# TABLE OF CONTENTS

## VOLUME 1

**Multidisciplinary Design Optimization for a Reusable Launch Vehicle Using Multiple-Phase Pseudospectral Optimization**  
Ryan Carr, Timothy Jorris, Eric Paulson  
Page 1

**MPD Augmentation of a Thermal Air Rocket Utilizing Low Energy Nuclear Reactions**  
Matt Fischer, Alan Wilhite, Roger Legusch, Christopher Jones  
Page 18

**Exploring the Best Performing Commercial Wind Turbines for Different Wind Regimes in a Target Market**  
Sanja Choudhury, Jie Zhang, Matthew Catalano, Achille Messanz, Luciano Castillo, Ali Mehmani, Samuel Notaro  
Page 38

**Multi-objective Shape Optimization for Vertical-Axis Wind Turbine Blades**  
Gunter Fischer, A Mark Savill, Timoleon Kipourous  
Page 56

** Hybrid Optimization for Wind Turbine Thick Airfoils**  
Francesco Grasso  
Page 66

**A Deterministic Approach for Reliability Based Topology Optimization**  
Pugazhendhi Kanakasabai, Anoop K. Dhingra  
Page 78

**Nonlinear Dynamic Response Topology Optimization Using the Equivalent Static Loads Method**  
Seokja Lee, Hyun-Ae Lee, Gyong-Ik Park  
Page 89

**Simultaneous Topology Optimization of Membrane Wings and Their Compliant Flapping Mechanisms**  
Bret Stanford, Philip Beran, Marcelo Kobayashi  
Page 101

**Level Set Based Topology Optimization with Stress Constraints and Consistent Sensitivity Analysis**  
Alexander Verbart, M. Langelaar, Nico Van Dijk, Fred Van Keulen  
Page 116

**Parameterization of Curvilinear Spurs and Ribs (SpaRibs) for Optimum Wing Structural Design**  
Daride Locatelli, Sameer Mudani, Rakesh Kapuria  
Page 131

**A Recursive Approach for Remaining Fatigue Life Predictions of Monitored Structural Systems**  
Maurizio Gobbato, John Kosmatka, Joel Conte  
Page 162

**Damage Characterization Method for Structural Health Management Using Reduced Number of Sensor Inputs**  
Thigaarajan Krishnamurthy, Adam Gallogly, Jacob Hochhalter  
Page 177

**Dynamic Bayes Nets in SHM**  
Gregory Bartrum, Sankaran Mahadevan  
Page 189

**Sensor Configuration and Optimization for Identification of Micro-anomalies in Structural Materials**  
Manisha Banker, Dineshkumar Harursampath, Narayana Naik  
Page 204

**Accounting for Proof Test Data in a Reliability Based Design Optimization Framework**  
Gerhard Venter, Stephen Scotti  
Page 209

**A Method for Projecting Uncertainty from Sparse Samples of Discrete Random Functions: Example of Multiple Stress-Strain Curves**  
Bonnie Antoun, Gerald Wellman, Frank Dempsey, Vicente Romero, William Scherzinger  
Page 227

**Interpretations, Relationships, and Application Issues in Model Validation**  
Sang Nguyen, E. Greenhalgh, Mike Graham, Arnold Francis, Robin Olsson  
Page 247

**Comprehensive Framework for Integration of Calibration, Verification and Validation**  
Jennifer Rhymer, Hyonny Kim  
Page 267

**Assessment of the Accuracy of a Model for Use in Prediction of Component Environments**  
Charles Sika, David Jensen, Craig Garvin, Mark Jensen  
Page 279

**Application of Quasi-Homogeneous Anisotropic Laminates in Grid-stiffened Panel Design**  
David Kennedy, Christopher York  
Page 296

**The Impact of Composite Ply Continuity Constraints on Aerospace Stiffened Panel Design**  
Damian Otten, Adrian Murphy, Mark Price, G. Shirley  
Page 319

**Comparison of Stress and Strain Based Iteration for Fiber Tailoring of Bolted Composite Plates**  
Peter Gustafson  
Page 339

**Efficient Design Optimization of Tow-Placed Panels for Enhanced Load-Carrying Capabilities by Adaptive Metamodelling**  
Fabio Laraghi  
Page 363

**Efficient Stiffened Composite Plate Analysis**  
Fabio Laraghi, Dinesh Kumar Harumamath, Narayana Naik  
Page 380

**Impact Damage Resistance and Tolerance of Polymer Nanofiber Interleaved Composite Laminates**  
Paul Akanagah, Kartigal Shivakumar  
Page 386

**Compression Strength After Impact of Unidirectional Fiberglass Rods Consolidated with Aramid Sleeves**  
Charles Sika, David Jensen, Craig Garvin, Mark Jensen  
Page 400

**Damage Prediction of Quasi-Isotropic Carbon/Epoxy Composite Panels Impacted by High Velocity Ice**  
Jennifer Rhymer, Hyeon-Jin Kim  
Page 411

**Methodology for Predicting the Threat of Runway Debris Impact to Large Transport Aircraft**  
Sang Nguyen, E. Greenhalgh, Mike Graham, Arnold Francis, Robin Olsson  
Page 422

**Developments in Morphing Composites**  
Paul Weaver, E. Eckstein  
Page 446

**Exploratory Structural Investigation of a Hawkmoth-Inspired MAV’s Thorax**  
Luciano Demasi, Anthony Palazzotto, Alex Hollenbeck, Rauno Cavallaro  
Page 462
Identification of Adhesive Bond in Carbon Fiber Composites with a ZnO Nanowire Interphase .......................................................... 882

Multi-component Polyamide 11 Nanocomposites: Thermal, Mechanical, and Flammability Properties ................................................. 894

Joseph Koo, Eric Aliem, Blake Johnson, Min Back, Karen Carpenter, Daniel Eils, C. St, Carla Lake, Patrick Lake

VOLUME 2

A Lifting Algorithm for Output-only Continuous Scan Laser Doppler Vibrometry .......................................................... 914
Shijie Yang, Matthew Allen

Impulse Based Substructuring for Coupling Offshore Structures and Wind Turbines in Aero-Elastic Simulations ............................. 931
Paul van der Valk, Daniel Rixen

Dynamic Identification of Wind Turbine System Under Operational Conditions Using FBG Transducers ........................................... 945
Ajit Achatharan, Tyler Arsenault, Pier Marzocca, Chiara Grappanorgi, Giuliano Coppotelli

Soil-Foundation Models and Tower Transfer Functions for Offshore Wind Turbines .......................................................... 961
Michael Harte, Biswajit Bass

NREL Gearbox Reliability Collaborative: Test and Model Investigation of Sun Orbit and Planet Load Share in a Wind Turbine Gearbox ...................................................................................................................... 973
William Lacata, Jonathan Keller, Brian McNift

Progressive Failure Analysis of Wind Turbine Blades Based on a Thin-Wall Beam Finite Element Model ............................................. 984
Diego Cardenas, David Arellano, Hugo Elizalde, Olivier Proost, Frank Abil, Ajit Achatharan, Pier Marzocca

On the Effects of Defects: Part B - Development of a Protocol for Defect Risk Management & Improved Reliability of Composite Structures .......................................................... 994
Trey Riddle, Douglas Cairns, Jared Nelson, Julie Workman

Effects of Defects: Part B - Progressive Damage Modeling of Fiberglass/Epoxy Composite Structures with Manufacture Flaws .................................................................................................................. 1017
Jared Nelson, Trey Riddle, Douglas Cairns, Julie Workman

Effect of Fiber Waviness on the Compressive Strength of Unidirectional Carbon Composites ......................................................... 1033
Paul Davidson, Anthony Waas, Kurt Hick Chandra, Wasseem Faid, Chandu Sekhar Yerramanna

Fracture Analysis of Thick Adhesive Joints for Wind Turbine Blades .......................................................................................... 1049
Kyeongshik Woo, Matt Peterson, Douglas Cairns, John Mandell

On the Effects of Turbulence Modelling in Design Optimisation for High-lift Devices ........................................................................... 1057
C. Guo, Timoleon Kipouras, Evgeniy Shapira, Ali Savvaris

Modeling for Conceptual Design: An Aeroelastic Approach .................................................................................................................. 1068
Edward Alyanak

Continuous Shape Sensitivity Method for Fluid Flow Around an Airfoil ......................................................................................... 1086
Shaobin Liu, Robert Canfield

An Investigation of Higher-order Multi-objective Optimisation for 3D Aerodynamic Shape Design ......................................................... 1101
T. Kipouras, Tiziano Ghisu, Geoffrey Parks, A Mark Savill

Aircraft Design with Active Load Alleviation and Natural Laminar Flow .................................................................................... 1110
Jia Xa, Jian Kuo

Improving the Accuracy of Surrogate Models Using Inverse Transform Sampling .................................................................................. 1135
Jung Jiang Zhang, Achille Messac, Jie Zhang, Souma Chowdhury

An Information-Theoretic Metric of System Complexity with Application to Engineering System Design ............................................. 1151
Douglas Allaire, Qixin He, Karen Willcox

Robustness Analysis and Optimally Robust Control Design via Sum-of-Squares ........................................................................ 1166
Andrei Dorobantu, Luis Crespo, Peter Seiler

Fidelity maps for Model Update under Uncertainty: Application to a Piano Soundboard ................................................................ 1177
Sylvain Lacaze, Somy Metsonon

Obtaining Non-Gaussian Output Error Distributions by Propagating Mean, Variance, Skewness, and Kurtosis Through Closed-Form Analytical Models .................................................................................. 1194
Travis Anderson, Christopher Mattson

A Multidisciplinary Possibilistic Approach to Light Aircraft Conceptual Design .......................................................... 1208
Daniel Neufeld, Nguyen Nhu-Van, Jae-Woo Lee, Sango Kim

