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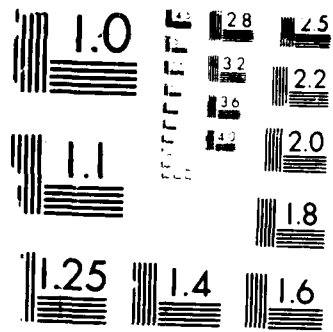
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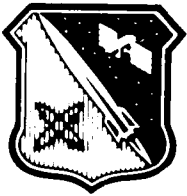
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Final Report  
for the period  
January 1981 to  
September 1987

# Combustion Mechanisms

September 1987

Author:  
T. Edwards

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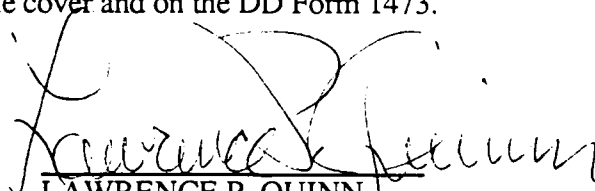
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## FOREWORD

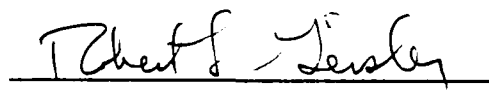
This is the final report for the Air Force Astronautics Laboratory (AFAL) in-house study Combustion Mechanisms. The project covered a 6.5 year period from January 1981 to September 1987. AFAL project managers were David Mann, David P. Weaver, and Tim Edwards.

This technical report has been reviewed and is approved for release and distribution in accordance with the distribution statement on the cover and on the DD Form 1473.

  
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<p>This is the final report of the Combustion Mechanisms project. This project covered a 6.5 year time period. The general goal of this project was to utilize the recently developed laser-based combustion diagnostic probes to learn more about the chemistry and physics occurring in high pressure solid propellant flames. References to published results are included in the report.</p>			
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## INTRODUCTION

This is the final report for the AFAL in-house program "Combustion Mechanisms." The general goal of this project was to utilize the recently developed laser-based combustion diagnostic probes to learn more about the chemistry and physics occurring in high pressure solid propellant flames. This involved modeling of the molecular dynamics in flames, experimental studies of chemiluminescence, and laser-induced fluorescence in high pressure solid propellant flames. The project is continuing under the title "High Pressure Combustion Kinetics." A good summary of the progress made in this project can be found in References 7 and 9.

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9. Edwards, T., "Modelling and Experimental Measurements of Solid Propellant Flame Structure," paper presented at 24th JANNAF Combustion Meeting, Naval Postgraduate School, Monterey, CA (Oct. 1987).
10. Edwards, T., "Laser-Induced Fluorescence in High Pressure Solid Propellant Flames," presented at Optical Society of America Topical Meeting on Laser Applications to Chemical Analysis, North Lake Tahoe, CA (Jan. 1987).
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12. Edwards, T. "Laser-Induced Fluorescence of CN in Solid Propellant Flames," Western States Section/Combustion Institute Paper WSS/CI 86-18, presented at University of Arizona (Oct. 1986).
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18. Campbell, D. H., "High Pressure Solid Propellant Combustion Zone Structure from Analysis of Hydroxyl Radical Chemiluminescence," AIAA Paper 85-1174 (Jul. 1985).
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Presentations were also made annually at the AFOSR task reviews and the AFOSR/AFRPL Rocket Research meetings. Presentations were made at the 1982, 1984 and 1986 AFOSR Contractors Meeting on Diagnostics of Reacting Flows and the 1986 AFOSR/ONR Contractors Meeting on Combustion.

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