

American Institute of
Aeronautics and Astronautics

26th AIAA Applied Aerodynamics Conference 2008

August 18-21, 2008
Honolulu, Hawaii, USA

Volume 1 of 4

Printed from e-media with permission by:

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

ISBN: 978-1-60560-810-5

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 1801 Alexander Bell Drive, Reston, VA 20191, USA.

TABLE OF CONTENTS

VOLUME 1

CADac: A New Geometry Construction Tool for Aerospace Vehicle Pre-Design and Conceptual Design	1
<i>A. Berard, A. Rizzi, A. Isikveren</i>	
A Generic Parallel Framework for Shape Parameterisation and CFD-Based Optimisation	11
<i>A. Morris, C. Allen, T. Rendall</i>	
Design Optimization of Hypersonic Vehicles for Boundary Layer Stability	25
<i>H. Johnson, M. Bartkowicz, T. Drayna, G. Candler, C. Alba</i>	
Multi-Stage Aerodynamic Design of Multi-Body Geometries by Kriging-Based Models and Adjoint Variable Approach	55
<i>J. Yim, B. Lee, C. Kim, S. Obayashi</i>	
Prediction Capabilities and Comparison of Panel, Semi-Empiric and CFD Codes for Missile Aerodynamic Analyses	72
<i>H. Atik, O. Basoglu, B. Erdem, M. Ilgaz, I. Karbanciaoglu, A. Katirci, O. Basoglu, E. Mahmutyazicioglu, L. Yalcin</i>	
A Pilot Project in Preparation of an Aerodynamic Optimization Workshop with Lessons Learned	91
<i>J. Vassberg, N. Harrison, S. Peigin, A. Jameson, B. Epstein, D. Roman</i>	
Dynamic CFD Simulation of Aircraft Recovery to an Aircraft Carrier	106
<i>J. Shipman, S. Arunajatesan, P. Cavallo, N. Sinha, S. Polsky</i>	
Aerodynamic Analysis of a Generic Fighter with a Chine Fuselage/Delta Wing Configuration Using Delayed Detached-Eddy Simulation	117
<i>T. Jeans, D. McDaniel, R. Cummings, W. Mason</i>	
A Comparison of Hybrid RANS/LES Turbulence Models for a Generic Weapons Bay With and Without a Spoiler	136
<i>R. Nichols</i>	
Aerodynamic Effects of Different FLIR Pods Carried by the CF-18 Aircraft	172
<i>S. McIlwain, N. Tang</i>	
Flow Past a Yawed Rectangular Cavity at Transonic and Low Supersonic Flows	178
<i>B. Lee, D. Orchard, N. Tang</i>	
An Efficient Fluid-Structure Interpolation and Mesh Motion Scheme for Large Aeroelastic Simulations	191
<i>T. Rendall, C. Allen</i>	
Hopf Bifurcation Analysis of Typical Sections with Structural Nonlinearities in Transonic Flow	205
<i>E. Camilo, F. Marques, J. Azevedo</i>	
Experimental Determination of Ornithopter Membrane Wing Shapes Used for Simple Aerodynamic Modeling	233
<i>R. Harmon, J. Grauer, J. Hubbard Jr., J. Conroy, J. Humbert, J. Siaraman, B. Roget</i>	
Simplified Modeling of Wing-Drag Reduction due to Structural Dynamics and Atmospheric Gusts	250
<i>G. Bramesfeld, D. Ironside, J. Schwochow</i>	
Momentum Conserving Coupling for Partitioned Computational Aeromechanic Analysis	261
<i>B. Silbaugh, J. Baeder</i>	

