

Abstract Submitted  
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**Dynamic 3-D vortex structure of the laminar separation bubble on SD7003 airfoil**<sup>1</sup> WEI ZHANG<sup>2</sup>, RAINER HAIN, CHRISTIAN J. KÄHLER, Institute of Fluid Mechanics, Technical University of Braunschweig — Recent increasing interest in laminar separation bubble (LSB) is aroused by the development of the micro air vehicles (MAVs), which normally cruise in the Reynolds number range of 50,000-200,000. This paper studies the LSB over the SD 7003 airfoil at the angle of attack  $\alpha=4^\circ$  and at  $Re=60,000$  using the time-resolved PIV technique. A Nd:Yag laser operated at 1000 Hz and a high speed CMOS camera was synchronized to capture the particle images with the full resolution of 1504 x 1128 pixels at 1000 fps. Measurements were carried out from two orthogonal views: in the stream-wise wall-normal plane and the quasi-surface-parallel plane. 3-D disturbance was observed to start even prior to the point of transition. Vortex shedding in transition near the reattachment region of the LSB was clearly identified in the span-wise wall-normal plane, with the dominant K-H frequency of around 10.7 Hz. And subsequent vortex evolution in the reattached turbulent boundary layer was found to be characterized by paired positive and negative vorticity packets transported downstream.

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