Abstract Submitted
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Numerical investigation of the interaction between a finite-span synthetic jet and a cross flow over a swept wing[1] MICHEL RASQUIN, NICHOLAS MATI, ECAE, University of Colorado at Boulder, ONKAR SAHNI, PECOS/ICES, The University of Texas at Austin, KENNETH JANSEN, ECAE, University of Colorado at Boulder — The interaction of a finite-span synthetic jet with the flow over a finite and swept back wing at a Reynolds number of 10^5 and at low angles of attack is studied by means of parallel adaptive flow simulations. The focus of the work is to explore the details of the flow structures in the vicinity of the synthetic jet, in coordination with experimental studies. Both instantaneous and phase-averaged flow fields are collected for that purpose. It is found that an array of counter-rotating vortical structures formed by the synthetic jet interacts with the cross flow, and develops three-dimensionalities as they are advected downstream. The effect of two blowing ratios (of 0.8 and 1.2) is also explored. In the case of low blowing ratio, coherent vortical structures are found to be dominant. At high blowing ratio, coherent vortical structures breakdown forming random ones. Finally, the predictions of the CFD simulations and the experimental measurements are compared.

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