Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Three-dimensional separation over a finite span NACA 0015 airfoil JACOB NEAL, MICHAEL AMITAY, Rensselaer Polytechnic Institute — Three-dimensional separation over a finite span, cantilevered NACA 0015 airfoil is influenced by several parameters. The effects of aspect ratio, Reynolds number, and angle of attack were explored in a series of wind tunnel experiments. Oil flow visualization (OFV) was performed on wings of aspect ratio four, two, and one. For all aspect ratios, it was seen that the Reynolds number did not affect the structures in the oil. For angles of attack above stall, two distinct foci were formed, one near the root and another counter-rotating near the wing tip. In addition, for a couple of cases, the flow field over the airfoil and the structures in its wake were explored using stereo particle image velocimetry at Reynolds number 330,000 for aspect ratio of two. At the higher angle, a clear three-dimensional separation bubble was present at the middle of the wing, and a surface normal vortex was seen to emerge from the focus points seen in the OFV and bend downstream into the flow.

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Date submitted: 26 Jul 2019 Electronic form version 1.4