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Experimental study of midplane jet evolution in multiple jets at Mach 2.0

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Abstract

The flowfield characteristics are experimentally studied in the inter-nozzle region of free jets from twin and triple supersonic nozzles. The nozzle is designed for Mach number 2.0, and the inter-nozzle spacing is twice the nozzle exit diameter. The impact of multiple jets on the flow characteristics such as the jet spread, supersonic jet core, and the shock wave structure is explored using pitot pressure readings and the schlieren technique. For Mach number 2.0 at nozzle pressure ratio (NPR) 2 and 8.5, pitot pressures are measured along the centerline, along the twin jet 's midplane , and the centroid of the triple jet . The crosswire tab is used as a passive control tool at the nozzle exit in two orientations to studying the effect of control. Schlieren images of Mach 2.0 twin jet at NPR 8.5 reveal that the supersonic jet core is different in a controlled jet than the uncontrolled jet .

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