

Abstract Submitted  
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**Experimental Investigation of Dynamic Stall on a Finite Span NACA 0012 Wing**<sup>1</sup> WYATT SPELLMAN, DOUGLAS BOHL, Clarkson University — In this work the velocity and vorticity fields around finite and “infinite” span wings with a NACA 0012 profile undergoing constant rate pitching were quantified using Molecular Tagging Velocimetry (MTV). The “infinite” span wing was bounded by walls to reduce the effects of the wing tip vortex while the finite span wing was bounded by a wall on one end and unbounded on the other. The wings were pitched from  $\alpha = 0$  to  $55^\circ$  with a constant non-dimensional pitch rate of  $\Omega^* = 0.1$  at  $Re_c = 12000$ . The Dynamic Stall Vortex (DSV) was identified and tracked using the “T criteria.” The results showed that the formation and trajectory of the DSV for the finite wing case varied with the spanwise location, with the location of the DSV remaining progressively closer to the airfoil surface towards the wingtip. These results were consistent with the “Omega” vortex structure previously observed in flow visualization. The DSV was also found to remain closer, and convect away from the airfoil surface slower, at all spanwise measurement planes when compared to the infinite span results.

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