

Abstract Submitted
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Assessment of Closed-Loop Control Using Multi-Mode Sensor Fusion For a High Reynolds Number Transonic Jet¹ KERWIN LOW, BASMAN ELHADIDI, MARK GLAUSER, Syracuse University — Understanding the different noise production mechanisms caused by the free shear flows in a turbulent jet flow provides insight to improve “intelligent” feedback mechanisms to control the noise. Towards this effort, a control scheme is based on feedback of azimuthal pressure measurements in the near field of the jet at two streamwise locations. Previous studies suggested that noise reduction can be achieved by azimuthal actuators perturbing the shear layer at the jet lip. The closed-loop actuation will be based on a low-dimensional Fourier representation of the hydrodynamic pressure measurements. Preliminary results show that control authority and reduction in the overall sound pressure level was possible. These results provide motivation to move forward with the overall vision of developing innovative multi-mode sensing methods to improve state estimation and derive dynamical systems. It is envisioned that estimating velocity-field and dynamic pressure information from various locations both local and in the far-field regions, sensor fusion techniques can be utilized to ascertain greater overall control authority.

¹Air Force Office of Scientific Research

Patrick Shea
Syracuse University

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