

Solid Rockets

Papers Presented at the AIAA Aviation Forum 2023

San Diego, California, USA
12-16 June 2023

ISBN: 978-1-7138-7884-1

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

The contents of this work are copyrighted and additional reproduction in whole or in part are expressly prohibited without the prior written permission of the Publisher or copyright holder. The resale of the entire proceeding as received from CURRAN is permitted.

For reprint permission, please contact AIAA's Business Manager, Technical Papers. Contact by phone at 703-264-7500; fax at 703-264-7551 or by mail at 34922 Uwptkug'Xcmg{ 'F tkxg."Uwkug"422, Reston, VA 20191, USA.

TABLE OF CONTENTS

TOPICS IN SOLID ROCKETS

The Stepped Helix Hybrid Rocket Engine	1
<i>Christopher Glaser, Jouke Hijkema, Jean-Yves Lestrade, Jerome Anthoine</i>	
Dual-Zone Temperature and Multi-Species Measurements in Solid-Propellant Flames Via Broadband Mid-Infrared Laser Absorption Spectroscopy	26
<i>Vishnu Radhakrishna, Kyle E. Uhlenhake, Steven F. Son, Christopher S. Goldenstein</i>	
Simulation of Liquefying Propellants with Swirl	35
<i>Brian A. Maicke</i>	
Rapidly Deployable, Low-Cost Hypersonic Rocket Optimization and Design.....	49
<i>Jacob Reddington, Matt Young, Nathaniel Miseli, Josiah R. Gibson, Jack Galante, Jacob Corsaro, Edwin Jang, Justin Mcstay, D'Anthony Brown, Bridget Ge</i>	
Solid Rocket Motor Internal Ballistics Using a Vortex Particle Method	67
<i>Griffin A. DiMaggio, Roy J. Hartfield, Vivek Ahuja</i>	
A Survey of Machine Learning in Rocket Propulsion Applications	84
<i>Brian A. Maicke</i>	

SOLID ROCKET AND PRESSURE GAIN PROPULSION

Effects of Increased RDC Injector Diodicity.....	93
<i>Konstantin Bischoff, Sebastian Rehberg, Provence Barnouin, Eric Bach, Christian O. Paschereit, Myles Bohon</i>	
Applications of soft-DTW for Time Series Data Averaging Inside a Rotating Detonation Combustor	107
<i>Mauro Tagliaferri, Provence Barnouin, Hongyi Wei, Eric Bach, Christian O. Paschereit, Myles Bohon</i>	
The Ignition and Combustion of Aluminum in Composite Propellants.....	118
<i>Liu Mengying, Zhu Liu, Wenhao Yu, Li Shipeng</i>	
Investigation on Flow Field and Operating Characteristics of Pintle Controlled Solid Rocket Motor During Dynamic Regulation Process.....	127
<i>Ling Zhang, Deyou Wang, Li Shipeng</i>	

GENERAL TOPICS IN AVIATION II VIRTUAL SESSION

Collision Severity Analysis of Quadrotors on Covered Linkways for Ground Risk Assessment in Urbanized Environments	141
<i>Mohd Hasrizam Che Man, Anush K. Sivakumar, Nathaniel Ng Jingwei, Kin Huat Low</i>	
Simulation of Laser Induced Breakdown and Heating of Oxygen Gas.....	155
<i>Kenneth A. Croft, George Ashe, Trevor M. Moeller</i>	
A Particle-Based Direct Numerical Simulation Model for Turbulence-Cloud-Aerosol Interactions.....	183
<i>Abdullah Al Muti Sharfuddin, Foluso Ladeinde</i>	

Sanal Flow Choking And/Or Sonic-Fluid-Throat Effect Reconfirms the Chapman–Jouguet Condition of Detonation Propagation and Ceases	193
<i>VR Sanal Kumar, Raunak Sharma, Vinay Dekkala, Saatvik Sharma, Vigneshwaran Rajendran, Vigneshwaran Sankar, Dhruv Panchal, Yash Raj, Amit Kushwaha, Hindool Sharma, Rohan Sharma, Arwa Farhat Abbas, Vignesh Saravanan, Nichith C, Ajith S, Sulthan Ariff Rahman M, Rohan Sarswat, Prathit Kalra, Srajan Shrivastava, Tejas Sandeep Kapatkar, Prisha K. Asher, Bhavya Saxena, Tanishka Varma, Sagnik Saha, Sobia Raza, Tanisha Singh, Maansi Srivastava</i>	
Shock Standoff Distance in Viscous Hypersonic Flows Around a Blunt Body.....	213
<i>Himanshu Khatri, Liwei Zhang</i>	

Author Index