

Abstract Submitted
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Aerodynamic Performance of a Rim Driven Thruster MAXWELL KOGLER, CONOR PACE, HASAN RAZA, MICHAEL VU, OLEG GOUSHCHA, Manhattan College — Rim driven thruster consists of a fan actuated into a rotational motion by a mechanism located at its outer radius, rather than by a centerline shaft as seen in conventional fan designs. Such configuration eliminates a need for a centerline hub containing driving mechanism, allowing for an undisturbed core flow of fluid through the centerline region of the fan. In this study we present a rim driven thruster actuated by an interaction between electric and magnetic fields, similar to the brushless motor with entire fan and supporting structure resembling rotor and stator, respectfully. This thruster operates in air and can be used as a propulsion system in airplanes. The aerodynamic performance was evaluated experimentally by measuring upstream and downstream velocity fields and thrust forces at various flight conditions. Results from the experiments are compared to the predictions made by the Blade Element Theory.

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