

Abstract Submitted
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PIV Measurements for Validation of Self-induction Theory of Vortex Breakdown BRAD THOMPSON, Aeronautics Dept USAF Academy, DANA DABIRI, MITSURU KUROSAKA, Aeronautics Dept University of Washington — **THE PROBLEM:** Tail buffeting is a severe operational and maintenance problem in twin-tailed aircraft. Tail buffeting is driven by aerodynamic forces resulting from the wing leading edge produced concentrated vortices and their subsequent abrupt breakdown and radial expansion. The expansion leads to large-diameter helical vortices, which impose lateral forces on the tails. Various brute-force, empirical approaches have provided some ad-hoc fixes, but poor understanding of the underlying physics prevents effective design solutions. It is not yet possible to design buffet-free aircraft from first principles. Preliminary work offers a unique explanation for vortex breakdown called the *azimuthal vorticity gradient theory* ... (Cain 2001). This paper will present and establish experimental evidence using DPIV to validate this recent theory. Cain, C. B. (2001). *The Self-Induction Theory of Vortex Breakdown*. Aeronautics Dept. Seattle, WA, University of Washington. **Master Thesis.**

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