A Comparison Study of Methods for Parameter Estimation in the Physics-based Prognostics ......................................................... 1219
Dawn An, Jooho Choi, Nam Hoo Kim

Online State-of-Health Prediction of Lithium-Ion Battery with a Multiscale Filtering Technique .................................................. 1232
Byung D. Youn, Chao Hu, Taegun Kim, Jaeük Chung

Cost/Benefit Analysis for System-Level Integration of Non-Deterministic Analysis and Maintenance Technology .......................... 1249
Keith Halbert, Leroy Fitzwater, Christopher Davis, Jeong-Beom Ihn, Danna Jones, Jeff McFarland, Tony Yi-Torn, David Wiegand

Bayesian Updating of Structural Health and Integrity Assessments using Real-Time Inspection Results ........................................ 1258
Dale Cape, John Mofett

On-Experimental Validation of Crack Growth Prognosis under Variable Amplitude Loads ......................................................... 1277
Sang Leem, Dawn An, Jooho Choi, Che Kyu Lim, Woongki Hwang

Validation Experiment for Shock Boundary Layer Interactions: Sensitivity to Upstream Geometric Perturbations ................................ 1287
Laura Campo, David Helmer, John Eaton

Validation of Using Linear Models for Nonlinear Structures .................................................................................................................. 1305
Michael Ross, Angel Urbina, Norman Hunter, Thomas Pavez
The Verification and Uncertainty Quantification of Surrogate Models Used for Structural Analysis .......................................................... 1330
Michael Boss, Angel Urbina, Todd Simmernacher, Thomas Pacc

Probabilistic Validation Metrics for Industrial Engineering Analysis Models ................................................................. 1346
Bharani Ravishankar, Liping Wang, Arun Karthi Subramanayan, Gulshan Singh

Repair Concepts as Design Constraints of a Stiffened Composite PRSEUS Panel .............................................................. 1359
Adam Perekop

Design, Analysis, and Test of the QwkSep Sub 24-inch Low-Profile Separation System ......................................................... 1377
Yann Stavast, Charles Lazansky, Bryan Helgesen

Use of GENOPT and BIGBOSOR4 to Obtain Optimum Designs of Multiwalled Inflatable Spherical and Cylindrical Vacuum Chambers .............................................................................................................. 1392
David Buchnell, Charles Rankin

Fundamental Design of Tensioned Precision Deployable Space Structures Applied to an X-Band Phased Array ................. 1411
SungJeon Jeon, Thomas Murphy

An Investigation on the Strain Distribution of Resistance Welded Thermoplastic Composite Joints ........................................ 1425
Jiajie Shi, Irene Fernandez Villegas, Harald Bersee

Co-rotational Formulation for Bonded Joint Finite Elements ............................................................................................... 1434
Scott Stapleton, Anthony Weas, Brett Bednarcyk, Steven Arnold

Simplified Methods for Automated Modeling of Riveted/Bolted Connections in Flight Structures ........................................ 1458
John Kosmatka, B. Brewer, Adarsh Pun, James Hunt

Performance of Bonded/Bolted Hybrid Joints ......................................................................................................................... 1473
Marc Robinson, John Kosmatka

A Numerical Model for Hybrid Metal-composite Joints with Through-thickness Reinforcement ........................................... 1480
Francesco Bianchi, Xiang Zhang

Nonlinear Finite Element Analysis of the SRM Flexible Joint .............................................................................................. 1490
X. Zhang, Y. Liu, J. Ren, K. Zhan

Nonlinear Aeroelastic Scaling of a Joined Wing Aircraft .......................................................................................................... 1500
Anthony Ricciardi, Robert Canfield, Mayuresh Patil, Ned Lindsey

Flutter and Directional Stability of Aircraft with Wing Tip-Fins - Conflict and Compromises ............................................... 1510
Matthew Snyder, Terry Weissshaar

The Influence of Unsymmetrical Bending and Torsion on Elastic and Viscoelastic Wing Flutter ............................................ 1527
Harry Hilton

Extension-twisting Coupled Laminates for Aero-elastic Compliant Blade Design ............................................................... 1548
Christopher York

Design of Composite Structures to Improve the Aeroelastic Performance ........................................................................ 1570
Gareth Vio, Jonathan Cooper, Georgia Georgiou

Static Aeroelastic Analysis of Very Flexible Wing Based on the 3-D Lifting-Line Theory .................................................. 1583
Changshuan Xie, Yi Liu, Chao Yang

Buckling Optimization of Variable Angle Tow Panels Using Exact Strip Models ................................................................. 1594
Wenti Liu, Richard Butler, Hyunran Kim

Compressive Strength Following Delamination Induced Interaction of Panel and Sublamine Buckling ................................ 1604
Andrew Rhead, Richard Butler, Giles Hunt

Nonlinear Analysis of PrandtlPlane Joined Wings. Part II: Effects of Anisotropy ................................................................. 1616
Luciano Demasi, Rauno Cavallario, Andrea Fassariello

Buckling of VAT Plates Using Energy Methods .................................................................................................................. 1653
Yangming Wu, Gangadharan Ragu, Paul Weaver

Wind Tunnel Test of a Very Flexible Aircraft Wing ................................................................................................................ 1665
Robert Britt, Daniel Ortega, John McTigue, Matthew Scott

A Rigid Horizontal Tail Wind Tunnel Test for High Transonic Mach and High Frequency Unsteady Pressure Acquisition ............................................................. 1689
Ruben Moreno, Paul Taylor, Jerry Newsom

Computational Identification of Non-Linear Damping in an Aeroelastic System ................................................................. 1706
Gareth Vio, Grigorios Dimitriadis

Aeroelastic Wind Tunnel Test for Aerodynamic Uncertainty Model Validation ............................................................... 1717
Yuting Dai, Chao Yang, Zhigang Wu, Lei Chen

Dynamic Response Analysis and Experimental Validation for Airdrop of a Flexible Aircraft ........................................... 1733
Zhigang Wu, Zhivei Jing, Chao Yang

Design and Analysis of a Wind Tunnel Test Model System for Gust Alleviation of Aeronautical Aircraft .............................. 1746
Libo Wang, Long Shen, Lei Chen, Zhigang Wu, Chao Yang

Dynamic Stiffness Formulation and Free Vibration Analysis of Composite Plate Assemblies Using Higher Order Shear Deformation Theory ....................................................................................... 1757
Fiorenzo Fazzolari, Marco Boscolo, Jnan Banerjee

Characterizing Plate Damping Loss Factor Estimation Errors .............................................................................................. 1782
Mark Evring, Himanshu Dande

Investigation of the Effect of Geodesic and Semi-geodesic Winding on the Vibration Characteristics of Variable Stiffness Filament Wound Shells of Revolution .......................................................... 1799
Altin Kayran, Erdem Yavuzbalkan, Serkan Ibrahimoglu
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjoint Based Sensitivity Analysis for Geometrically Exact Beam Theory and Variational Asymptotic Beam</td>
<td></td>
</tr>
<tr>
<td>Section Analysis with Applications to Wind Turbine Design Optimization</td>
<td></td>
</tr>
<tr>
<td>Hydrodynamic Ram Model Development - Survivability Analysis Requirements</td>
<td></td>
</tr>
<tr>
<td>Dynamic Analysis of Damage to the Aircraft Propulsion System Impacted by an Exploding Missile</td>
<td></td>
</tr>
<tr>
<td>Assessing Survivability Increasing Technologies in the A-10 Aircraft</td>
<td></td>
</tr>
<tr>
<td>An Improved Prediction Model for Spacecraft Damage Following Orbital Debris Impact</td>
<td></td>
</tr>
<tr>
<td>Effects of Weave Type on Ballistic Performance for Aramid, UHMWPE, and Hybrid Fabrics</td>
<td></td>
</tr>
<tr>
<td>Morphing Trailing Edge Control Using Flexible Matrix Composite Actuators</td>
<td>Daewon Kim, Michael Philen, Ryan Capps</td>
</tr>
<tr>
<td>Span Morphing: A Conceptual Design Study</td>
<td></td>
</tr>
<tr>
<td>Steerable Adaptive Bullet Flight Control Mechanism Design</td>
<td></td>
</tr>
<tr>
<td>Analysis of a Free-Fall Ballute Vehicle</td>
<td></td>
</tr>
<tr>
<td>Design and Testing of an Expandable Space Structure Using Softgoods Composite Technology</td>
<td>Jonathan Hinkle, David Cadogan, Jeff Roushey, Ryan Cook</td>
</tr>
<tr>
<td>Design and Testing of the Inflatable Aeroshell for the IRVE-3 Flight Experiment</td>
<td>David Lichodziejewski, Christopher Kelley, Benjamin Tutt, Glen Brown, David Jurewicz, Dennis Barber, Robert Dillman, Charles Player, Brian Giles</td>
</tr>
<tr>
<td>Aerodynamic and Aeroelastic Characteristics of Conformal Control Surfaces and Application in Active</td>
<td></td>
</tr>
<tr>
<td>Aeroelastic Wing Technology</td>
<td></td>
</tr>
<tr>
<td>Control of a Heavy-Lift Robotic Manipulator with Pneumatic Artificial Muscles</td>
<td></td>
</tr>
<tr>
<td>A Regularized Discrete Laminate Parametrization Technique with Applications to Wing-Box Design Optimization</td>
<td>Graeme Kennedy, Joaquin Martins</td>
</tr>
<tr>
<td>Optimal Design of a Composite Sandwich Structure Using Lamination Parameters</td>
<td>Vladimir Balabanov, Olaf Weckner, Michael Epton, Gerald Mahson, Samuel Cregger, Adriana Blom</td>
</tr>
<tr>
<td>Evidence-Based Design Optimization of Energy Absorbing Components under Material Field Uncertainty</td>
<td>Shahabedine Salehshaghfizani, Massoud Raissi-Rohani</td>
</tr>
<tr>
<td>Ply Number Rounding-off in Optimization of Composite Structures Using Lamination Parameters</td>
<td>Dianzu Liu, Yaxi Li, Toropov</td>
</tr>
<tr>
<td>Modelling Approaches for the Simulation-based Preliminary Design and Optimization of Electromechanical and</td>
<td></td>
</tr>
<tr>
<td>Hydraulic Actuation Systems</td>
<td></td>
</tr>
<tr>
<td>Aircraft Route Optimization for Heterogeneous Formation Flight</td>
<td></td>
</tr>
<tr>
<td>Three Dimensional Multi-Objective UAV Path Planning Using Digital Pheromone Particle Swarm Optimization</td>
<td></td>
</tr>
<tr>
<td>Engineering System Co-Design with Limited Plant Redesign</td>
<td></td>
</tr>
<tr>
<td>Surrogate-based Design Optimization with Adaptive Sequential Sampling</td>
<td>Jie Zhang, Souma Chowdhury, Achille Messac, Ali Mehmani</td>
</tr>
<tr>
<td>Integration of Manufacturing Process Simulation with Probabilistic Damage Tolerance Analysis of Aircraft</td>
<td></td>
</tr>
<tr>
<td>Engine Components</td>
<td></td>
</tr>
<tr>
<td>Towards a Probabilistic Framework for Integrated Computational Materials Engineering</td>
<td></td>
</tr>
<tr>
<td>Identification and Validation of a Stochastic Model for Mesoscale Material Description of Metallic Polycrystals</td>
<td>Roger Ghaman, Arash Nooshadvaran</td>
</tr>
<tr>
<td>Quantification of Behavioral Uncertainty Resulting from Insertion of Heterogeneity into Microstructure</td>
<td></td>
</tr>
<tr>
<td>Structural Integration of Pulsating Heat Pipes in Printed Circuit Boards and Facesheets of Honeycomb Panels</td>
<td>Fritz Lau, Brent Taft</td>
</tr>
<tr>
<td>Thermal Characterization of Graphite Storable Tubular Extendable Masts</td>
<td>Derek Hengeveld, Thomas Murphey, Brent Taft, Sam Pedrotty</td>
</tr>
</tbody>
</table>
Structural Performance of a Grid-Stiffened Panel with Integrated Thermal Control ................................................. 2714
Ultrasonic Characterization as a Correlating Metric for Evaluating Thermal Contact Resistance .................................. 2723

