

Structural Dynamics

Papers Presented at the AIAA SCITECH 2026 Forum

Orlando, Florida, USA
12-16 January 2026

Volume 1 of 2

ISBN: 979-8-3313-3526-7

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 12700 Sunrise Valley Drive, Suite 200, Reston, VA 20191, USA.

TABLE OF CONTENTS

VOLUME 1

Reduced-Order Modeling of Unsteady Aerodynamics Using Constrained Optimization and Random Input.....	1
<i>Tamir Gazit; Maxim Freydin</i>	
Data-Driven Aerodynamic Kernel Functions for Boundary Element Flows.....	21
<i>Ben Preston; Urban Fasel; Rafael Palacios; Andrea Castrichini</i>	
Data-Driven Parametric Aeroelastic Modeling of the Pazy Wing.....	41
<i>Mario A. Sinani; Rafael Palacios; Urban Fasel; Andrew Wynn</i>	
Large Deformation Correction for Linearized Time-Domain Unsteady Aerodynamics for a Cantilevered Plate.....	62
<i>Luisa Piccolo Serafim; Earl Dowell</i>	
Experiments on Supersonic Fluid-Structure Interaction in Transient Flow Fields.....	81
<i>Dennis Daub; Sebastian Willems; Patrick Gruhn; Ali Guelhan; Timothy J. Beberniss; Kirk R. Brouwer; S. M. Spottswood; Zachary B. Riley</i>	
New Methods for Efficient Mission Assurance Dynamics Testing.....	98
<i>Edward E. Heyd; Dale A. Schick; Kevin L. Napolitano; Mike Yang</i>	
Assessing Sound Field Diffuseness in Direct Field Acoustic Tests Using Fractional Octave Band Coherence.....	103
<i>Albert Allen; Michael B. Van Dyke; Ali Kolaini</i>	
Acoustic Characterization of a Direct Field Acoustic Testing Source.....	122
<i>Albert Allen; Matthew B. Galles; Dale A. Schick; Daniel Hayes; Ed Kinsella</i>	
Examining a Multi SISO Acoustic Control Method and Structural Response.....	142
<i>Dale A. Schick</i>	
The Importance of Microphone Placement with Respect to the Test Article for Direct Field Acoustic (DFA) Testing – a Case Study.....	165
<i>Marcos A. Underwood; Wes Mayne; Rabah Hadjit; Alexis Castel</i>	
Addressing Harmonic Excitation in Complex Aeronautical Test Cases Using Stochastic Modal Appropriation.....	192
<i>Daniele Antonini; Giuliano Coppotelli; Maher Abdelghani</i>	
Flutter Tests of Swept Very Flexible Wings.....	221
<i>Bar Revivo; Daniella E. Raveh</i>	
Static and Dynamic Characterization of a Swept Pazy Wing Through Wind Tunnel Testing.....	241
<i>Ludovica Onofri; Daniele Antonini; Giuliano Coppotelli; Marcello Righi; Marco Berci</i>	
Fast Flutter Prediction for Very Flexible Swept Wings.....	257
<i>Ben Preston; Urban Fasel; Rafael Palacios; Andrea Castrichini</i>	
Nonlinear Substructuring of the Dynamic Substructures Round Robin Structure.....	269
<i>Daniel R. Roettgen; Benjamin Moldenhauer</i>	

