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Analysis of Buzz in a Supersonic Inlet

By Rodrick V. Chima

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 46 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. A dual-stream, low-boom supersonic inlet designed for use on a small, Mach 1.6 aircraft was tested experimentally in the 8- by 6-Foot Supersonic Wind Tunnel (SWT) at the NASA Glenn Research Center (GRC). The tests showed that the inlet had good recovery and stable operation over large mass flow range. The inlet went into buzz at mass flows well below that needed for engine operation, and the experiments generated a wealth of data during buzz. High frequency response pressure measurements and high-speed schlieren videos were recorded for many buzz events. The objective of the present work was to use computational fluid dynamics (CFD) to predict some of the experimental data taken during buzz, compare those predictions to the experimental data, and to use both datasets to explain the physics of the buzz cycle. The calculations were done with the Wind-US CFD code using a second-order time-accurate differencing scheme and the SST turbulence model. Computed Mach number contours were compared with schlieren images, and ensemble-averaged unsteady pressures were compared to data. The results showed that the buzz cycle consisted partly of...



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