VOLUME 4

On the Mesh Dependency of Cohesive Zone Models for Crack Propagation Analysis .................................................. 2732
Julian Romoli, Juan Rojas, Farah Khemani
Investigation of Progressive Damage and Fracture in Laminated Composites Using the Smeared Crack Approach .................. 2741
Christian Heinrich, Anthony Waas
A Statistical Volume Element Based Approach to Multiscale Modeling of Fatigue Crack Formation in AA 2024-T351 ................................................................. 2760
Jinjun Zhang, Chuntiao Luo, Aditya Chattopadhyay
Progressive Failure of a Unidirectional Fiber-reinforced Composite Using the Method of Cells: Discretization Objective Computational Results ................................................................. 2770
Evan Pineda, Anthony Waas, Brett Bednarcyk, Steven Arnold
Peridynamics Based on the Principle of Virtual Work ........................................................................................................ 2816
Ertan Oktar, Erdogan Madenci, Atilla Barut
Uncertainty Quantification In Non-planar Crack Growth Analysis .................................................................................. 2841
Yadegar Hombal, Kevin Wolfe, You Ling, Sankaran Mahadevan
Fracture Behavior of Nanostructured Materials through Peridynamic Theory ............................................................. 2855
Ibrahim Goven, Kyle Colavito, Erdogan Madenci
Industry Perspectives on Composite Structural Certification and Design ................................................................. 2866
Carl Rosemame, Stephen Engelstad, Steve Owens
Progressive Failure Analysis Method of a Pi Joint with Uncertainties in Fracture Properties ........................................... 2876
Vassosoulis, Jr., Anthony Waas, Ravi Ravendra
Multi-scale Multi-functional Progressive Fracture of Composite Structures ................................................................. 2885
Christos Chamis, L. Mimayan
Multiscale Fatigue Life Prediction for Composite Panels ................................................................................................. 2899
Brett Bednarcyk, Phillip Yarrington, Steven Arnold
Characterization of Isotropic Viscoelastic Moduli and Compliances from 1-D Tension Experiments ............................ 2917
Michael Michaeli, Abraham Shlarch, Hagay Grosbein, Harry Hilton
Modeling and Analysis of Shock Impingements on Thermo-Mechanically Compliant Surface Panels ......................... 2952
Brent Miller, Jack McNamara, Andrew Crowell
Hypersonic Boundary Layer Stability in the Presence of Thermo-Mechanical Surface Compliance ................................. 2983
Zachary Riley, Jack McNamara, Heath Johnson
Application of Reduced-Order Models for Thermoelastic Trajectory Simulation .......................................................... 3001
Joseph Hollkamp, Robert Gordon
Aerothermal-Aeroelastic Two-way Coupling Method for Hypersonic Flutter of Three-Dimensional Curved Panel .......... 3015
Guoqun Li, Zhiquang Wan
An Overview of the Semi-Span Super-Sonic Transport (SST) Wind-Tunnel Model Program ........................................... 3032
Walter Silva, Boyd Perry, James Florance, Mark Sanestrak, Carol Wieseman, William Steveno, Christina Funk, Jiyoung Hur, David Christhildf, David Coulson
James Florance, Robert Scott, Donald Keller, Mark Sanestrak, Walter Silva
Analytical and Experimental Evaluation of Digital Control Systems for the Semi-Span Super-Sonic Transport (SST) Project .................................................................................. 3070
Carol Wieseman, David Christhildf, Boyd Perry
Characteristics of Control Laws Tested on the Semi-Span Super-Sonic Transport (SST) Wind-Tunnel Model ...................... 3089
David Christhildf, Kevin Roughen, Boris Moulin, Erich Ritz, Ping Chen, Boyd Perry
Computational Aeroelastic Analysis of the Semi-Span Super-Sonic Transport (SST) Wind-Tunnel Model ...................... 3105
Mark Sanestrak, Walter Silva, Jiyoung Hur
Rapid Prediction of Worst Case Gust Loads Following Structural Modification ............................................................. 3128
Hamed Khodaparast, Jonathan Cooper
Active Control of Performance and Vibratory Loads Using Leading Edge Slats ............................................................... 3147
Inderjit Chopra, Kumar Ravichandran
Experimental Validation of a Multifunctional Wing Spar Design with Sensing, Harvesting and Gust Alleviation Capabilities ............................................................................................... 3169
Ya Wang, Daniel Inman
Towards CFD Based Aeroservoelastic Flight Vehicle Shape Optimization - New Capabilities and New Results with ZEU Project ................................................................. 3189
Zhichao Zhang, Ping Chen, Eli Livne
Coupled CSD/CFD Non-linear Aeroelastic Trim of Free-flying Flexible Aircraft .......................................................... 3218
Giuilo Romanelli, Michele Castellanti, Sergio Ricci, Paolo Mantegazza
Lyapunov Inverse Iteration for Stability Analysis using Computational Fluid Dynamics ............................................. 3233
Sebastian Timme, Kenneth Badcock, Minghao Wu, Alastair Spence
Enabling Sensitivity Analysis Capability for a CFD-Based Unsteady Aerodynamic/Aeroelastic Solver .......................................................... 3248
Zhiqun Wang, Zhichao Zhang, Peng Chen, Darius Salhaddi, Wenbin Yu

Elastic Properties of Aligned Carbon Nanotube Polymer Nanocomposites with Controlled Morphology .......................................................... 3265
Roberto Gazman De Villoria, Silvia Chan, Kosuke Takahashi, Hulya Cebeci, M. Williams, D. Handlin

Aligned Carbon Nanotube Reinforcement of Aerospace Carbon Fiber Composites: Substructural Strength ........................................ 3270
Roberto Gazman De Villoria, Lisa Yedefors, Per Hallander, Kyoko Ishiguro, Pontus Nordin, B. Wardle

Evaluation for Aerostructure Applications ............................................................................................................................. 3277
Timotei Centea, Stella Hughes, Steven Payette, James Kritz, Pascal Hubert

Effect of Manufacturing Route on Mode I Fracture Toughness of Aligned Carbon Nanotube Reinforced Composites .................................................. 3283
Sanny Wicks, Soh-Mei Katsioun, Marcel Williams, Roberto Gazman De Villoria, Brian Wardle

Scaling Challenges Encountered with Out-of-Autoclave Prepregs ........................................................................................................ 3298
Delphine Carponcin, Eric Dantras, Colette Lacabanne, Pascale Guigue, Helene Combex, Claire Tonon, Mathieu Chevalier

Influence of Vacuum and Temperature During Simulated Aging on Properties of a Polyepoxy Adhesive Used in Spacecraft Applications .................................................................................................................................................. 3307
Nicolas Canesse, Eric Dantras, Colette Lacabanne, Pascale Guigue, Helene Combex, Claire Tonon, Mathieu Chevalier

Processing and Characterization of a Submicronic Ceramic-Thermoplastic Polymer Composite: Particle Size and Volume Fraction Optimization for Promoting a Smart and Lightweight Piezoelectric Material for Space Applications ................................................................................................................................................................................................... 3316
Oliver Rhodes, Matthew Santer, Alberto Pirrera, Paul Weaver

