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Unsteady Aerodynamic Flow Control of a Suspended Axisymmetric Moving Platform[1] THOMAS LAMBERT, BOJAN VUKASINOVIC, ARI GLEZER, Georgia Tech — The aerodynamic forces on an axisymmetric wind tunnel model are altered by fluidic interaction of an azimuthal array of integrated synthetic jet actuators with the cross flow. Four-quadrant actuators are integrated into a Coanda surface on the aft section of the body, and the jets emanate from narrow, azimuthally segmented slots equally distributed around the model's perimeter. The model is suspended in the tunnel using eight wires each comprising miniature in-line force sensors and shape-memory-alloy (SMA) strands that are used to control the instantaneous forces and moments on the model and its orientation. The interaction of the actuation jets with the flow over the moving model is investigated using PIV and time-resolved force measurements to assess the transitory aerodynamic loading effected by coupling between the induced motion of the aerodynamic surface and the fluid dynamics that is driven by the actuation. It is shown that these interactions can lead to effective control of the aerodynamic forces and moments, and thereby of the model's motion.

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