

# **Inlets, Nozzles, and Propulsion Systems Integration**

Papers Presented at the AIAA SCITECH 2026 Forum

Orlando, Florida, USA  
12 - 16 January 2026

ISBN: 979-8-3313-3502-1

**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 Uwytkug'Xcmg{'Ftkxg.'Uwky'422, Reston, VA 20191, USA.

## TABLE OF CONTENTS

Airbus Cryoprop Demonstrator and Cryogenic Electric Propulsion: Progress Update ..... 1 <i>Ludovic Ybanez, Reda Abdouh, Emelie Nilsson, Frederick Berg, Remi Dorget, Mohammed E. Ahmed, Alexandre Colle, Stefan Raabe, Ravi K. Surapaneni, Edwin Calderon, Pedro Barusco, Matteo Tassisto, Jean-Francois Allias, Irina Jimenez, Jean-Francois Rouquette</i>	1
ICEFlight: Powering the Future of Aviation With Cryogenic Innovation in the Netherlands ..... 29 <i>Reda Abdouh, Daniel Kierbel, Stijn Braunius, Iris Dekker, Marloes van Put, Arne te Nijenhuis, René Alderliesten, Marc Dhalle, Gerhard Knol, Francesco Dioguardi, Frank van Duin, Max Van Vliet, Matteo Tassisto, Emelie Nilsson, Jeremie Monin Baroille, Jan-Willem Van Zwieten</i>	29
Aircraft Propulsion Motors With Cryogen-Free Superconducting Rotor ..... 36 <i>Kiruba S. Haran, Thanathepan Balachandran, Noah James Salk, Uijong Bong, Samith Sirimanna, Jianqiao Xiao, Kevin Uvodich, Raatan Venkataraman, Phoenix Bauer, Sania Huq, Tim O'Connell</i>	36
Certification Readiness Level Scale: Maturing the Certifiability of Innovative Aircraft ..... 45 <i>Joel Jezegou, Charles Blondel de Joigny, Victor Bureau, Christel Seguin, Beatriz Jiménez Carrasco, Robert André, Giovanni Cilio, Eliano Simone</i>	45
Experimental Investigation of Hypersonic Performance Inlet at Sub-Design Mach Number with Varying Angle of Attack ..... 58 <i>Matthew J. Schram, Venkateswaran Narayanaswamy</i>	58
Ramp-Jet Scaling Effects on Aerospike Nozzle Flow Dynamics Using a High-Fidelity Navier-Stokes Solver ..... 68 <i>Zac Q. Pyle, Gustaaf B. Jacobs</i>	68
Performance Analysis of an Unsteady Ejector Driven by Exhaust Conditions of a Rotating Detonation Engine (RDE) ..... 86 <i>Sai Lakshminarayanan Balakrishnan, Gregory A. Blaisdell</i>	86
CFD Analysis of High-Speed Air-Breathing Inlets ..... 111 <i>Mookesh Dhanasar, Frederick Ferguson, Connor Ramaswamy</i>	111
De-Risking of a High-Speed Intake Distortion Facility Using a Small-Scale Pilot Rig ..... 130 <i>Matteo Migliorini, Stijn Hersbach, Pavlos K. Zachos, David MacManus, Peter G. Martin</i>	130
Unsteady Characterization of Vortical Structures in Highly Distorted Intake Duct Flows ..... 148 <i>Andreas Grois, Jonas Remiger, Luis Oberthür, Marcel Stößel, Dragan Kozulovic, Michael Krummenauer</i>	148
Bluff Body Dynamic Distortion Generators: Design and RANS CFD Analysis of Dynamic Stream Vanes ..... 165 <i>Emily Padula, K. T. Lowe, Alexandrina Untaroiu, Joseph Gonzales</i>	165
Assessment of a Thrust Measurement System for Supersonic Nozzles ..... 184 <i>Gaetano M. Di Cicca, Michele Ferlauto, Jehangir Hassan, Roberto Marsilio</i>	184
Numerical Analysis of Separation Events for Two-Dimensional Supersonic Wavy Geometries ..... 194 <i>Hadie Sabbah, Alessandro Montanari, Marco Grossi, Mario Tindaro Migliorino, Francesco Nasuti, James Braun</i>	194

Optimization and Experimental Validation of a Robust S-Duct Geometry With Boundary-Layer Ingestion .....	214
<i>Ines Chikhaoui, Catherine Clark, Faezeh Rasimarzabadi, Hamza abo el Ella, Hugo Breton, David W. Zingg</i>	
Unsteady Swirl Distortion Characterization in a Coupled Fan-Intake System in Crosswind Conditions Using Stereoscopic Particle Image Velocimetry .....	228
<i>Tommaso Piovesan, Pavlos K. Zachos, David MacManus</i>	
The Aero Derivative Reactivity-Controlled Compounded Internal Combustion Engine Cycle: Achieving Near-Carnot Efficiencies for Medium and Heavy-Duty Applications .....	248
<i>John R. Bucknell</i>	
Geometric Considerations of Hypersonic Inlet Integrability for Internal Flow-Path Combustion .....	259
<i>Subhan B. Wade, Emilio M. Pereira, Spencer Smith, Kareem A. Ahmed</i>	
Performance Evaluation of a Conceptual Turbo-Ramjet Engine for a Two Stage To Orbit Launch System .....	270
<i>Mennatallah M. Hussein, Sara Hauptman, Ahmed Ghoniem</i>	
Numerical Investigation on the Use of Plasma Actuators for Separation Control in Over-Expanded Nozzles .....	282
<i>Daniele Tozzi, Christian Bach, Andrea Ferrero, Filippo Masseni, Dario G. Pastrone</i>	
Numerical Design of a Mach-Adaptable Intake for a Dual-Mode Ramjet in VLEO Launch Applications.....	298
<i>Marco Rigamonti, Ben shoesmith, Antonella Ingenito, Giuseppe Rocco</i>	
Design and Testing of a Water-Cooled Center Body in a Small Scale Rotating Detonation Engine .....	315
<i>Edward D. Blaney, Frederick R. Schauer, Scott W. Theuerkauf, Brian C. Sell, Christopher A. Stevens</i>	
Analytical Mechanics of Ceramics and Fiber-Reinforced CMCs for Material Processing Foundations of Rocket Nozzles: Stage I.....	327
<i>Nestor A. Cano, Victor Ceja, Oscar Lopez, Joshua J. Jimenez, Dylan A. Odwyer, Abraham A. Galicia, Jose S. Hernandez</i>	
Numerical Study of a Perpendicularly Injected Jet for Fluidic Thrust Vectoring Applications .....	354
<i>Nils Schwagerus, Marcel Stöbel, Dragan Kozulovic</i>	
Numerical Study on Distortion at the Nacelle Inlet Under Crosswind.....	374
<i>Ryouichi Kokubo, Yoshinori Oba, Makoto Yamamoto</i>	
Design and Test of a Resonance Igniter With Aerospike Nozzle.....	386
<i>Simon Steiner, Christian Bauer</i>	

## **Author Index**