Temperature and Frequency Effects on the Fatigue Properties of Unidirectional Glass Fiber-Epoxy Composites .................................................. 3324
John Mandell, Daniel Samborsky, David Miller

Deposition Modeling ........................................................................................................................................................................ 3330
David Mandell, Daniel Samborsky, D. Todd Griffith, Bernardette Hernandez-Sanchez

Performance of Composite Materials Subjected to Salt Water Environments .................................................................................................................. 3336
David Miller, John Mandell, Daniel Samborsky, D. Todd Griffith, Bernardette Hernandez-Sanchez

Pseudo-Bistable Morphing Composites ..................................................................................................................................................... 3343
David Mandell, Daniel Samborsky, D. Todd Griffith, Bernardette Hernandez-Sanchez

Aeroelastic Optimization of a Morphing 2D Shock Control Bump ...................................................................................................................... 3350
Oliver Rhodes, Matthew Santer

Multiphysics Modeling of Composite Beams under Large Temperature Changes .......................................................................................................................... 3356
Qi Wang, Wenbin Yu

Wavelet Spectral Finite Element Modeling of Transverse Crack for Structural Health Monitoring of Composite Plates .................................................................................................................................................................................. 3362
Hans Monner, Johannes Riemschneider, Markus Kintscher

Groundtest of a Composite Smart Droop Nose ......................................................................................................................................................... 3368
Hans Monner, Johannes Riemschneider, Markus Kintscher

MegaFlex - The Scaling Potential of UltraFlex Technology .......................................................................................................................................................................................... 3374
David Murphy

Experimental and Theoretical Evaluations on Deployment Behavior of Inflatable Boom Elements .................................................................................................................................................................................. 3380
Markus Kintscher, Nobuhisa Katsumata, M. Natori, Hiroshi Yamakawa

Electron Flux Deflection Experiments with Coulomb Gossamer Structures ........................................................................................................ 3386
Laura Stiles, Hanspeter Schaub

A New Deployable Truss for Gossamer Space Structures ................................................................................................................................. 3392
Martin Hillebrandt, Marco Straubel, Christian Huebner, Martin Wiedemann

Advancing the Design of Complex Engineered Systems through Multidisciplinary Design Optimization: Report from an NSF Workshop ................................................................................................................................. 3408
Timothy Simpson, Joaquin Martins

A Standard Platform for Testing of MDAO Architectures ..................................................................................................................................................... 3414
Justin Gray, Christopher Heath, Kenneth Moore, Bret Naylor

Robust and Reliability Based Design Optimization Framework for Wing Design .................................................................................................................. 3420
Afzal Saleem, Buran Sanehlo, Ricardo Paiva

Robust Topology Optimisation for Expected Compliance and Variance Using Level-Set Method .................................................................................................................................................................................. 3426
Peter Dunning, Hyunsun Kim

Review and Unification of Methods for Computing Derivatives of Multidisciplinary Systems .................................................................................................................................................................................. 3432
Nobuhisa Katsumata, M. Natori, Hiroshi Yamakawa

Trust Region Based MPS Method for Global Optimization of High Dimensional Design Problems .................................................................................................................................................................................. 3438
George Cheng, Guangfeng Wang

Advanced Probabilistic Neural Network for Reliability Estimation via Semi-supervised Learning .................................................................................................................................................................................. 3444
Jiten Patel, Seung-Kyuam Choi
VOLUME 5

Estimating Probability of Failure of Composite Laminated Panel with Multiple Failure Modes ................................................................. 3647

Changoung Park, Nam Ho Kim, Raphael Haftha

Time-dependent Reliability Analysis Using Efficient Bayesian Method ................................................................................................ 3666

Xuefei Guan, Jingjing He, Ratneshwar Jha, Yongming Liu

Variance Sensitivity Analysis of Parameters in Puck's Failure Theory for Composites .................................................................................. 3682

Rafay Navaid, Satchi Venkataraman

Development of a Multistage Reliability-Based Design Optimization Method .............................................................................................. 3716

Eric Paulson, Ryan Starkey

Synchronizing Condition-based Maintenance with Necessary Scheduled Maintenance ............................................................................ 3725

Sumitha Patilbhirama, Christian Goiga, Nam Ho Kim, Raphael Haftha, Christian Bes

Bayesian Model Selection Between Underdetermined Nuclear Reactor Models .......................................................................................... 3740

Kenneth Hu, Angel Urbina

Data-Based Stochastic Evaluation of Closed-Loop Stability and Performance Metrics ...................................................................................... 3766

Dimitri Krattiger, Seth Lacy, Yi Babushka, Steven Lane, Thomas Paez

Probabilistic Framework for Prediction of Material Property Distributions from Small Microstructural Models .................................................. 3775

Eileen Sparkman, Harry Millwater, Patrick Golden, Raji John

Optimal Wrap Angles for Composite Pressure Vessels Part 1: Static Orthogonal Arrays .......................................................... 3812

Peter Gustafson

Optimal Wrap Angles for Composite Pressure Vessels Part 2: Dynamic Failure Modes ............................................................. 3895

Peter Gustafson

Advanced Layer-Wise Shells Theories Based on Trigonometric Functions Expansion .................................................................................. 3895

Daniela Crispulli, Maria Cinefra, Erasmo Carrera

High-Fidelity Total-Lagrangian Geometrically Exact Modeling and Analysis of Highly Flexible Plates/Shells .................................................. 3851

P. Frank Pai, Robert Chapman, Zaichun Feng

A New Theoretical Framework for the Formulation of General, Nonlinear, Multiscale Shell Theories ................................................................. 3880

Todd Williams

Effects of Shell-Buckling Knockdown Factors in Large Cylindrical Shells ........................................................................................................ 3886

Glenn Hrinda

Finite Element Based HWB Centerbody Structural Optimization and Weight Prediction ................................................................. 3909

Frank Gern

Phantom Eye - Accelerated Air Vehicle Structural Development thru Prototyping ...................................................................................... 3918

Terry Richardson

Mechanism Design for Aircraft Morphing Wing ........................................................................................................................................ 3930

Qing Wang, Yan Chen, Hui Tang

Optimization of Leading Edge and Flap with Actuation System for a Variable Camber Wing ............................................................................. 3944

Natalia Di Matteo, Shijun Gao, Ryoko Morishima

Survey of Reliability Analysis Methods for Design Optimization of Aircraft Structures ................................................................. 3953

Jacobo Diaz, Santiago Hernandez, Luis Romera, Ator Baldur

The Design and Flight Test of a New Smart Wing System .............................................................................................................................. 3969

Yue Wang, Sai An

A Thermodynamically-Based Mesh Objective Work Potential Theory for Predicting Intralaminar Progressive Damage and Failure in Fiber-Reinforced Laminate .................................................................................................................. 3969

Evan Pineda, Anthony Waas

Debond Resisting Composite Stringers ...................................................................................................................................................... 4009

Matthew O'Donnell, Paul Weaver, Enzo Cosentino

Analysis Methodology for Assessing Delaminations in Composite Overwrapped Pressure Vessels ................................................................. 4030

Vinay Goyal, Jacob Rome

Multiscale Modeling of Damage Accumulation in Carbon Fiber Reinforced Polymers Subjected to Fatigue ............................................................. 4054

Robert Crouch, Caglar Oskay, Stephen Clay

Estimation of Ground Service Equipment Contact Damage in Composite Aircraft Panels ................................................................. 4065

Hyoony Kim, Gabriela Defrancisci, Zhi Chen

Finite Element Modeling of Z-Pinned Composite Structures under Mode II Loading ...................................................................................... 4080

Vipul Ranatunga, Stephen Clay

Developing Guidelines for the Application of Coupled Fracture/Continuum Mechanics - Based Composite Damage Models for Reducing Mesh Sensitivity .................................................................................................. 4099

Doug Kenik, Emmett Nelson, Gerald Matson, Don Robbins

Influence of Finite Element Size in Residual Strength Prediction of Composite Structures ............................................................................... 4108

A. Satyanarayana, P. Bogert, K. Karayev, P. Nordman, H. Raz

Energy-Based Stiffness Degradation for Alleviation of Mesh Sensitivity for Progressive Failure Analysis of Center-Notched Composite Panels ........................................................................................................... 4109


Mesh Dependency in Progressive Failure Modeling of Notched Laminates Under Out-of-Plane Bending ............................................................. 4134

John Parmigiani, Timothy Kennedy, Thomas Wright

Finite Element Based Decohesive Failure Simulation Sensitivity Studies ........................................................................................................ 4146

Gerald Matson, Olaf Weckner, Mathadavadas Rammah

Mesh Dependency of the Discrete Damage Modeling in Laminated Composites .............................................................................................. 4160

Michael Swindeman, David Mollehnauer, Endel Jarve, Kevin Hoos, Stephen Hallet
Initial Assessment of a CFD Application for Predicting Jet Fighter Aircraft Cavity Bay Acoustics for Subsonic and Supersonic Aircraft States ............................................................4156
Mark Morton, James Cox, Eugene Powell

Calculation of Coupled Vibroacoustics Response Estimates from a Library of Available Uncoupled Transfer Function Sets ..........................................................4183
Andrew Smith, R. Benjamin Davis, Bruce Lavender, Ronald Hunt, Clay Fulcher, Douglas Jones, Jonathan Band

Application and Demonstration of Nonlinear Reduced Order Modeling (NLROM) for Thermal/Acoustic Response ..........................................................4195
Salvatore Liguori, Dale Pitt, Michael Thomas

Multi-objective Vibro-acoustic Optimization of Point Excited Curved Panels with Straight/Curvilinear Stiffeners ..........................................................4207
Pankaj Joshi, Sameer Mudani, Rakesh Kapania

