

Airbus A320 Flight Tests of the AFLoNext Project with the Vertical Tail Plane Equipped by a Hybrid Laminar Flow Control System

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A laminar boundary layer causes a much lower friction drag than a turbulent one. For Mach numbers up to 0.75 and sweep angles below twenty degrees, laminarity can be reached by suitable wing shaping alone [1]. For transport aircraft flying at higher Mach numbers with larger sweep angles flying, however, we also need to apply active boundary layer control through suction at the leading edge. Because of the combination of suction and shaping, this technology is called Hybrid Laminar Flow Control (HLFC). The feasibility of HLFC was proven in the 1990s by both Boeing and Airbus using the systems of that time, though these were prohibitively heavy and complex.



Figure 1: Airbus A320 ATRA of DLR with HLFC test system on the vertical tail plane

In the meantime, within the European AFLoNext project, a much simpler and lighter HLFC system has been designed for the vertical tail plane (VTP) of an A320 aircraft (Fig. 1). This presentation will give an overview of design [2], manufacturing, measuring systems, and installation on the aircraft. Furthermore, we will present some results of the flight tests from spring, 2018.

References:

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- [3] G. Schrauf, H. von Geyr, Hybrid Laminar Flow Control on A320 Fin: Retrofit Design and Sample Results, AIAA Journal of Aircraft (2021), Vol. 58, No. 6, November-December 2021, pp. 1272-1280.
- [4] G. Schrauf, H. von Geyr, Simplified Hybrid Laminar Flow Control for the A320 Fin. Part 2: Evaluation with the e^N-method, AIAA SciTech Forum, 11-15 & 19-21 January 2021, Virtual Event, AIAA Paper No. AIAA-2021-1305.