered MAV does maintain the flight and took longer time to reach ground compare to unpowered MAV.