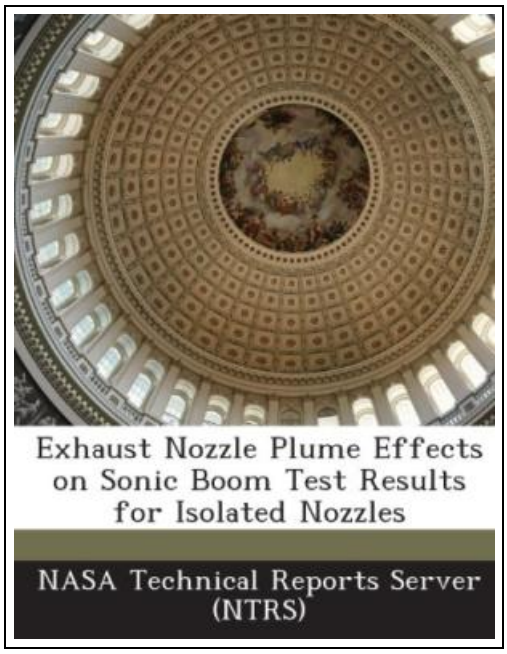
Exhaust Nozzle Plume Effects on Sonic Boom Test Results for Isolated Nozzles



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EXHAUST NOZZLE PLUME EFFECTS ON SONIC BOOM TEST RESULTS FOR ISOLATED NOZZLES

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BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 28 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.Reducing or eliminating the operational restrictions of supersonic aircraft over populated areas has led to extensive research at NASA. Restrictions were due to the disturbance of the sonic boom, caused by the coalescence of shock waves formed off the aircraft. Recent work has been performed to reduce the magnitude of the sonic boom N-wave generated by airplane components with focus on shock waves caused by the exhaust nozzle plume. Previous Computational Fluid Dynamics (CFD) analysis showed how the shock wave formed at the nozzle lip interacts with the nozzle boat-tail expansion wave. An experiment was conducted in the 1- by 1-ft Supersonic Wind Tunnel at the NASA Glenn Research Center to validate the computational study. Results demonstrated how the nozzle lip shock moved with increasing nozzle pressure ratio (NPR) and reduced the nozzle boat-tail expansion, causing a favorable change in the observed pressure signature. Experimental results were presented for comparison to the CFD results. The strong nozzle lip shock at high values of NPR intersected the nozzle boat-tail expansion and suppressed the expansion wave. Based on these results, it may be feasible to reduce the boat-tail expansion for a future supersonic aircraft with under-expanded nozzle exhaust flow by modifying nozzle pressure or nozzle divergent section geometry. This item ships from La Vergne,TN. Paperback.

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