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Control of Flow Structure and Topology on a Delta Wing of Low Sweep Angle via Trailing-Edge Blowing MEHMET YAVUZ, DONALD ROCKWELL, Lehigh University — The near-surface flow structure and topology are characterized on a low swept delta wing, which is subjected to trailing-edge blowing. A technique of high-image-density particle image velocimetry is employed to determine the topological critical points adjacent to the surface and in the near-wake of the wing, in relation to the dimensionless magnitude of the blowing coefficient. These topological features are, in turn, interpreted in conjunction with patterns of surface-normal vorticity and near-surface velocity fluctuations, which provide an indication of buffet loading. Even though the jet blowing is at the trailing-edge, it has a remarkable, global influence on the surface patterns located well upstream; at high angle-of-attack, it leads to eradication of large-scale, three-dimensional separation in the vicinity of the apex. Further investigation of the effect of trailing-edge blowing involves topological patterns in crossflow planes above the surface of the wing, which relate the structure of the leading-edge vortices to the existence of three-dimensional surface separation, as well as other features along the wing surface.

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