Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

The leading-edge vortex of swift-wing shaped delta wings[1]
ROWAN MUIR, ABEL ARREDONDO-GALEANA, IGNAZIO MARIA VIOLA, Institute for Energy Systems, School of Engineering, University of Edinburgh —
Recent investigations on the aerodynamics of natural fliers have illuminated the significance of the Leading-Edge Vortex (LEV) for lift generation in a variety of flight conditions. In this investigation, a model non-slender delta shaped wing with a sharp leading-edge is tested at low Reynolds Number, along with a delta wing of the same design, but with a modified trailing edge inspired by the wing of a common swift *Apus apus*. The effect of the tapering swift wing on LEV development and stability is compared with the flow structure over the un-modified delta wing model through particle image velocimetry. For the first time, a leading-edge vortex system consisting of a dual or triple LEV is recorded on a swift-wing shaped delta wing, where such a system is found across all tested conditions. It is shown that the spanwise location of LEV breakdown is governed by the local chord rather than Reynolds Number or angle of attack. These findings suggest that the trailing-edge geometry of the swift wing alone does not prevent the common swift from generating an LEV system comparable with that of a delta shaped wing.

[1]This work received funding from the Engineering and Physical Sciences Research Council [EP/M506515/1] and the Consejo Nacional de Ciencia y Tecnología (CONACYT).

Ignazio Maria Viola
Institute for Energy Systems, School of Engineering, University of Edinburgh

Date submitted: 04 Aug 2017 Electronic form version 1.4