Advanced Propulsion Concepts

Papers Presented at the AIAA Propulsion and Energy Forum 2019

Indianapolis, Indiana, USA
19 – 22 August 2019

ISBN: 978-1-7138-0103-0
# TABLE OF CONTENTS

PERFORMANCE ANALYSIS OF A COMBINED LASER AND NEUTRAL PARTICLE BEAM PROPULSION CONCEPT BASED ON SELF-GUIDING ........................................................................... 1  
C. Limbach, K. Hara  

DEVELOPMENT OF A STABLE ACCELERATION SYSTEM FOR A SPHERICAL CAPSULE USING A DOUGHNUT BEAM PROFILE ................................................................. 13  
D. Tran, C. Xie, K. Mori  

A SIMPLIFIED MODEL FOR THE THRUST PERFORMANCE OF POROUS HEAT EXCHANGER (PHX) LASER ROCKET PROPULSION ................................................................. 22  
K. Mori, H. Itoh, M. Matsui  

NUMERICAL SIMULATION OF LASER AND PARTICLE COUPLED BEAM PROPAGATION ........................................................................................................... 28  
D. Kuldinov, K. Hara, D. Morales, C. Limbach  

AVAILABILITY RESPONSIVENESS FOR AFFORDABLE SUSTAINABLE REUSABLE SPACE TRANSPORTATION SYSTEM ................................................................. 38  
J. Robinson, R. Rhodes  

ASSESSMENT OF FEEDSTOCKS FOR BLENDED ALCOHOL-TO-JET FUEL MANUFACTURING FROM STANDALONE AND DISTRIBUTED SCHEME FOR SUSTAINABLE AVIATION ........................................................................................................ 48  
S. Jagtap  

THEORETICAL AND EXPERIMENTAL ANALYSIS FOR AN AIR-BREATHING PULSED PLASMA THRUSTER ........................................................................................................ 65  
M. Rosales, C. Hansen, R. Winglee  

BUOYANT HYBRID PROPULSION RIGID AIRSHIP SPACECRAFT ........................................................................................................... N/A  
N/A  

PERFORMANCE ENHANCEMENT OF AN ETHYLENE-FUELED SCRAMJET COMBUSTOR USING A POROUS CYLINDRICAL BURNER ............................................................................. 79  
W. Lee, K. Pan  

A SMALL MULTI-INTER TURBINE BURNER-ENABLED TURBOSHAFT ENGINE FOR UAV APPLICATIONS ........................................................................................................... 99  
C. Spytek  

PROPULSION REQUIREMENTS FOR FUTURE GENERATION SPACE HABITATS ............................................................................................................................. 112  
K. MacLeod, J. Martin  

CFD-BASED FLUIDIC THRUST VECTORING MODEL FOR FIGHTER AIRCRAFT ............................................................................................................................. 121  
E. Capello, A. Ferrero, R. Marsillo, M. Ferlauto  

SILENT STRONG COMPRESSION, NEARLY-COMPLETE AIR-INSULATION, AND HIGH THRUST REPEATEDLY OBTAINED BY PULSED ROCKET ENGINE BASED ON COLLIDING SUPERMULTI-JETS ........................................................................................................... 133  

FIELD COOLING MAGNETIZATION AND LOSSES OF AN IMPROVED ARCHITECTURE OF TRAPPED-FIELD SUPERCONDUCTING ROTOR FOR AIRCRAFT APPLICATIONS ............................................................................................................................. 146  
V. Climento-Alarcon, A. Smara, A. Patel, B. Glowacki, A. Baskys, T. Reis  

AIR AND SPACE THERMAL ROCKET ENGINE WITH TURBOJET (ASTRET) ............................................................................................................................. 158  
D. Nikitaev  

WEAKLY-PULSATED CENTER COMBUSTION ENGINE: RESULTING IN NEARLY-COMPLETE AIR-INSULATION EFFECT CAUSED BY WALL REFLECTION OF PRESSURE-WAVE ........................................................................................................... 232  
T. Kobayashi, J. Mikoda, K. Kinoshita, H. Makimoto, Y. Kobayashi, S. Luijiang, R. Konagaya, K. Naitoh  

HELICAL ENGINE ............................................................................................................................. 238  
D. Burns  

Author Index