Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Experimental Study of Thin NACA Symmetric and Cambered Airfoils at Low Reynolds Numbers VIBHAV DURGESH, ELIFALET GARCIA, HAMID JOHARI, Cal State Univ - Northridge — The low-Reynolds number performance of airfoils is intriguing due to the complex fluid dynamics phenomena associated with flow at these Reynolds numbers, like laminar separated flow, increased transition susceptibility, and the separated shear layer that undergoes a rapid transition to a turbulent flow. Therefore, the objective of this investigation was to experimentally study the aerodynamic performance of a thin symmetric airfoil (NACA-0012) and a cambered (NACA-6412) airfoil at low Reynolds numbers, and to identify the flow structures responsible for altering the aerodynamic performance. Lift and drag force measurements were performed for both airfoils along with flow visualization measurements for Reynolds numbers of 20,000, 30,000, 40,000, and 50,000 and angles of attack between -8^o to 15^o with an increment of 1^o. All the measurements for this study were performed in the water tunnel facility at California State University Northridge. A significant difference in the aerodynamic performance and flow behavior of the thin cambered airfoil is observed as compared to that of the thin symmetric airfoil. The presentation will discuss the correlation between observed flow structures and aerodynamic performance of both airfoils at low-Reynolds numbers.

Vibhav Durgesh
Cal State Univ - Northridge

Date submitted: 01 Aug 2016 Electronic form version 1.4