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**Effect of an Adjacent Plate on Supersonic Jet Noise** EPHRAIM GUTMARK, PABLO MORA, FLORIAN BAIER, Univ of Cincinnati, KAILAS KAILASANATH, RYAN JOHNSON, KAMAL VISWANATH, Naval Research Laboratory, UNIVERSITY OF CINCINNATI COLLABORATION, NAVAL RESEARCH LABORATORY COLLABORATION — A flat plate was installed parallel to  $Md = 1.5$  circular and rectangular ( $AR=2$ ) jets. Flow structures, from high speed shadowgraphs, and acoustic far-field at design, overexpanded and underexpanded conditions are compared between the free jets and the jets with the plate at different distances from the jet axis,  $0.5-3De$ . The circular and rectangular jets had similar far field acoustics except that the latter had stronger screech tones. The free jet exhibited strong flapping mode and screech when overexpanded and broadband shock associated noise at all NPRs. When the plate was at the nozzle lip, the jet was stabilized and screech and BBSN were suppressed. Flapping and screech reappeared when the plate was moved away from the jet and at the largest stand off distance they were amplified. In the shielded region behind the plate, noise levels at all frequencies except the very low ones were significantly reduced for all plate positions. Conversely, reflection at the azimuthal angle above the plate enhanced OASPL magnitudes across all conditions. Mixing noise dominant in the downstream angle was affected by the plate location at the side azimuthal angle. The measurements were compared with LES computations of the SPL spectra and the OASPL and excellent agreement was shown.

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