

Abstract Submitted  
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**PTV implementation on two-phase flow in a forced impinging jet<sup>1</sup>**

RAHUL MULINTI, KENNETH KIGER, University of Maryland - College Park — Two-phase flow experiments have been conducted to predict particle suspension and sedimentation within coupled particle-laden flows relevant to rotorcraft brownout conditions. A hybrid PIV/PTV technique has been implemented to improve the performance in high concentration regions, while still retaining the flexibility inherent to PTV to resolve multi-valued velocity displacements within a given interrogation region. These processing tools have been optimized and their reliability has been validated using synthetic particle images in a prescribed Taylor-Green vortex flow model. The parametric space of investigation included particle image density, Stokes number and image delay times. Experiments have been conducted to study the interaction of a mobile sediment bed with characteristic flow structures similar to those within a rotor wake. The mobilization conditions and wall-normal flux of particulates by the vortex-wall interaction will be reported for different particle size classes, and are correlated to the local vortex conditions such as vortex decay and its subsequent three dimensionalization. The effect of turbulent coupling between the particle and fluid momentum, as based on a point-particle drag law valid for dilute concentrations of particles has been examined.

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