Abstract Submitted
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A Methodology for Time-Resolved microDPIV JAIME SCHMIEG, School of Biomedical Engineering and Sciences, Virginia Tech, ADRIC ECKSTEIN, Center for Advanced Aviation Systems Development, The MITRE Corporation, JOHN CHARONKO, PAVLOS VLACHOS, School of Biomedical Engineering and Sciences, Virginia Tech — Micro Digital Particle Image Velocimetry (uDPIV) measurements are often limited to time averaged analyses due to low signal to noise ratios, high background illumination, and low particle seeding. As a result, the measurement of transient microscale flows is difficult to achieve through conventional DPIV correlation methods. Eckstein and Vlachos (2009), presented the Robust Phase Correlation (RPC) method which utilizes a series of digital filters to mitigate the effects of background noise. This study further explores the potential of RPC using experimentally derived, time-resolved uPIV images taken within three different microchannels of various geometries. Performance comparisons were based on RMS error, as well as percent of erroneous vectors, as determined by the mode-ratio bootstrapping method (Pun et. al. 2007). Results displayed a significant reduction of RMS error and erroneous vectors for the RPC method in comparison to standard techniques. 1. Eckstein and Vlachos. Meas. Sci. Technol. (2009). 2. Pun et al. Meas. Sci. Technol. (2007).

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