

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Dynamic stall reattachment revisited KAREN MULLENERS, Ecole Polytechnique Federale de Lausanne — Dynamic stall on pitching airfoils is an important practical problem that affects for example rotary wing aircraft and wind turbines. It also comprises a number of interesting fundamental fluid dynamical phenomena such as unsteady flow separation, vortex formation and shedding, unsteady flow reattachment, and dynamic hysteresis. Following up on past efforts focussing on the separation development, we now revisited the flow reattachment or stall recovery process. Experimental time-resolved velocity field and surface pressure data for a two-dimensional sinusoidally pitching airfoil with various reduced frequencies was analysed using different Eulerian, Lagrangian, and modal decomposition methods. This complementary analysis resulted in the identification of the chain of events that play a role in the flow reattachment process, a detailed description of that role, and characterisation of the individual events by the governing time-scales and flow features.

Karen Mulleners
Ecole Polytechnique Federale de Lausanne

Date submitted: 06 Jul 2017

Electronic form version 1.4