



An Experimental Study of Characteristic Combustion-Driven Flow for CFD Validation

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# An Experimental Study of Characteristic Combustion-Driven Flow for Cfd Validation

By Robert J. Santoro

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 130 pages. Dimensions: 9.7in. x 7.4in. x 0.3in. A series of uni-element rocket injector studies were completed to provide benchmark quality data needed to validate computational fluid dynamic models. A shear coaxial injector geometry was selected as the primary injector for study using gaseous hydrogen/oxygen and gaseous hydrogen/liquid oxygen propellants. Emphasis was placed on the use of non-intrusive diagnostic techniques to characterize the flowfields inside an optically-accessible rocket chamber. Measurements of the velocity and species fields were obtained using laser velocimetry and Raman spectroscopy, respectively. Qualitative flame shape information was also obtained using laser-induced fluorescence excited from OH radicals and laser light scattering studies of aluminum oxide particle seeded combusting flows. The gaseous hydrogen/liquid oxygen propellant studies for the shear coaxial injector focused on breakup mechanisms associated with the liquid oxygen jet under sub-critical pressure conditions. Laser sheet illumination techniques were used to visualize the core region of the jet and a Phase Doppler Particle Analyzer was utilized for drop velocity, size and size distribution characterization. The results of these studies indicated that the shear coaxial geometry configuration was a relatively poor injector in terms of mixing. The oxygen...



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