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**Direct Numerical Simulation of Low Reynolds Number Separated Flow around an Eppler 387** MEHMET SAHIN, University of Colorado, KAMRAN MOHSENI, Univesity of Colorado — Low Reynolds number aerodynamic flows are important for various applications including micro-arial vehicles, sailplanes, leading edge control devices, high-altitude vehicles and wind turbines. These flows are generally characterized by the presence of laminar separation bubbles. These bubbles are generally unsteady and have a significant effect on the overall resulting aerodynamic forces. In this study, the time-dependent unsteady calculations of low Reynolds number flows are carried out over an Eppler 387 airfoil in both two- and three-dimensions. Various instantaneous and time-averaged aerodynamic parameters including pressure, lift, and drag coefficients are calculated in each case and compared with the available experimental data. An observed anomaly in the pressure coefficient around the location of the separation bubble in two-dimensional simulations is attributed to the lack of spanwise flow in two-dimensional simulations that results in vorticity extraction from the forming vortices in this region in three-dimensional flows. Preliminary three-dimensional calculations verified this argument.

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