The Experimental Modal Craig-Bampton Substructure	277
<i>Randy Mayes</i>	
Solving the Over-Constrained Hurty/Craig-Bampton Problem.....	285
<i>Arya Majed; Ed Henkel; Ali Kolaini; Dexter Johnson; Robert Coppolino</i>	
Primary DOF Selection Via QR Pivoting for Physical-Type Dynamic Condensation and Substructuring	298
<i>Robel W. Hagos; Seung-Chan Lee; Jae-Hung Han</i>	
Multi-Output Auto-Regressive Modeling of Transonic Unsteady Aerodynamics	316
<i>Ron Efrati; Daniella E. Raveh</i>	
Coupled Aeroelastic Simulation of Aircraft Tail Buffeting Under Dynamic Maneuvering Conditions	343
<i>Manoj R. Rajanna; Jim Lua; Brandon Donaldson; Nam Phan; Ming-Chen Hsu</i>	
Ground Structure – Impinging Jet Interaction	356
<i>Saranyamol V. S.; Lauren Anzueto; Camrynn G. Harper; Karis Wilson; Anushka Heda; Jonas Gustavsson; Rajan Kumar</i>	
Fluid–Structure Interaction Modeling of Sloshing Dynamics with Flexible Baffles: Design Insights for Aerospace Applications.....	368
<i>Cristiano Biagioli; Francesco Serraino; Valerio Belardi; Francesco Vivio</i>	
Two-Dimensional Aeroelastic Limit Cycle Oscillation Computations for the NASA Benchmark Supercritical Wing Configuration.....	385
<i>Jeffrey Thomas; Earl Dowell</i>	
A Physical Explanation of Coupled-Mode Flutter Using Forced-Response Networks	407
<i>Kailen Patel; Demetrios Lefas</i>	
Transonic Aeroelastic Flutter Computations with Mesh Adaptation	438
<i>Bret Stanford; Steve Massey; Kevin Jacobson; Pawel Chwalowski</i>	
Sparse Identification of Aeroelastic Reduced-Order Models in Transonic Buffeting Flow	452
<i>Michael J. Candon; Pier Marzocca; Earl Dowell</i>	
Transonic Aeroelastic Analysis of the X-59 Aircraft Using FUN3D.....	469
<i>Walter A. Silva; Mark Sanetrik; Wesley Li; Shun-Fat Lung; Benjamin Park</i>	
Damage Detection for Composite Panels by Frequency-Domain Reverse-Time Migration	485
<i>John D. Day; Weihua Su</i>	
Damping Modulation of Dampened Kapton Surfaces.....	501
<i>Sebastian Esteban; Jillian Wilson; Jeffrey L. Kauffman; Emazuddin Alif; Andrew Dickerson</i>	
Predicting the In-Flight Shape of an Aircraft Wing.....	510
<i>Imre Gal; John Mottershead; Sebastiano Fichera; Francesco Gambioli; Edoardo Menga; Irma Isnardi</i>	
Very Flexible Aircraft Damping Characterization and the Support System Impact During Ground Vibration Testing	520
<i>Bilal Sharqi; Carlos Cesnik</i>	
Design of Elastic Wind Tunnel Models Via Level-Set Topology Optimization of Eigenvalue Ratios and Compliance	539
<i>Eisuke Nakagawa; Tomohiro Yokozeiki; Natsuki Tsushima</i>	

High-Fidelity Aeroelastic Predictions of a Very Flexible Wing	555
<i>Michael J. Candon; Sitthichart Tohmuang; Arturo J. Delgado-Gutiérrez; Pier Marzocca; Daniele Antonini; Giuliano Coppotelli; Marcello Righi</i>	
Nonlinear Aeroelastic Modeling and Analysis of 3D Highly Flexible Wings	567
<i>Hong Tang; Sanuja Jayatilake; Fintan Healy; James Ascham; Mark H. Lowenberg; Dorian Jones; Jonathan E. Cooper; Etienne Coetzee</i>	
Aeroservoelastic Wind Tunnel Evaluation of H_{∞} Active Flutter Suppression	596
<i>Kuang-Ying Ting; John Berg; Mehran Mesbahi; Eli Livne</i>	
Freeplay and Preload Effects on the Aeroelastic Behavior of the XDIA Wind Tunnel Model: 2025 Test Results and Insights	620
<i>Francesco Toffol; Elena Roncolini; Sergio Ricci; Eli Livne</i>	
Testing of Active Flutter Suppression for Wings Incorporating Floating Wingtips.....	639
<i>Joshua Sneddon; Fintan Healy; Mark H. Lowenberg; Jonathan E. Cooper</i>	
Nonlinear Actuator Modeling and Describing Function Analysis for Active Flutter Suppression	659
<i>Mriganka S. Ghosh; Mayuresh Patil</i>	
Aeroelastic Uncertainty Quantification of Flexible Wing Nonlinear Dynamics Using Reduced Order Models.....	680
<i>Declan Clifford; Giuseppe Morichetti; Andrea Da Ronch</i>	
Aeroelastic Stability Analysis of a Wing-Propeller System Including Aerodynamic Interference Effects.....	702
<i>João Santos; Flavio D. Marques; Cristina Riso</i>	
Aeroelastic Analysis of Rotor Blades Using Flexible Multibody Dynamics with Geometrically Nonlinear 3D Finite Elements	719
<i>Seongwoo Cheon; Sangmin Son; Youngjung Kee; Jaeheon Jeong; Inho Jeong; Haeseong Cho; Hakjin Lee</i>	
Exploration of a 3-D Fluid-Structure Interface for Mis-Matched RANS-FEA Meshes of a Helicopter Rotor	731
<i>Anubhav Datta; Logan Swaisgood</i>	
Wall-Resolved LES Evaluation of Mach Number and Angle of Attack Effects on the Flow Field Around NACA Airfoils at Low Reynolds Numbers Under Compressible Conditions.....	753
<i>Tentaro Uchida; Takayuki Nagata; Taku Nonomura</i>	

