Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Flexible Airfoils and Their Effect on Flow Separation[1] DAVID FARIYIKE, The University of Alabama, KELLIS KINCAID TEAM, LALIT ROY TEAM, DR. DAVID MACPHEE TEAM, ROOHANY MAHMOOD TEAM — In the US alone there are 5,000 planes in flight at any given moment and 52,000 wind turbines in operation. Any object that is subject to high wind speeds or varying attack angles has the potential to have flow separation. Flow separation increases drag which results in a less efficient aerodynamic system. Previous research has shown that active shape changing airfoils can reduce flow separation. However, since the shape change is active it introduces parasitic cost to the system, detracting overall energy capture. In this project, a passive method of reducing flow separation with flexible airfoils is investigated. The flexible airfoils have shown to increase airfoil performance as compared to a rigid design. While the flexible airfoils can increase airfoil performance, it cannot withstand the same wind speeds as its rigid counterpart. The performance improvement is speculated to be a result of boundary layer reattachment post the point of stall, reducing the flow separation and increasing lift when compared to the rigid design.

[1]National Science Foundation

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Date submitted: 01 Aug 2019 Electronic form version 1.4