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An investigation of the influence of freestream turbulence on the laminar separation bubble of an SD7003 airfoil at low Reynolds number<sup>1</sup> DAVID OLSON, ALAN KATZ, AHMED NAGUIB, MANOOCHEHR KOOCHES-FAHANI, Michigan State University, DONALD RIZZETTA, MIGUEL VISBAL, Air Force Research Laboratory, Wright-Patterson Air Force Base — There is considerable discrepancy in the literature regarding the location of separation and reattachment points on the steady SD7003 airfoil obtained in different experimental and computational studies. Among several factors that could lead to this discrepancy in experiments, the facility's freestream turbulence level is believed to be important. Freestream turbulence acts as an excitation source that can influence the evolution of the boundary layer and the separated shear layer. The current investigation tries to quantify this influence by deliberately modifying the freestream turbulence using a turbulence-generating grid upstream of the airfoil. Multiline single-component Molecular Tagging Velocimetry (MTV) with its high resolution near-wall measurement capability (approximately 10 times better cross-stream resolution than recent PIV studies) is utilized. Results with/without the grid are compared with computations and other experiments in different facilities.

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