VOLUME 2

Benchmark Supercritical Wing Computations Using CREATE-AV KESTREL and NASA AEROM.....	761
<i>Walter A. Silva</i>	
A Mixed-Time Explicit-Implicit Generalized Finite Element Method for Multi-Scale Field Problems	775
<i>Todd J. Miller; Jack J. McNamara</i>	
Effect of Intralaminar Inhomogeneity on Buckling Behavior of Woven Fabric Composite Laminates with Interlaminar Delamination	796
<i>Maki Okuno; Ryo Miyakawa; Keishiro Yoshida</i>	

In-Flight Hyperparameter Controller Adjustment for Load Alleviation of Very Flexible Aircraft	805
<i>João B. Cavalcanti; Ilya Kolmanovsky; Carlos Cesnik</i>	
Integrated Gust Load Alleviation and Active Flutter Suppression - Control Law Synthesis and Wind Tunnel Tests.....	823
<i>Andrea A. Sabatini; Eli Livne; Giuliano Coppotelli</i>	
Feature-Based Modeling for Aeroelastic Loads Alleviation Using Smart Vortex Generators	859
<i>Adrian Beno; Jurij Sodja; Xuerui Wang</i>	
Aeroelastic Behavior of Forward-Swept Wings with Flared Folding Wingtips	879
<i>Francesco Sacchi; Joshua Sneddon; Fintan Healy; Djamel Rezgui; Jonathan E. Cooper</i>	
Utilization of Damper Systems for Nose Gear Drag Load Reduction.....	897
<i>Darin Haudrich; Zachary Lively</i>	
Aeroelastic Stability Assessment of the AMSL Aero Vertiia eVTOL Aircraft	918
<i>Vincenzo Muscarello; Pier Marzocca; Rhys Lehmann; Alfred Swallow; Daniel Linton</i>	
Aeroelastic Analysis of a Distributed Propulsor with Rotary Inertia on an Uniform Cantilever Wing	934
<i>Mahima D. Prajapati; Rakesh K. Kapania</i>	
Trajectory Optimization of Morphing Aerial Vehicles Based on Mid-Fidelity Aeroservoelastic Models	952
<i>Parker J. Smith; Subarna Pudasaini; Daning Huang</i>	
Modelling the Impact of a Gust on a Small Unmanned Cruise Vehicle	990
<i>Alessandro Pontillo; Punsara D. Banneheka Navaratna; Mark H. Lowenberg; Jonathan E. Cooper; David Hayes</i>	
Summary of the Integrated Adaptive Wing Technology Maturation Wind Tunnel Tests of a High Aspect Ratio Commercial Transport Aircraft	1003
<i>John F. Quindlen; Patrick S. Heaney; Daniel Ortega; Gregory J. Clark; Heather S. Hussain; Patrick J. Bentley; David A. Coulson; Ian M. Giles; Garrett McHugh; Jennifer L. Pinkerton; James M. Ramey; William L. Stevens</i>	
Comparison of Methods for Efficient Static Wind Tunnel Testing Using Multiple Control Surfaces.....	1038
<i>Jared A. Grauer; Benjamin M. Simmons; Nhan T. Nguyen; Christopher Forte; John F. Quindlen</i>	
Experimental Verification of High-Fidelity Static Aeroelastic Load Predictions	1063
<i>Juntao Xiong; Patrick J. Bentley; Garrett McHugh; William L. Stevens; Nhan T. Nguyen; Christopher Forte</i>	
High-Fidelity Flutter Prediction of Aspect Ratio 13.5 Flexible Wing Wind Tunnel Model	1080
<i>Nhan T. Nguyen; Juntao Xiong; Jeffrey A. Ouellette; Daniel Ortega</i>	
A Model of Turbulence in the Langley Transonic Dynamics Tunnel for Aeroservoelastic Analysis	1103
<i>Jeffrey A. Ouellette</i>	
Design and Testing of Drag Minimization and Maneuver Load Alleviation Control Laws for the IAWTM Wind Tunnel Test	1119
<i>Christopher J. Forte; Nhan T. Nguyen; John F. Quindlen; Heather S. Hussain</i>	
Design and Testing of Gust Load Alleviation Control Laws for the IAWTM Wind Tunnel Test.....	1148
<i>John F. Quindlen; Christopher J. Forte; Nhan T. Nguyen; Thomas G. Ivanco; Heather S. Hussain</i>	