Validation of Component Vibrations Predicted from Response Matching Method by Finite Element Acoustic Analysis ..........................................................4226
Yung Tseng Chung, Derek Krebs, Hana Tong, Clay Fulcher

Experimental and Computational Studies to Understand the Role of Flow Curvature Effects on the Aerodynamic Performance of a MAV-Scale Cycloidal Rotor in Forward Flight ..........................................................4242
Mobile Benedict, Tejaswi Jarugumilli, Inderjit Chopra, Vinod Lakshminarasimhan

Aerelastic Responses of Spring-suspended Airfoil Systems in Transonic Buffeting Flows ..........................................................4272
Daniella Raveh, Earl Dowell

Uncertainty Due to Unsteady Fluid/Structure Interaction for the Ares I Vehicle Traversing the Transonic Regime ..........................................................4290
Robert Bartels

3D and Finite-wing Effects on the Shock-buffet Instability Mechanism ..........................................................4306
Michael Iovnovich, Daniella Raveh

Static and Forced Motion Aerelastic Simulations of the HIRENASD Wind Tunnel Model ..........................................................4325
Mark Bitter

Effect of Engine Placement on Aerelastic Trim and Stability of Flying Wing Aircraft ..........................................................4339
Pezhan Mardanpour, Dewey Hodges, Ryan Neuhart, Nathan Grayhead

Design of a Lift-optimized Flapping-wing Using a Finite Element Aerelastic Framework of Insect Flight ..........................................................4354
Thomas Vanneste, Jean-Bernard Paquet, Sébastien Grondel, Eric Cattan

CFD-CSD Coupled Aerelastic Analysis of Flexible Flapping Wings for MAV Applications: Methodology Validation ..........................................................4366
Rita Mathew, Vinod Lakshminarasimhan, Pierangelo Masarati, James Bieder, Inderjit Chopra, Marco Morandini, Giuseppe Quaranta

Flapping Wing Force and Deformation Analysis ..........................................................4383
Alan Jennings, Jonathan Black, John Alerding

Stability and Power Optimality in Time-Periodic Flapping Wing Structures ..........................................................4398
Bret Stanford, Philip Beran, Richard Snyder, Mayuresh Patil

Towards a Fundamental Understanding of Low Reynolds Number Hover-Capable Flapping Wing Aerodynamics ..........................................................4418
Pranay Seshadri, Mobile Benedict, Inderjit Chopra

Thrust Augmentation of Flapping Airfoils in Low Reynolds Number Flow Using a Flexible Membrane ..........................................................4447
Justin Jaworski, Raymond Gardnier

Damping Models for Shear Beams with Applications to Spacecraft Wiring Harnesses ..........................................................4463
Jeffrey Kaufman, George Lesieutre, Vit Babuska

Friction Stir Processing of Aluminum for Enhanced Passive Damping: Modeling and Testing of Two Structures ..........................................................4473
Eric Musti, Abida Evur, Umesh Korde, Christian Widener

Validation of Measured Damping Trends for Flight-Like Vehicle Panel/Equipment Including a Range of Cable Harness Assemblies ..........................................................4487
Andrew Smith, R. Benjamin Davis, Clay Eyerde, Clay Fulcher, Douglas Jones, James Waldon

Piezoelectric Vibration Damping Study for Rotating Composite Fan Blades ..........................................................4500
James Min, Kirsten Duffy, Andrew Provenza, Benjamin Choi, Nicholas Kray

Otone Scott-Emuakpor, Brian Runyon, Tommy George

Vibration Analysis of a Helicopter Blade with a Piezoelectric Actuated Trailing Edge Flap ..........................................................4531
Osge Vladimir Ogunnas, Metin Kaya

Self-Rechargeable Multifunctional Carbon Fiber Composites with CNTs Supercapacitors ..........................................................4550
Gualia Lanzara, Lucia Bastirico

Micromechanics Modeling of High Temperature Materials with Temperature-dependent Constituents ..........................................................4557
Chong Teng, Wenbin Yu, Ming Chen

Autonomous Self-healing of Damaged CFRPs ..........................................................4571
Vita Imperiale, Ian Bond

Micromechanics of Fatigue Damage in Unidirectional Polymer Composites ..........................................................4580
Mark Garnich, Ray Fertig, Evan Anderson, Shuang Deng

Simulation of Mode I Fracture at the Micro-level in Polymer Matrix Composite Laminate Plies ..........................................................4589
David Mollenhauer, Tim Breitzman, Endel Inaves, Kevin Hsso, Michael Swindeman, Eric Zhou

Modeling of Damage Initiation and Progression in a SiC/SiC Woven Ceramic Matrix Composite ..........................................................4597
Subodh Mital, Robert Goldberg, Peter Bonacuse

General Fracture Criterion for Mixed-mode Delamination in Composite Materials ..........................................................4611
Chao Zhang, Jifeng Xu, Zizzi Lu, Yongming Liu

VOLUME 6
A Multi-scale Finite Element Approach for the Random Mechanical Response of Honeycomb-cored Structures.................................4619

Sensitivity to Gust Parameters and Control of Aerodynamic Loads on a Rotating Blade .................................................................4633

Developing Simplified Models for Wind Turbine Blades ..................................................................................................................4641

A Stochastic Modal Decomposition Framework for the Analysis of Structural Dynamics under Uncertainties ................................4656

Numerical assisted Design of a Variable Rotating Vane Carrier Device for Turbine Test Rigs with split Housing ..................................................4670

On the Approximate Bending Stiffness for Structural Optimization of double-skin Hollowed Rectangular Plates ..................4680

Investigation to Determine Rotational Stability of On-Orbit Propellant Storage and Transfer Systems Undergoing Operational Fuel Transfer Scenarios ..........................................................................................................................4686

Development of a Span-Extending Blade Tip System for a Reconfigurable Helicopter Rotor ..........................................................4711

Modelling and Analysis of Piezoelectric Energy Harvesting from Helicopter Blades ..............................................................4722

Structural Design of an Active Trailing-Edge Flap Blade for Helicopter Vibration Control ..........................................................4738

Morphing Blade Fluid-Structure Interaction ............................................................................................................................................4747

Thin Deformable Mirrors for a Reconfigurable Space Telescope ..............................................................................................................4762

Magnetically-Controlled Membrane Reflector ......................................................................................................................................4774

MOIRE Gossamer Space Telescope - Structural Challenges and Solutions ..........................................................................................4784

CubeSat-Deployable Photon Sieve Design for Strength and a High Degree of Deployment Control ................................................4793

Three-Point Suspension for Circular Membrane Apertures ..................................................................................................................4803


A Resource-Oriented Architecture for MDO Framework ..................................................................................................................4828

An Integrated Environment for Preliminary Aircraft Design and Optimization ..............................................................................4841

A Multidisciplinary Analysis Optimization Environment for Wings Having SpaRibs ................................................................4865

Enhancing and Developing the Practical Optimisatio...
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Study of the Compression Response of Fluted-Core Composite Panels with Joints</td>
<td>5099</td>
</tr>
<tr>
<td>A Component-Wise Approach for the Failure Analysis of Composite Structures</td>
<td>5112</td>
</tr>
<tr>
<td>Peridynamics for Failure Prediction in Composites</td>
<td>5127</td>
</tr>
<tr>
<td>Progressive Failure Analysis of Laminated Composite Structures Based on Puck's Failure Criteria</td>
<td>5159</td>
</tr>
<tr>
<td>Identification of Failure Mechanisms in Sandwich Structures with Foam Core Thickness Mismatches</td>
<td>5188</td>
</tr>
<tr>
<td>Fiber-Aligned, Discrete-Layer Modeling Approaches for Progressive Failure Simulation of Open Hole Composite Panels</td>
<td>5201</td>
</tr>
<tr>
<td>Design and Experimental Validation of a Mixed-Mode Crack Arrest Specimen</td>
<td>5221</td>
</tr>
<tr>
<td>Crack Growth and Residual Strength Prediction of Thin-Walled Aluminum Structures Using XSHELL</td>
<td>5229</td>
</tr>
<tr>
<td>Bonded Crack Retarders for Aircraft Integral Metallic Structures: a Sensitivity Analysis of Design Parameters</td>
<td>5244</td>
</tr>
<tr>
<td>Improved Stress Intensity Factor Solution for Cracks in Panels with Arbitrarily Located Stringers</td>
<td>5260</td>
</tr>
<tr>
<td>Improved Stress Intensity Factor Solutions for Surface and Corner Cracks at a Hole</td>
<td>5295</td>
</tr>
<tr>
<td>Experimental Study on the Low-velocity Impact Behavior of Foam-core Sandwich Panels</td>
<td>5305</td>
</tr>
<tr>
<td>Functionally Grading Honeycomb Core Material by Inplane Crushing for Tapered Sandwich Closures</td>
<td>5318</td>
</tr>
<tr>
<td>Compression After Impact on Honeycomb Core Sandwich Panels with Thin Facesheets, Part 1: Experiments</td>
<td>5347</td>
</tr>
<tr>
<td>Compression After Impact on Honeycomb Core Sandwich Panels with Thin Facesheets, Part 2: Analysis</td>
<td>5384</td>
</tr>
<tr>
<td>A Refined Zigzag Theory for Laminated Composite and Sandwich Plates Incorporating Thickness Stretch Deformation</td>
<td>5435</td>
</tr>
<tr>
<td>Computational Considerations for the Prediction of Stall Flutter</td>
<td>5460</td>
</tr>
<tr>
<td>Modeling Flutter Response of a Flexible Morphing Wing for UAV</td>
<td>5473</td>
</tr>
<tr>
<td>Toward an Unsteady Aerodynamic ROM for Multiple Mach Regimes</td>
<td>5479</td>
</tr>
<tr>
<td>Impact of Structural Variability on Robust Flutter Optimization</td>
<td>5499</td>
</tr>
<tr>
<td>Flutter-Boundary Prediction Using System Identification-Based Reduced-Order Aeroelasticity Analysis</td>
<td>5510</td>
</tr>
<tr>
<td>Subgrid-scale Dynamics for a Nonlinear Beam</td>
<td>5535</td>
</tr>
<tr>
<td>Energy Dissipation of a Bi-stable von-Mises Truss under Harmonic Excitation</td>
<td>5570</td>
</tr>
<tr>
<td>Strain-Based Analysis for Geometrically Nonlinear Beams: A Modal Approach</td>
<td>5584</td>
</tr>
<tr>
<td>Amplification of Initial Imperfection of an Ultra-long Beam under Impulsive Compression</td>
<td>5607</td>
</tr>
<tr>
<td>Flutter Computations for a Generic Reference Aircraft Adopting CFD and Reduced Order Methods</td>
<td>5614</td>
</tr>
<tr>
<td>Efficient Calculation of Aerodynamic States for Aeroelastic Analyses in the Frequency Domain</td>
<td>5633</td>
</tr>
<tr>
<td>A Hybrid Quasi-steady CFD-Inflow Approach for Gust Response Analysis of Highly Flexible Aircraft</td>
<td>5654</td>
</tr>
<tr>
<td>Transonic Stabilization Laws for Unsteady Aerodynamics and Flutter</td>
<td>5669</td>
</tr>
<tr>
<td>Transonic Flutter Analysis Using Coupled CFD-CSD Analysis and New Reduced Order Modeling Technique</td>
<td>5688</td>
</tr>
<tr>
<td>Design and Testing of a Quad Shrouded Rotor Micro Air Vehicle in Hover</td>
<td>5702</td>
</tr>
<tr>
<td>Airworthiness Evaluation of a Sealed Joined-Wing Aircraft</td>
<td>5718</td>
</tr>
</tbody>
</table>
A Conceptual Design and Optimization Method for Blended-Wing-Body Aircraft ..............................................6164

