

A

REPORT ON

CFD ANALYSIS OF DRONE THRUST WITH DUCT

A Project report submitted for the partial fulfillment of the requirements for award
of Degree of

BACHELOR OF TECHNOLOGY
IN
MECHANICAL ENGINEERING

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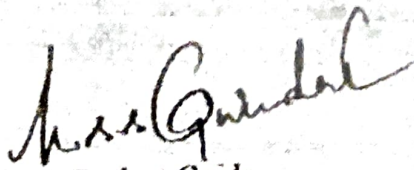
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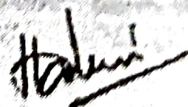
**DEPARTMENT OF MECHANICAL ENGINEERING
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CERTIFICATE

This is to certify that the project entitled "CFD Analysis of drone thrust with duct" is the record of the work carried out by Indala Jagadeesh(18815A0320), Vodugonda Mouli(18815A0370), Adari Gurudatta Ramana Sai Kumar(18815A0319), Jalumuri Sai(18815A0321) students of final year B. Tech in the department of Mechanical engineering. This work is done for the partial fulfilment for the award of BACHELOR OF TECHNOLOGY during the year 2020-2021.


Project Guide


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ABSTRACT

Drone propellers are rotating wings producing lift in the direction of the axis of rotation. Propeller blade design is critical to generate enough thrust to carry the takeoff weight and reduce noise level. In this project, numerical analysis is conducted for the aerodynamic performance of two propeller designs at the static thrust condition. The first design is based on the DJI Spark drone propeller blade and the second design adds a winglet to the first design. 3D CAD models were created in SOLIDWORKS and were imported to SimScale, a cloud-based software, for the computational fluid dynamics (CFD) analysis. The winglet propeller was found to generate 21% more thrust than the original propeller without winglets. The flow patterns, including pressure and velocity distributions were compared for both models. CFD results have been found to follow similar trends with experimental results in terms of thrust coefficient. In addition, predictions of numerical analyses were found to get closer to experimental results at lower airspeeds.