Reduced-Order Models of Zero-Net Mass-Flux Jets for Large-Scale Flow Control Simulations	281
<i>R. Raju, E. Aram, R. Mittal, L. Cattafesta</i>	
Effects of Store Separation on the Aeroelastic Behavior of Wing	307
<i>S. Zhang, A. Meganathan, T. Fuchiwaki, K. Jain</i>	
Linearization of the Coupled Unsteady Fluid-Structure Equations: Application to Flutter Control	325
<i>K. Mani, D. Mavriplis</i>	
Aerodynamic Analysis of a Multi-Mission Short-Shrouded Coaxial UAV: part I-Hovering Flight	344
<i>C. Thipyopas, R. Barenas, J. Moschetta</i>	
Aerodynamic Moment of Self-Sustained Small Amplitude Oscillations of an Airfoil at Rec = 77,000	361
<i>D. Poirel, W. Yuan</i>	
Separated Flow Discrete Vortex Model for Nano-Scale Hovering Flapping Wings	375
<i>P. Zdunich</i>	
Static Testing of Micro Propellers	387
<i>R. Deters, M. Selig</i>	
A Flat Plate Rectangular Wing Subjected To Grid-Generated Turbulence	427
<i>E. Cruz, S. Watkins, B. Loxton, J. Watmuff</i>	
Aerodynamic and Structural Dynamic Identification of a Flapping Wing Micro Air Vehicle	437
<i>N. Bradshaw, D. Lentink</i>	
Analysis of Wind Tunnel Unsteady Aerodynamic Data of Flexible Micro Air Vehicle Wings	445
<i>R. Albertani, J. Babcock</i>	
From Development of Micro Air Vehicle Testing Research to the Prototype of TYTO: Low Speed Biplane MAV	456
<i>C. Thipyopas, J. Moschetta</i>	
A Numerical Study of Gust Suppression by Flapping Airfoils	468
<i>H. Gopalan, A. Povitsky</i>	
Computations of Flows Past an Insect-Like Flapping Wing	488
<i>W. Yuan, M. Khalid, X. Huang</i>	
Aerodynamic Study of a Flapping-Wing NAV Using a Combination of Numerical and Experimental Methods	510
<i>F. Lesage, N. Hamel, W. Yuan, M. Khalid, X. Huang, P. Zdunich</i>	
A Computational Study of Flexible Wing Ornithopter Flight	521
<i>J. Sitaraman, B. Roget, R. Harmon, J. Grauer, J. Conroy, J. Hubbard, S. Humbert</i>	
Kutta Condition Violation of Two-Dimensional NACA0012 Airfoil at Low Reynolds Number	541
<i>K. Yonemoto, K. Takato, H. Ochi, S. Fujie</i>	
Unsteady Flowfields Characteristics Around Two- and Three-dimensional Flapping Flight	552
<i>J. Kim, C. Kim</i>	
Numerical Investigation of Rail Influence on Initial Forces/Moments During Subscale Launch with RATO	565
<i>J. Martel, T. Eymann</i>	

Active Control of Inlet Ducts	579
<i>J. Vaccaro, M. Amitay, J. Vasile</i>	
Experimental Development of Hingeless Aerodynamic Control Effectors	595
<i>S. Kondor, J. Neidhoefer, W. Lee, J. Ryan</i>	
Reduced-Order Models of Zero-Net Mass-Flux Jets for Large-Scale Flow Control Simulations	609
<i>R. Raju, E. Aram, R. Mittal, L. Cattafesta</i>	
Evaluation of Macro Fiber Composite (MFC) Synthetic Jet Actuators	623
<i>O. Ohanian III, P. Gelhausen, D. Inman</i>	
Aircraft Control Using Fluidic Maneuver Effectors	637
<i>P. Wilde, A. Buonanno, W. Crowther, A. Savvaris</i>	

VOLUME 2

Active Flow Control at Low Reynolds Numbers on a NACA 0015 Airfoil	649
<i>L. Melton, J. Hannon, J. Harris, C. Yao</i>	
On A Synthetic Jet In A Background Flow	667
<i>G. Krishnan, K. Mohseni</i>	
Air Force's Process for Alternative Fuels Certification	676
<i>B. Rodriguez, T. Bartsch</i>	
Design Studies for Hydrogen Fuel Cell Powered Unmanned Aerial Vehicles	683
<i>T. Bradley, B. Moffitt, T. Fuller, D. Mavris, D. Parekh</i>	
Experimental Investigation Flow Field in Close Wake of a Simplified C130 Shape	699
<i>Y. Bury, S. Morton, R. Charles</i>	
1/5 Scale Model of Aeromot 200S SuperXimango for Scaled Flight Research	720
<i>A. Gross, C. Pearman, R. Kremer, B. Napier, C. Gosla, A. Kurz, S. Mack, C. Brehm, B. Heine, A. Radi, B. Marovic, S. Retzko, N. Feindler, B. Zickler, H. Fasel, A. Osbrink</i>	
Icing Wind-Tunnel Icing Test on a Contaminated Full-Scall Wing-Model at Takeoff Conditions	740
<i>X. Huang, B. Myers, J. D'Avirro, M. Ruggi</i>	
Unsteady Measurement of a Transonic Delta Wing Flow by a Novel PSP	756
<i>M. Kameda, H. Seki, T. Makoshi, Y. Amai, K. Nakakita</i>	
Static Aeroelastic Analysis of Experimental SST NEXST-1 Flight Test Using Wing-Body Configuration Model	764
<i>H. Kawakami, T. Takatoya, H. Ishikawa</i>	
Determination of Surface Pressure and Temperature Distributions of Hypersonic Waveriders	775
<i>T. Zien</i>	
Effect of Nozzle Burn-Through on CLV Booster Controllability	785
<i>T. Holst, S. Pandya</i>	
Effects of Solid Rocket Booster Case Breach on Vehicle and Crew Safety	798
<i>S. Pandya</i>	
Space Shuttle Foam Debris Monte Carlo Risk Analysis	812
<i>J. Brekke, M. Eby, B. Hardy, R. Williams</i>	
Implicit LES of Compressible Turbulent Flow Over a Backward-Facing Step	823
<i>K. Ishiko, K. Ueno, K. Sawada</i>	

