

Abstract Submitted  
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**The interaction of an array of circumferentially varying stators with a uniform crossflow**<sup>1</sup> JOHN FARNSWORTH, MICHAEL AMITAY, Rensselaer Polytechnic Institute — A propulsor capable of producing maneuvering forces in all directions effectively eliminates the need for additional control surfaces. Side forces can be generated by the propeller through the variation of the inflow swirl velocity to a conventional propeller. These control forces are generated based on the same geometric principles as a helicopter swash-plate. Instead of cyclically adjusting the propeller blade pitch angle, the relative pitch angle of a fixed pitch propeller is cyclically altered through a preswirled inflow generated by an upstream stator row. Wind tunnel experiments were conducted where global and detailed flow measurements were acquired through surface static pressure, and stereoscopic PIV on a simplified propulsor model. From these measurements a better understanding of the fluidic interactions associated with the non-uniform upstream stator row and the flow field was achieved.

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