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Computational Fluid Dynamic Simulations of a Finite NACA 0015 Wing in an Unsteady Flow[1] MARK BLANCO, DASHA GLOUTAK, JOHN FARNSWORTH, KENNETH JANSEN, University of Colorado Boulder — Computational fluid dynamic simulations were performed for a finite span NACA 0015 rectangular wing section subjected to an unsteady surging flow in a simulated, open test-section or free jet wind tunnel. The full wing and wind tunnel facility was completely modeled and simulated for accurate comparison to collaborative experimental investigations being performed in parallel. At moderate to high angles of attack the flow over the wing section is observed to undergo periodic, three-dimensional separation and reattachment as the surging flow decelerates and then accelerates, respectively. A detailed analysis of the three-dimensional flow field behavior is discussed focusing on the time varying response of the flow field, surface pressure distribution, and wall shear stress.

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