

Ejector Enhanced Pulsejet Based Pressure Gain Combustors: An Old Idea with a New Twist (Paperback)



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Reviews

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(Mrs. Yasmine Crona)

EJECTOR ENHANCED PULSEJET BASED PRESSURE GAIN COMBUSTORS: AN OLD IDEA WITH A NEW TWIST (PAPERBACK)



Bibliogov, United States, 2013. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****. An experimental investigation of pressure-gain combustion for gas turbine application is described. The test article consists of an off-the-shelf valved pulsejet, and an optimized ejector, both housed within a shroud. The combination forms an effective can combustor across which there is a modest total pressure rise rather than the usual loss found in conventional combustors. Although the concept of using a pulsejet to affect semi-constant volume (i.e., pressure-gain) combustion is not new, that of combining it with a well designed ejector to efficiently mix the bypass flow is. The result is a device which to date has demonstrated an overall pressure rise of approximately 3.5 percent at an overall temperature ratio commensurate with modern gas turbines. This pressure ratio is substantially higher than what has been previously reported in pulsejet-based combustion experiments. Flow non-uniformities in the downstream portion of the device are also shown to be substantially reduced compared to those within the pulsejet itself. The standard deviation of total pressure fluctuations, measured just downstream of the ejector was only 5.0 percent of the mean. This smoothing aspect of the device is critical to turbomachinery applications since turbine performance is, in general, negatively affected by flow non-uniformities and unsteadiness. The experimental rig will be described and details of the performance measurements will be presented. Analyses showing the thermodynamic benefits from this level of pressure-gain performance in a gas turbine will also be assessed for several engine types. Issues regarding practical development of such a device are discussed, as are potential emissions reductions resulting from the rich burning nature of the pulsejet and the rapid mixing (quenched) associated with unsteady ejectors.



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