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Two-phase PIV measurements of particle suspension in a forced impinging jet[1] RAHUL MULINTI, KEN KIGER, University of Maryland — The condition of rotorcraft brownout is characterized by intense dust suspension that is uplifted during landing and takeoff operations in regions covered with loose sediment. To predict particle suspension and sedimentation within coupled particle-laden flows, detailed characterization of the micro-scale mechanics is needed within a prototypical flow that captures the essence of the rotorcraft/ground wake interactions. Two-phase PIV has been used to study the interaction of a sediment bed made of glass spheres with characteristic flow structures reminiscent from flow within a rotor wake. In order to make reliable simultaneous two-phase PIV measurements, a phase discrimination algorithm from a single two-phase image has been implemented. The validity of the separation is checked by processing images that consisted only of the very small tracer particles, or only the dispersed phase particles, and examining how much "cross-talk" was present between the phases. The mobilization and wall-normal flux of particulates by the vortex-wall interaction will be reported for several different operational conditions, and correlated to the local vortex conditions.

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