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# Numerical Simulation of Vortex Generators on a Winglet Control Surface

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## Abstract

The objective of the present paper is improving the effectiveness of a winglet control surface at deflections greater than  $\approx 5^\circ$  through passive vortex generators (VG) placed on the control surface. Without deflection, the VGs are aligned with the flow direction and thus have almost no impact. The conceptual idea is that a control surface deflection changes the flow direction in such a way that the VGs become active and delay flow separation from the trailing edge. To decide on an appropriate initial Vortex Generator (VG) configuration the aerodynamic characteristics of the winglet are investigated first with Reynolds averaged Navier-Stokes (RANS) simulations. The functional principle of the concept is then demonstrated. A parametric study of different VG dimensions investigates the effectiveness for a range of flow conditions and deflection angles.

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