Development and Application of Multi-disciplinary Optimization Capabilities Based on High-fidelity Methods .................................................................6178

Joel Brezillon, Arno Ronzheimer, Danil Haar, Mohammed Abu-Zurayk, Markus Lammer, Franz Josef Natterer, Wolf Kruger

Optimal Flying Wings: A Numerical Optimization Study .........................................................................................6206

Charles Mader, Joaquim Martins

Integrated Systems Design of a Cargo Aircraft with Environmentally Responsible Goals .....................................6240

Erik Boekelo, Anthony Pavaloro, Timothy Harris, Luke Humphrey, Brandon Johnson, Troy Lake, Collin McBee, Kimberly Scheider, Yukiko Shimizu, Barrett Tirey

Economics of Laminar Aircraft Considering Off-Design Performance ...............................................................6257

Katharina Franz, Tim Lammering, Kristof Riske, Eckhard Anton, Ralf Hoenischmeyer

A Novel Surrogate Modeling Technique for Parametric Uncertainty Quantification in Simulation-Based Design .................................................................6276

Matthew Riley, Ramana Grandhi

Principal Component Analysis on 3D Scanned Compressor Blades for Probabilistic CFD Simulation ................6292

Alexander Lange, Matthias Vogt, Konrad Vogeler, Erik Johann

A Statistics-Based Material Property Analysis to Support Ablation Simulation UQ Efforts ..................................6308

S. Copeland, M. Muhari, J. Gyozna, J. Alonso

Reliability Analysis of Solid Rocket Motor under Bayesian Framework ..........................................................6326

Wan-Beom Kim, Jin-Hyuck Gang, Ji-Sek Hong, Ki-Wan Kim, Joo-Ho Choi, Jinkon Kim, Hong-Gye Sang

Optimum Stress and Material Distributions in Stitched PRSEUS Composites .....................................................6335

Daniel Lee, Harry Hilton, Alex Felicki

On Compressive Response of IM7/8552 Lamina- A Theoretical & Experimental Review ..................................6348

Ahmed Hustien, Marissa Moebringen, Chris Schwall, Byron Pipes

VOLUME 8

Integrated Composite Structures Demonstration for Future Space Launch Vehicle Airframe Applications .................................6365

Robert Biggs, Ryan Cochran, Ben Clark, Edmund Pendleton, Ken Griffin

Design and Maintainability Considerations Regarding the Effects of Suborbital Flights on Composite Constructed Vehicles ........................................................................6386

Eric Lundgren, Jesse Hanson

Non-linear Modeling of Extension-Twist Coupled Energy Absorbing Composite Tubes .......................................6396

Chandrashekhar Tiwari, Edward Smith, Charles Ballis

Sizing and Lifecycle Cost Analysis of an Ares V Composite Interstage ................................................................6413

Troy Mann, Stanley Smeltzer, Brian Mason, Ray Grenoble, Sve Rosario, Bob Fairbairn

Accelerated Creep Testing of High Strength Aramid Webbing ..............................................................................6424

Thomas Jones, Omar Valverde, Clarence Stanfield, William Doggett

Structural Verification of the First Orbital Wonder of the World - The Structural Testing and Analysis of the International Space Station (ISS) ................................................................................6438

John Zipay, Karen Bernstein, Erica Bruno, Phillippe Deloo, Raymond Patin

Predicting and Measuring the Strength Reduction of Sandwich Structures with Spliced Foam Cores ..............6567

Jacob Roshine, Vani Goyal, Dhiraj Patel, Patrick Schubel, Gary Stockel

Initial Investigation of Chordwise Flexible Flat Aerofoil ....................................................................................6580

Jagoda Worotynska, Gareth Vio, Marco Berci, Grigorios Dimitriadis

Experimental Investigation of Thermal Contact Conductance Between Titanium TC4 and Alloy Steel 30CrMnSi ........................................................................6593

Wang Zongren, Jun Yang, Mingyuan Yang, Weifang Zhang

Stress Analysis and Testing at the Marshall Space Flight Center to Study Cause and Corrective Action of Space Shuttle External Tank Stringer Failures ................................................6600

Robert Wingate

STS-133 Space Shuttle External Tank Intertank Stringer Crack Investigation Stress Analysis ..................................6627

Brian Steever

Elastic-Plastic Nonlinear Response of a Space Shuttle External Tank Stringer: Stringer-Feet Imperfections and Assembly ..................................................................................6639

Norman Knight, Kyoungchan Song, Kenny Elliott, Ivatyra Raja, Jerry Warren

Elastic-Plastic Nonlinear Response of a Space Shuttle External Tank Stringer: Thermal and Mechanical Loadings ........................................................................6656

Norman Knight, Jerry Warren, Kenny Elliott, Kyoungchan Song, Ivatyra Raja

STS-133/ET-137 Tanking Test Photogrammetry Assessment ..............................................................................6679

Stanley Oliver

Stringer Bending Test Helps Diagnose and Prevent Cracks in the Space Shuttle's External Tank .................................6690

Joe Saxon, Robert Wingate, Greg Swanson, William Ondoczin, Todd Bales

Test-Analysis Correlation of the Single Stringer Bending Tests for the Space Shuttle ET-137 Intertank Stringer Crack Investigation ........................................................................6702

Dawn Phillips, Joseph Saxon, Robert Wingate

Structural Health Diagnosis Using Deep Belief Network Based State Classification ...........................................6721

Prasanna Tamilselvan, Pingfeng Wang

A Hybrid Inference Approach for Health Diagnostics with Unexamined Faulty States .......................................6735

Prasanna Tamilselvan, Pingfeng Wang
Modeling Lamb Wave Propagation for Damage Detection in a Complex Metallic Aerospace Structural Component

Effects of Strain on the Propagation of PZT-induced Lamb Waves in Aluminum Plates Measured via 3D Laser Doppler Vibrometry

A Statistical Approach to Investigate Temperature Effects on Guided Wave Based Structural Health Monitoring

Acoustic Emission Structural Health Monitoring of Laminated Composite Aircraft Structures

Nonlinear Finite Element Modal Formulation for Panel Flutter with Thermal Effects and Acoustic Excitation

A Model-assisted Integrated Diagnostics for Structural Health Monitoring Challenges with Structural Life Forecasting Using Realistic Mission Profiles

The Airframe Digital Twin: Some Challenges to Realization Platform Strategies from a PLM Perspective - Theory and Practice for the Aerospace Industry

Resilience Allocation for Engineered System Design The Airframe Digital Twin: Some Challenges to Realization

Challenges with Structural Life Forecasting Using Realistic Mission Profiles

A Model-assisted Integrated Diagnostics for Structural Health Monitoring Sensitivity Analysis of Structural Life Prediction Models in a Multiaxial Fatigue Environment

Probabilistic Fatigue Life Prediction Using Subset Simulation

Error Quantification and Confidence Assessment of Aeroelastic Model Predictions for Hypersonic Aircraft
The Digital Twin Paradigm for Future NASA and U.S. Air Force Vehicles ................................................................. 7247
Edward Glaeser, David Stargel

VOLUME 9

Multiscale Modeling Analysis of the Interface Effects on the Mechanical Properties of CNT-Polyethylene Nanocomposites ................................................................. 7261
Yumeng Li, Gary Seidel

How Does CNT Functionalization and Epoxy Curing Affects the Thermal Interface Conductance in CNT-epoxy Composites? An Atomistic Modeling Perspective ........................................... 7278
Vikas Varshney, Jonghoon Lee, Aijit Roy, Tyler Michalak, Barry Farmer

Predictive Mechanical Properties of EPON 862 (DGEBF) cross-linked with Curing Agent W (DETDA) and SWCNT using MD Simulations - Effect of Carbon Vacancy Defects ................................................................. 7285
Ram Mohan, Elvia Feifei, Aijit Roy

