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Noise Reduction Mechanism of a High-Lift Airfoil's Leading-Edge Device. RINIE AKKERMANS, PAUL BERNICKE, TU Braunschweig — Airframe noise is a major part of the total noise produced by an aircraft during its landing phase, of which the wing's leading-edge device (i.e., slat) is a major contributor. In this contribution, the noise reduction of such slat devices is investigated by means of Overset-LES simulations. It solves the compressible Navier-Stokes equations in perturbation form over a background flow, supplemented by a sub-filter-stress model. Two geometries are considered, i.e., a reference and a modified long-cord slat geometry. The effect of the long-cord slat on the turbulent sound sources is investigated by mainly considering turbulence statistics and span-wise coherence length in the slat cove region. Furthermore, acoustic far-field propagation reveals the influence of long-cord slat on the directivity. Results show that the noise reduction is mainly resulting from a shielding effect by the long-cord slat, rather than modification of the turbulent sound source in the slat cove region itself.

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