Design and Evaluation of Active Flutter Suppression Control Laws for the IAWTM Wind Tunnel Test	1183
<i>Jared A. Grauer; Josiah Waite; Bret Stanford; Thomas G. Ivanco; Nhan T. Nguyen; Christopher Forte; John F. Quindlen; Heather S. Hussain; Logan S. Anderson; Ryan Caverly</i>	
Design and Experimental Validation of Multi-Objective Gust Load Alleviation Optimal Control for a High Aspect Ratio Flexible Transport Wing	1212
<i>Christopher J. Forte; Nhan T. Nguyen</i>	
Design and Experimental Validation of Hamiltonian Control for Gust Load Alleviation and Flutter Suppression of a High Aspect Ratio Flexible Transport Wing	1233
<i>Christopher J. Forte; Nhan T. Nguyen</i>	
Impacts of Bolt Preload Variation on the Vibrational Properties of Bolted-Joint Beams	1257
<i>Tharwat I. Elkabani; Andres Tiede; Abdessattar Abdelkefi</i>	
Transient Coupling and Damping Loss Factors for Nonlinear Mass-Spring System	1263
<i>Joseph Lopez; Ryan Kaiser; Zahra Sotoudeh</i>	
Comparative Dynamical Study and Repeatability of Metallic Plates Using Additive and Subtractive Manufacturing Techniques	1284
<i>Nicholas Hall; Devin M. Binns; Marina Fountain; Abdessattar Abdelkefi</i>	
Model-Free Adaptive Output Feedback Vibration Suppression in a Cantilever Beam.....	1292
<i>Juan Augusto Paredes Salazar; Ankit Goel</i>	
Low-Order H2/H-Infinity Controller Design for Aeroelastic Vibration Suppression.....	1309
<i>Mohammad Mirtaba; Juan Augusto Paredes Salazar; Daning Huang; Ankit Goel</i>	
Aeroelastic Stability Characterization of a Slender Model Under Planar Shock Impingement in Mach 5 Flow.....	1321
<i>Benjamin E. Diaz Villa; Jayant Sirohi; Noel Clemens</i>	
Mach 6 Aerothermoelastic Experiment for an Inclined, Compliant CFCF Panel with Buckling.....	1341
<i>Damon Kirkpatrick; Dylan Dooner; Andrew J. Neely; Charles Hoke; Timothy J. Beberniss; David Buttsworth</i>	
Numerical Investigation of Coupled Aerothermoelastic Effects on Hypersonic Intake Performance.....	1359
<i>Nishchal Poudel; Sudip Bhattarai</i>	
Transport-Induced Load Prediction for Aircraft Structures Using a Neural Network Surrogate.....	1382
<i>Tigran Mkhoyan</i>	
Efficient Approach for Early Failure Prediction in High-Aspect-Ratio Wings During Gust Encounters.....	1396
<i>Mario Miranda; Alvaro Cea; Runze Li; Rafael Palacios; Silvestre T. Pinho</i>	
Design Optimisation of a Lightweight Aerodynamic Fairing for Vibration Fatigue	1406
<i>Stefan O. Anderson; Jonathan E. Cooper; Fabrizio Scarpa; Brano Titurus</i>	
Unsteady Nonlinear 2D Lift Model Based on Steady Coefficients	1422
<i>Naama Aliskevicius; Oksana Stanlov; Moti Karpel</i>	

Guidelines and Designs for Helicopter Airfoils and Blades for Mars Applications with Experimental Validation	1435
<i>B. Natalia Perez Perez; Haley V. Cummings; Witold Koning; Farid Haddad; Alex Sheikman; Charles Cornelison; Alfredo Perez; Antonio Cervantes; Stephen J. Wright; Ethan Romander; Wayne Johnson; J. Ken Smith; Ravi T. Lumba; Cheng Chi; Marge Donovan; Anubhav Datta; Takayuki Nagata; Keisuke Asai; Taku Nonomura; Lidia Caros; Oliver Buxton; Peter Vincent</i>	
On the Fabrication of Ultra-Thin Composite Rotors for Martian Flight	1464
<i>Marge Donovan; Anubhav Datta</i>	
Failure Analysis of Mars Hexacopter with RPM-Controlled Rotors	1482
<i>Weston Fong; Farhan Gandhi</i>	
The Effects of Rotor Shaft Spacing and Rotor Rotation Direction on Aerodynamic Interference of Mars Multicopter Rotors	1503
<i>Ryutaro Onishi; Akira Oyama</i>	
Aerodynamic Optimization of Angular Airfoil for Micro-Scale Mars Airplane.....	1516
<i>Yuki Iida; Akira Oyama; Satoshi Sekimoto; Makoto Sato</i>	

Author Index