

DEVELOPMENT OF A HIGH PRESSURE OPTICALLY ACCESSIBLE
COMBUSTOR AND SHEAR CO AXIAL INJECTOR

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Dedication

I would like to dedicate this work to my parents, Samuel and Maria, for without their inspiration and support I would not be the man I am today.

PREVIEW

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by

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THESIS

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PREVIEW

Abstract

A trend in the last decade in the field of propulsion and rocketry is leaning toward the use of the combination of Liquid Methane and Liquid Oxygen as propellant fuels. This is in contrast with the earlier trend of using Hydrogen systems and toxic hypergolic systems. The Multi-Purpose Optically Accessible Combustor (MOAC) and Shear Coaxial injectors have been developed to investigate injector design and combustion research involving Oxygen and Methane propellants. The MOAC is intended for the experimentation and research of combustion of liquid and gaseous propellants. Development of the MOAC system and versatility to use a number of injector styles is discussed. Development of Shear Coaxial injectors common with Oxygen and Methane systems and geometric influences are discussed as well. Instrumentation critical to obtaining test data for analysis of the thermodynamic properties of both the propellants and the combustion chamber are detailed. Optical instrumentation associated with the MOAC system is thoroughly described to identify the characteristics of the spray and combustion dynamics. Finally, testing parameters will be explained as well as a summary of initial test results concluded from initial testing.

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