Unsteady Pressure-Sensitive Paint Measurement for Oscillating Shock Wave in Supersonic Nozzle	834
<i>K. Nakakita, J. Osawa, N. Hori, M. Kameda</i>	
Extracting Accurate Supersonic Flight Data for a Rotating Hemisphere with Pitot Tubes	846
<i>A. VanderWyst</i>	
Geometric Filtration Using POD for Aerodynamic Design Optimization	859
<i>D. Toal, N. Bressloff, A. Keane</i>	
Mach Number and Temperature Effects on Mach Wave Emission from Supersonic Jets	872
<i>T. Nonomura, K. Fujii</i>	
Assessment of Near-Field Sonic Boom Simulation Tools	905
<i>J. Casper, S. Cliff, S. Thomas, M. Park, J. Melton, M. McMullen, D. Durston</i>	
Adjoint-Based Adaptive Mesh Refinement for Sonic Boom Prediction	919
<i>M. Wintzer, M. Nemeč, M. Aftosmis</i>	
Output-Adaptive Tetrahedral Cut-Cell Validation for Sonic Boom Prediction	938
<i>M. Park, D. Darmofal</i>	
Grid Sourcing and Adaptation Study Using Unstructured Grids for Supersonic Boom Prediction	957
<i>M. Carter, K. Deere</i>	
Supporting System Study of Wind-Tunnel Models for Validation of Aft-Sonic-Boom Shaping Design	979
<i>T. Furukawa, Y. Makino, M. Noguchi, T. Ito</i>	
Computational and Experimental Investigation of the Benefits of a Slotted Airfoil	987
<i>E. Ledbetter, S. Hayashibara, J. Ashworth</i>	
Mach Effects on Circulation Control and Jet Flap Airfoils	997
<i>C. Friedman, Z. Jamchi, S. Yasovitch, R. Arieli, Y. Levy</i>	
Passive Control of the Flow Around the Stratospheric Observatory for Infrared Astronomy	1020
<i>S. Schmid, T. Lutz, E. Kramer, T. Kuhn</i>	
Flow-Field Measurement of a Hybrid Wing Body Model with Blown Flaps	1030
<i>J. Lin, G. Jones, B. Allan, B. Westra, S. Collins, C. Zeune</i>	
A Stochastic Static Stall Model Applied to Wind Turbine Blade	1047
<i>F. Bertagnolio, F. Rasmussen, H. Madsen, N. Sorensen, J. Johansen</i>	
Parallel Efficient Mesh Motion Using Radial Basis Functions with Application to Multi-Bladed Rotors	1065
<i>T. Rendall, C. Allen</i>	
Study of Dynamic Tip Vortex Tracking in Rotorcraft CFD	1077
<i>Y. Lee, T. Egoľf, J. Baeder</i>	
Computational Investigation of the Effects of Gurney Flap on the High Speed Characteristics of Helicopter Rotors	1087
<i>L. Sankar, B-Y. Min, N. Rajmohan, J. Prasad</i>	
Overset Grid Flow Simulation on a Modern Wind Turbine	1099
<i>F. Zahle, N. Sorensen</i>	
Increased Aerodynamic Efficiency of Wind Turbine Rotors Using Winglets	1116
<i>J. Johansen, M. Gaunaa, N. Sorensen</i>	

