

Abstract Submitted  
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**3D Plenoptic PIV Measurements of a Shock Wave Boundary Layer Interaction**<sup>1</sup> BRIAN THUROW, JOHNATHAN BOLTON, Auburn University, NISHUL ARORA, FARRUKH ALVI, Florida State University — Plenoptic particle image velocimetry (PIV) is a relatively new technique that uses the computational refocusing capability of a single plenoptic camera and volume illumination with a double-pulsed light source to measure the instantaneous 3D/3C velocity field of a flow field seeded with particles. In this work, plenoptic PIV is used to perform volumetric velocity field measurements of a shock-wave turbulent boundary layer interaction (SBLI). Experiments were performed in a Mach 2.0 flow with the SBLI produced by an unswept fin at 15° angle of attack. The measurement volume was 38 x 25 x 32 mm<sup>3</sup> and illuminated with a 400 mJ/pulse Nd:YAG laser with 1.7 microsecond inter-pulse time. Conventional planar PIV measurements along two planes within the volume are used for comparison. 3D visualizations of the fin generated shock and subsequent SBLI are presented. The growth of the shock foot and separation region with increasing distance from the fin tip is observed and agrees with observations made using planar PIV. Instantaneous images depict 3D fluctuations in the position of the shock foot from one image to the next.

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Brian Thurow  
Auburn University

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