Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

A low-turbulence transverse gust generator in a wind tunnel[1]
DAVID OLSON, AHMED NAGUIB, MANOOCHEHR KOOCHESFAHANI, Michigan State University — There exists a broad range of aerodynamic problems where the commonly used steady uniform freestream condition is not appropriate. Airfoil-gust interactions are one such problem, with the transverse gust being particularly difficult to study experimentally. We present a novel transverse gust generator consisting of an actuated array of vortex generators mounted to a wind tunnel's test section. The primary advantage of the design over existing gust generators is its capability to produce a reasonably-uniform transverse stream without producing turbulence in the freestream. The generator's design can potentially allow for the time history control of the magnitude, direction, and duration of the gust strength. A simplified model for the performance of the design, and the experimental characterization of the gust generator are discussed.

[1]This work was supported by ONR grant number N00014-16-1-2760.

David Olson
Michigan State University

Date submitted: 26 Jul 2019 Electronic form version 1.4