Abstract Submitted
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Experimental Measurements of a Finite NACA 0015 Wing in an Unsteady Flow as Compared to Theory[1] DASHA GLOUTAK, EMANUELE COSTANTINO, MARK BLANCO, KENNETH JANSEN, JOHN FARNSWORTH, University of Colorado Boulder — Force, moment and velocity measurements of a semi-span, NACA 0015 rectangular wing subjected to unsteady flow are compared to classical surging airfoil theory. Unsteady streamwise flow, generated by a louver system at the wind tunnel inlet, consisted of maximum velocity amplitudes of 40% at frequencies up to 3Hz, with mean chord Reynolds Number below 150,000. These sinusoidal velocity gusts were imposed on the wing in the closed test section and free jet wind tunnel configurations. In the former, velocity changes occurred instantaneously over the entire chord length of the wing, and in the latter the velocity changes propagated at the gust's convective speed. Quasi-steady and unsteady lift coefficient responses were compared to Isaacs' unsteady airfoil theory, which details the lift behavior of an infinite airfoil at constant angle of attack with a variable streamwise velocity.

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