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Noise Signature Study of a Rim Driven Thruster HASAN RAZA, MAXWELL KOGLER, CONOR PACE, MICHAEL VU, OLEG GOUSHCHA, Manhattan College — A unique propulsion system has been assembled in which a flow is driven using a fan actuated at its outer diameter rim. This fan configuration eliminates the need for a shaft and a centerline hub required by the conventional fan designs allowing for an undisturbed flow through the centerline region. Also, in our design the fan blades extend from the rim inward towards the centerline. Blades at the outer radius are connected to the rim. The inner radius blade tips are located in a relatively low-flow region associated with small tangential velocity of the fan near the centerline. Therefore, the tip vortices and the associated noise produced by the tip vortices should be minimized compared to the conventional propeller configuration where bade tips are located in a high-tangential velocity region associated with the outer radius. We present an experimental study of noise signature from the rim driven thruster and compare our results to the noise signature of a conventional propeller and fan to comment on any high-frequency noise reduction.

Oleg Goushcha
Manhattan College

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