Concurrently Coupled Multi-scale Modeling of Nano-Particle Reinforced Polymers in the Nonlinear Regime
Samit Roy, Avinash Akepati, Nicholas Hayes

Multiscale Model for Polymer-based Nanocomposites Considering Phase Transition Behavior ........................................... 7303
Joonnyungh Choi, Seunghwa Yang, Suyoung Yu, Maenghyo Cho

Micromechanically Based Effective Thermal Conductivity Estimates for Polymer Nanocomposites ........................................... 7311
Abdessettar Abdelkefi, Ali Nayfeh, Mohammad Haji, Mehdi Ghommem, Abdullah Nahuit

Effect of Nanoscale Fillers on the Viscoelasticity of Polymer Nanocomposites ................................................................. 7317
Mohammad Bonakdara, Gary Seidel, Daniel Inman

Validation of an Enhanced Aeroelastic Analysis Code for Wind Turbines ................................................................. 7329
Krista Keeskesemey, Jack McNamara

Investigating Aerodynamic Performance of Multi-Mega Watt Wind Turbine Rotor Using CFD ........................................... 7348
David Corson, D. Todd Griffith, Tom Ashwill, Furzin Shabik

Extension of MSC Nastran UVLM.OpenFSI for Rotational Applications Including Wind Turbines ........................................... 7365
Zhiyun Wang, Ping Chen, Darius Sarhaddi, Alan Diner

A Simplified Approach for Implicitly Considering Aerodynamics in the Seismic Response of Utility Scale Wind Turbines ................................................................. 7386
Mohammad Amin Asareh, Ian Prowell

Thunderstorm Risks to Wind Farms ................................................................. 7397
Hieu Nguyen, Lance Manuel, Matthew Barone, Joshua Paquette

Power Enhancement of Piezoelectric Energy Harvesters from Aeroelastic Vibrations ........................................... 7409
Ashish Parekar, Alison Platata, Jin-Hyeong Yoo, Ganesh Bagunan

Experiments of Vortex-Induced Vibration of a Flat Plate Exposed to a Normal Cross Flow ........................................... 7420
Yi Yang, Thomas Striganac

Statistical Model Calibration for Energy Harvesting Skin Analysis and Design ................................................................. 7428
Byungchang Jung, Chulmin Cho, Heon Jun Yoon, Hansol Yoon, Byung D Yoon, Yoonyoung Kim

Development of Gallenfo Based Non-Contact Torque Sensor ................................................................. 7441
Arno Ronzheimer, Martin Hepperle, Joel Brezillon, Jan Lieber

Optimal Design of Magnetorheological Damper using Response Surface Method ................................................................. 7451
Armin Hadian, Ramin Sedeghati, Ebrahim Esmaeilzadeh

Structural Architectures for a Deployable Wideband UHF Antenna ................................................................. 7461
Hiroshi Sakamoto, Nozomi Kosata, Masaaki Okuma, Hiroaki Tanaka, Kosei Ishimura

A Large and High Radio Frequency Deployable Reflector ................................................................. 7481
Arend Stolker, Paul Dorman, Mark Sutton, Carla Cesnik, Devesh Kumar

Design and Testing of Ultra-Thin Shell Reflector Demonstrator ................................................................. 7489
Omer Soykasap, Sakru Karamaya

Automatic Surface Mesh Generation for Design of Space Deployable Mesh Reflectors ................................................................. 7502
Hang Shi, Binga Yang, Mark Thomson, Houfei Fang

Aerodynamic Optimal Engine Integration for a Business Jet Configuration ................................................................. 7522
Arun Ronsheime, Martin Hepperle, Joel Brezillon, Olaf Brodersen, Jan Lieber

A Multidisciplinary Design Environment for Composite Rotor Blades ................................................................. 7533
Peter Rohr, Paul Dorman, Mark Sutton, Carola Cesnik, Devesh Kumar

A KBE Application for Automatic Wire Harness Routing of Aircraft Design ................................................................. 7548
Z. Zhu, M. Van Tooren, G. L Rocca

Multidisciplinary Design Optimization of Axial Compressor with Double Step Optimization ................................................................. 7558
Saeil Lee, Sun Choi, Changsoo Jeon, Young-Seek Kang, Soo-Seek Yang, Dong-Ho Lee

Study on Disk and Blade Design Based on Multi-layer Optimization Strategy ................................................................. 7563
Jong-Qiao Wang, Zhefang Liu, Jun-Jie Yang, Chun-Yin Hu, Jiang Fan, Xiu-Li Shen

Multilevel Decomposition and Optimization of Coupled Process-Performance Systems ................................................................. 7574
Ali Najafip, Masoud Rais-Rohani

Reliability-Based Design Optimization Within Analytical Target Cascading Framework ................................................................. 7589
Saber Dormohammadi, Masoud Rais-Rohani

Divergent Exploration in Design with a Dynamic Multiobjective Optimization Formulation ................................................................. 7599
Shane Curtis, Christopher Mattson, Braden Hancock, Patrick Lewis
Design and Analysis of Dual Pressure Probes for Predicting Turbulence-Induced Vibration in Low Velocity Flow .................................. 8109
Jared Hobeck, Daniel Inman

Photogrammetric Technique for Center of Gravity Determination ............................................................................................................ 8119
Thomas Jones, Thomas Johnson, Dave Shevbell, Christopher Shreves

A Mode Selection Criterion Based on Flexibility Approach in Component Mode Synthesis ................................................................. 8128
K. C. Park, Jingyu Kim, Philliseng Lee

An Improved Ground Vibration Testing Approach of Flight Vehicle Structures Using a Scanning Laser Vibrometer .......................................................... 8147
Chad Foerster, Aaron Valdes, John Kosmatka

VOLUME 10

A Comparison Investigation of Experimental and Computational Fuel Slosh Models Utilizing Diaphragm-Implemented Spacecraft Propellant Tanks ................................................................................................................................. 8158
Brian Lenahen, Adrien Bernier, Grace Peters, Sathya Gangadharan

A Computational Investigation for Determining the Natural Frequencies and Damping Effects of Diaphragm-Implemented Spacecraft Propellant Tanks .............................................................................................................. 8187
Brian Lenahen, Adrien Bernier, Sathya Gangadharan

Effect of Internal Liquids on the Vibrations of Aerospace Structures ........................................................................................................ 8224
Jean-Sebastien Schutte, Roger Ohayon, T. Miras

A CFD Study of Cryogenic LH2 Tank Ullage Pressurization ......................................................................................................................... 8233
Dhwali Leva, Sathy Gangadharan, Peter Wilson, Bernard Katter

Design, Analysis and Fabrication of Secondary Structural Components for the Habitat Demonstration Unit - Deep Space Habitat ............................................................................................................................................. 8256
Russell Smith, William Langford

Improved Methodologies for Damage Tolerant Composite Structure Qualification .......................................................................................... 8288
Jaco Schutte, Stephen Clay, J. Meeker

Material Quality of Braided Fuselage Profiles .................................................................................................................................................. 8308
Karin Birkefeld, Tjark Von Reden, Klaus Drechsel

Design and Optimization of an Axial Mode II Crack Arrest Specimen ........................................................................................................... 8316
Chi Ho Eric Cheung, Kuen Yuan Lin, Phillip Gray

Analysis of the Static and Fatigue Strength of a Damage Tolerant 3D-Reinforced Joining Technology on Composite Single Lap Joints ................................................................................................................................. 8327
Ana Carolina Nogueira, Klaus Drechsel, Elke Hombergsmeyer

Identification and Characterization of Debonded and Weakly Bonded Structures ......................................................................................... 8337
Rohit Hesliharr

The Interaction of Failure Modes in the Compression Response and Failure of Laminated Composites ............................................................................. 8352
Pavana Prabhakar, Anthony Waas, Ravi Raveendra

Instrumented Projectile Impact on Composites ..................................................................................................................................................... 8367
Matthew Mordasky, Weinong Chen

Electric Current Analysis for Thick Laminated CFRP Composites ..................................................................................................................... 8374
Akira Tadokoro

Behavior of Long Carbon Fiber Reinforced Concrete Panels under Impact Loading ......................................................................................... 8381
Zahra S. Tabatabaei, Jeffery Volz

Cyclic Hydrothermal Aging of Aircraft Lightning Protections: Phenomenological Overview ...................................................................................... 8388
Gilles Lubineau, Jalal Yagoubi, Abe Askari, Shahid Saghiri, Lakshmi Selvakumar

Foam Property and Its Role in the Radiative Heat Transfer of Hybrid Materials ............................................................................................. 8397
Ming-Yung Chen, Charles Tseng, Bahk Sikorke, Raymond Viskanta

Implementation of a Continuous-Inextensible-Surface Piezocomposite Airfoil ............................................................................................. 8407
Onur Bilgen, Erick Saavedra Flores, Michael Friswell

Finite Element Modeling of Macro Fiber Composite Piezoelectric Actuators on Micro Air Vehicles ........................................................ 8420
Bradley Lacroix, Peter Ifju

Validation Tests of Fiber Optic Strain-Based Operational Shape and Load Measurements ...................................................................................... 8429
John Bakalyar, Christine Jute

Pressurized Morphing Wing Structures ................................................................................................................................................................. 8510
Srinivas Varshita, Liyong Tang

Piezoelectric Adaptive Flutter Test Vane: Low Net Passive Stiffness (LNPS) Techniques for Deflection Amplification ................................................................. 8521
Ryan Barnhart, Ron Barrett

Modeling and Quasi-Static Analysis of a Shape Memory Polymer Cantilever Beam for Space Applications ......................................................... 8535
Dean Bergman, Bingen Yang, Gregory Davis, Huijie Fang

