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Coanda-assisted Spray Manipulation KATIE MABEY, BARTON SMITH, REID ARCHIBALD, BRIAN WEST, Utah State University — An overview of research on a flow control technique called Coanda-assisted Spray Manipulation (CSM) is presented. CSM uses a high-momentum control jet under the influence of the Coanda effect to vector a high volume-flow jet or spray. Actuators provide the capability of moving the location of applied control flow making rotary or arbitrary motion of the vectored flow possible. The presented work includes a fundamental isothermal study on the effects of rotation speed and Reynolds number on a vectored jet using a belt-driven CSM actuator. Three-component velocity data were acquired for three Reynolds numbers and three rotation speeds using timed resolved high-speed stereo Particle Image Velocimetry. A second CSM system with 16 pneumatically-driven control ports has been retrofitted to a flame spray gun. This combination provides the capability to rapidly alter the direction of applied metal powders. High speed video of this process will also be presented. Finally, a fundamental study on the pneumatic system's response to minor losses and connection lines of varying lengths is presented.

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