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Vortragstitel	Design and Qualification of a Winglet with a High Speed Oscillating Active Control Surface for Aeroelastic Wind Tunnel Experiments under Cryogenic Conditions
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Abstract	Within the frame of the Aero-Structural Dynamics Methods for Airplane Design (ASDMAD) transfer project wind tunnel experiments are carried out employing a flexible semi-span wing model. The wing model is retrofit with two different winglets, in order to investigate the unsteady aero-structural interaction, The wing model is actively excited in its modal shapes using piezoelectric actuators located in the wing root. The experiments are performed at Reynolds and Mach Numbers typical for large passenger aircraft in cruise flight at the European Transonic Windtunnel (ETW). The first configuration is a rigid, conventional winglet, while the second one is equipped with a trailing edge control surface. This control surface can be quasi-statically deflected, as weil as excited at high frequency using in-situ piezoelectric actuators. This simultaneously aims at local aeroclynamic trimming and active excitation or suppression of modal responses. The final design of the in-situ Active Control Surface (ACS) is a compromise between contradicting demands including the temperature range (cryogenic to room temperature) , limited available space, necessary power output, strength and stiffness. Further contribution factors include implemented instrumentation, feasibility and control equipment. This paper presents on the development of this winglet in detail, including design, sizing, manufacturing and qualification.