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Cross-Stream Piv Measurements of Jets with Internal Lobed Mixers

By James Bridges

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 26 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. With emphasis being placed on enhanced mixing of jet plumes for noise reduction and on predictions of jet noise based upon turbulent kinetic energy, unsteady measurements of jet plumes are a very important part of jet noise studies. Given that hot flows are of most practical interest, optical techniques such as Particle Image Velocimetry (PIV) are applicable. When the flow has strong azimuthal features, such as those generated by chevrons or lobed mixers, traditional PIV, which aligns the measurement plane parallel to the dominant flow direction is very inefficient, requiring many planes of data to be acquired and stacked up to produce the desired flow cross-sections. This paper presents PIV data acquired in a plane normal to the jet axis, directly measuring the cross-stream gradients and features of an internally mixed nozzle operating at aircraft engine flow conditions. These nozzle systems included variations in lobed mixer penetration, lobe count, lobe scalloping, and nozzle length. Several cases validating the accuracy of the PIV data are examined along with examples of its use in answering questions about the jet noise generation processes in...



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