

Abstract Submitted
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Utilization of transient growth disturbances for drag reduction in boundary layers¹ JENS H.M. FRANSSON, KTH Royal Institute of Technology — Over the last decade wind tunnel experiments^{2,3} have shown that steady streamwise elongated streaks, produced by the lift-up mechanism, are able to reduce skin-friction drag by delaying transition to turbulence in flat plate boundary layers. Steady streaks may be generated by passive devices such as circular roughness elements or miniature vortex generators (MVGs), the latter being the more effective device. The optimal streak amplitude to accomplish the stabilizing boundary-layer effect is around 30% of the free-stream velocity (considering an integrated amplitude definition). On the basis of a parametrical study, by varying boundary layer as well as geometrical parameters of the MVGs, a streak amplitude scaling founded on empiricism has been proposed, which is necessary when applying the control strategy in new flow configurations. Different types of disturbances have successfully been damped and the possibility of extending the laminar boundary layer even further by mounting a second array of MVGs downstream of the first one has been accomplished. A review of the AFRODITE program results and future work will be presented.

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²Fransson et al. PRL **96**, 064501, 2006.

³Shahinfar et al. PRL **109**, 074501, 2012.

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