

Abstract Submitted  
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**An Experimental Investigation of Compressible Dynamic Stall on a Pitching Airfoil**<sup>1</sup> KATIE THORNE, PATRICK BOWLES, University of Notre Dame — A new facility has been designed and constructed at the University of Notre Dame to investigate dynamic stall on a 2-D pitching airfoil at high subsonic Mach numbers. This work is motivated by the need to investigate dynamic stall at conditions relevant to military helicopters. One focus of the experiments is to characterize the role of shock/boundary layer interactions during the pitching cycle. The new dynamic stall facility is integrated into a closed-loop, low turbulence wind tunnel capable of achieving test section Mach numbers in excess of  $M = 0.6$ . The design of the dynamic stall test section was focused on achieving reduced pitching frequencies of up to  $k = 0.2$  and chord Reynolds numbers up to  $5 \times 10^6$ . The facility has the unique ability to execute non-harmonic pitching motions through the use of an actuated pitch link mechanism. Optical access is provided to allow the use of high-speed and Schlieren imaging. Thirty-one flush mounted Kulite dynamic pressure transducers provide the instantaneous unsteady surface pressure distribution over the airfoil. Initial dynamic stall measurements obtained in the new facility will be described.

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