EM Analysis of a Deployable Composite Shell Reflector for Space Applications ................................................................................................. 8549
Derek Doyle, Jeremy Bank, Brandon Arvitt

Characterization of a High Strain Composite Material ........................................................................................................................................... 8560
Ignacio Maqueda, Sergio Pellegrino, Juan Mejia-Ariza

Micromechanical Modeling of Deployment and Shape Recovery of Thin-walled Viscoelastic Composite Space Structures ................................................. 8572
Kawai Kwok, Sergio Pellegrino
Sensitivity Analysis of Extreme Pressure Loads to Inflow Disturbance Parameters............................................................9093

Partially Layerwise Advanced Zig-Zag and HSDT Models Based on the Generalized Unified Formulation..........................9108
Luciano Demasi

Micro-structural Advanced Zig-Zag and HSDT Models Based on the Generalized Unified Formulation..............................9149
Hae-Kyu Hur, Junghun Park

Ordinary State-Based Peridynamic Material Constants .................................................................................................9168
Erkan Oterkus, Erdogan Madenci

Optimal Stacking Sequences for Thermally Induced Twist Deformation.............................................................9199
Sean Muder, Erian Armanios, R. Haynes

Strain Rate Dependent Multiscale Modeling of Woven Composites ........................................................................9207
Kuang Lia, Aditi Chattopadhyay

Homogenization of Slender Periodic Composite Structures ......................................................................................9243
Julian Dizy, Rafael Palacios, Silvestre Pinho

Modular Reconfigurable Zero Free-Play (MORF) Solar Array Deployment Concept Verification...............................9254
Materials, Structures and Manufacturing: An Integrated Approach to Develop Expandable Structures......................9264
W. Blevin, Martin Zander, David Sleight, John Connell, Nancy Holloway, Frank Palmeri

FAST Mast Single-Bay Structural Response to Axial Loading: Modeling and Verification ...........................................9278
Norman Knight, Kyoungchun Song, Kenny Elliott, Jeffery Rayburn, Justin Templeton

Model Calibration Efforts for the International Space Station's Solar Array Mast ..........................................................9309
Kenny Elliott, Justin Templeton, Norman Knight, Lucas Faria

Dynamic Behavior of a Low Inertia Gravity Off-load Passive Device ............................................................................9325
Emil Ardelean, Benjamin Cooper, Sunguen Jeon

Creep Effects and Deployment Characterization of Rollable Composite Shell Reflectors ..............................................9339
Juan Fernandez, Jeremy Banik, Emil Ardelean

On the Folding and Deployment of Tape Springs: A Large Displacements and Large Rotations Rod Model with Highly Flexible Thin-walled Cross-sections ........................................................................9350
Elia Picault, Stephane Bourgeois, Bruno Cochelin, Francois Guinot

Buckling and Crack Propagation of Cracked Box Beams ............................................................................................9360
Hung-Chieh Lo, Raksh Kapania, Mayuresh Pate

Influence of Consolidating Sleeves and Geometric Scale on Buckling After Impact of Basalt Columns .......................9379
Michael Embley, David Jensen, Craig Garvin, Mark Jensen

Stability Analysis of Columns with Imperfection .........................................................................................................9390
Zahra Sotoudeh, Dewey Hodges

The Impact of Geometric Imperfections on Metallic Stiffened Panels with Skin Buckling Containment Features ........................................................................................................................................................................9408
Grant Houston, David Booth, Thomas Murphy, David Witt, Joseph Footdale

Computationally Efficient Analysis of the Postbuckling Behaviour of Stiffened Fuselage Sections ..............................9425
Michael Quatmann, Hans-Guenther Reimerdes

Study on Bending Collapse of Thin Plate with Corrugated Cross-Section ......................................................................9438
Kenichi Masuda, Dai-Heng Chen

Fully Coupled Peridynamic Thermomechanics .................................................................................................................9446
Abigal Agpai, Ibrahim Gavus, Erdogan Madenci

Analytical and Statistical Approaches to Flexural Behavior for Epoxy Resin Materials ................................................9462
Masoud Yekani Fard, Yingtao Liu, Aditi Chattopadhyay

A Multiscale Modeling Methodology for Metal Matrix Composites Including Fiber Strength Stochastics ...............9472
Trenton Ricks, Thomas Lucy, Brett Bednarcyk, Steven Arnold

Nonlinear Modeling of Piezo-composite Actuators with Application to Flapping Wing Micro Aerial Vehicles ..........9480
S. Ponnusami, D. Harursampath, A. Uthandi

A New Moving Least Square Response Surface Method for Structural Reliability Analysis ....................................9488
Jian Li, Hai Wang, Nam Ho Kim

Extreme Value Modeling and Parametric Investigations of Gust and Maneuver Loads for General Aviation ..............9506
Gulshan Singh, Juan Ocampo, Harry Millwater

Efficient Structure-preserving Model Reduction for Nonlinear Mechanical Systems with Application to Structural Dynamics ..............................................................................................................................................9532
Kevin Carlberg, Ray Tuminaro, Paul Boggs

A Numerical Continuation Method to Compute Nonlinear Normal Modes Using Modal Reduction ...........................9548
Matthew Allen, Robert Koehler, Brandon Deuner, Michael Striz

Nonlinear Reduced-Order Simulation Using an Experimentally Guided Modal Basis ................................................9567
Stephen Riszi, Adam Przekop

Nonlinear Structural Reduced Order Modeling Methods for Hypersonic Structures ..................................................9584
Andrew Matney, Stephen Spottswood, Marc Mignolet, R. Perez, X. Wang

Dynamic Simulation of Geometrically Nonlinear Membranes Using Hermite Time Interpolation ..............................9595
Donald Kunz, Kyle Kolsti

Dynamics of Non-linear Structures: Modal Interaction and Non-linear Identification ..................................................9608
Andrea Cammarano, Alessandro Carrella

Limit Cycle Oscillations of Swept-back Wings in an Incompressible Flow ...................................................................9616
Seher Durma, Metin Kaya
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonlinear Aeroelastic Framework Based on Vortex-Lattice Method and Corotational Shell Finite Element</td>
<td>9628</td>
</tr>
<tr>
<td>Post-Flutter Analysis of Flexible High-Aspect-Ratio Wings</td>
<td>9649</td>
</tr>
<tr>
<td>Experimental and Numerical Investigation of the Behavior of a T-tail with Control Surface Freeplay</td>
<td>9660</td>
</tr>
<tr>
<td>Flutter and LCO of an All-movable Horizontal Tail with Freeplay</td>
<td>9674</td>
</tr>
<tr>
<td>Control Surface Freeplay Nonlinearity: Modeling and Experimental Validation</td>
<td>9683</td>
</tr>
<tr>
<td>Proper Modes for Modeling Flapping Dynamics of Ornithopters</td>
<td>9695</td>
</tr>
<tr>
<td>Various Structural Approaches to Analyze an Aircraft with High Aspect Ratio Wings</td>
<td>9708</td>
</tr>
<tr>
<td>Stowed Unmanned Air Vehicle Engineering (SUAVE): Deployable Wing Design and Testing</td>
<td>9719</td>
</tr>
<tr>
<td>An Analysis Technique/Automated Tool for Comparing and Tracking Analysis Modes of Different Finite Element Models</td>
<td>9725</td>
</tr>
<tr>
<td>Discrete Vortex Simulations of the Torsional Flutter Oscillations of a 4:1 Rectangular Cylinder</td>
<td>9777</td>
</tr>
<tr>
<td>Model Updating in Structural Dynamics through a Confluence Approach</td>
<td>9797</td>
</tr>
<tr>
<td>A New and Robust Order Preserving Computational Framework for Index 3 DAE Multibody Dynamics Systems: Two-Field Form</td>
<td>9813</td>
</tr>
<tr>
<td>Transient Dynamics of Stochastic Structural Systems using a Reduced Order Spectral Function Approach</td>
<td>9826</td>
</tr>
<tr>
<td>Numerical Simulation and Experimental Verification of the Electro-Impulse De-Icing System</td>
<td>9846</td>
</tr>
<tr>
<td>Cabin Window Design Space Exploration and Understanding of Interactions with Surrounding Structure</td>
<td>9855</td>
</tr>
<tr>
<td>The Influence of Spar Position on Aeroelastic Optimization of a Large Aircraft Wing with Different Materials</td>
<td>9870</td>
</tr>
<tr>
<td>Weight Investigation of a Novel Split-Wing Airplane Layout</td>
<td>9880</td>
</tr>
<tr>
<td>Multi-fidelity Framework for the Design and MSD/CFD Verification of Flutter Suppression Active Control System</td>
<td>9888</td>
</tr>
<tr>
<td>Development of an Enhanced Wing for the A-10 Wing Replacement Program (WRP)</td>
<td>9898</td>
</tr>
<tr>
<td>A New Structural Design Concept for Blended Wing Body Cabins</td>
<td>9908</td>
</tr>
<tr>
<td>Hybrid-Wing-Body Pressurized Fuselage Modeling, Analysis and Design for Weight Reduction</td>
<td>9920</td>
</tr>
<tr>
<td>Modeling of Oxidation Effects on Heat Transfer Behavior of ZrB2 and ZrB2-SiC Ceramics at High Temperature</td>
<td>9934</td>
</tr>
<tr>
<td>Continuum Modeling of Synthetic Microvascular Materials</td>
<td>9945</td>
</tr>
<tr>
<td>Maximize Unit Cell Choices for Variational Asymptotic Homogenization</td>
<td>9965</td>
</tr>
<tr>
<td>A Novel Modeling Platform for Characterization and Optimal Design of Micro-Architected Materials</td>
<td>9980</td>
</tr>
</tbody>
</table>

**Author Index**

- Scott Godfrey, Lorenzo Valdevis