Hovering Rotor Computation Including Aero-Elastic Effects with an Overlapped Grid Navier-Stokes Solver	1125
<i>J. Kim, S. Park, J. Ko, I. Park, S. Jung, Y. Yu, E. Kim, J. Kwon</i>	
Adjoint-Based Aerodynamic Shape Optimization of Rotorcraft Blades	1138
<i>S. Nadarajah, C. Tatossian</i>	
Application of Advanced Aerodynamic Technology to Ground and Sport Vehicles (Invited)	1165
<i>R. Englar</i>	
Aerodynamics of Heavy Vehicles Driving Past a Wall	1190
<i>F. Iser, R. Almbauer</i>	
An Evaluation of Proposed Formula 1 Aerodynamic Regulations Changes Using Computational Fluid Dynamics	1203
<i>R. Perry, D. Marshall</i>	
Application of Slope-Seeking to a Generic Car Model for Active Drag Control	1220
<i>A. Brunn, L. Henning, W. Nitsche, R. King</i>	
Efficient Use of Computational Fluid Dynamics for the Aerodynamic Development Process in the Automotive Industry	1227
<i>A. Gabriel, P. Drage, T. Hormann, G. Brenn, W. Meile, G. Lindbichler</i>	
Influence of Moving Ground Conditions on the Cooling Flows of Road Vehicles	1242
<i>L. Christoffersen, L. Lofdahl, R. Quartey-Papafio, C. Landstrom, A. Jonson</i>	
Effects of Base Shape on Spin-Stabilized Projectile Aerodynamics	1256
<i>J. DeSpirito</i>	

VOLUME 3

Base Drag Considerations on a 0.50-caliber Spinning Projectile	1275
<i>S. Sifton, S. Dinavahi</i>	
Numerical Computations of Transonic Flow Over a Course Corrected Spinning Projectile	1291
<i>J. Sahu, K. Heavey, R. Buretta</i>	
CFD Study of an Electro-Magnetic Launched Projectile for Access to Space	1302
<i>R. Gosse, G. Candler</i>	
Concept of a Gun Launched Micro Air Vehicle	1316
<i>P. Gnemmi, J. Haertig</i>	
Unsteady Simulations of Missile Exhaust Plume Interactions	1327
<i>M. Hughson, E. Luke</i>	
Complete CFD Analysis of a Velocity XL-5 RG with Flight-Test Verification	1347
<i>S. Schouten, W. Saric</i>	
Validation and Minimizing CFD Uncertainty for Commercial Aircraft Applications	1364
<i>E. Tinoco</i>	
Drag Decomposition Analysis of CFD Data of the DLR-F6 Model	1393
<i>M. Ueno, J. Akatsuka, A. Hidaka</i>	
Utilization of CFD in the American Airlines Flight 587 Accident Investigation	1404
<i>D. Bower, J. O'Callaghan</i>	
Guidelines for Avoiding Vortex Wakes During Use of Closely-Spaced Parallel Runways	1421
<i>V. Rossow, L. Meyn</i>	

Transonic Shock Buffet Interference of an Oscillating High Aspect Ratio Swept Wing	1449
<i>P. Steimle, W. Schröder, M. Klaas</i>	
Aerodynamics Module for the Space Shuttle Foam Debris Probabilistic Risk Assessment	1462
<i>M. Eby</i>	
Simulation of Fluid-Structure Interaction of the Mars Science Laboratory Parachute	1475
<i>V. Gidzak, M. Barnhardt, T. Drayna, I. Nompelis, G. Candler, W. Garrard</i>	
Dynamic Viscous Simulations of Atmospheric-Entry Capsules	1486
<i>S. Murman</i>	
Simulation of Propellant Explosions Resulting from Crew Launch Vehicle Tank Failure	1507
<i>A. Hosangadi, N. Madavan</i>	
Combined Environments Testing of Space Shuttle External Tank Foam Defects	1522
<i>B. Hardy, R. Williams</i>	
A Combined Environments Facility for Testing of Space Shuttle External Tank Ice Ball Debris Liberation	1532
<i>B. Hardy, S. McCall, R. Williams</i>	
Light Gas Gun Impact Testing for the NASA Space Shuttle	1545
<i>T. Graves, B. Hardy, S. McCall, R. Williams, M. Eby</i>	
Launch Vehicle Performance Enhancement Using Aerodynamic Lifting During Early Flight	1552
<i>B. McDavid, R. Hartfield, J. Burkhalter</i>	
Experimental Investigation of the DLR-F6 Transport Configuration in the National Transonic Facility (Invited)	1564
<i>G. Gatlin, M. Rivers, S. Goodliff, R. Rudnik, M. Sitzmann</i>	
Comparison of NTF Experimental Data with CFD Predictions from DPW-III	1586
<i>J. Vassberg, E. Tinoco, M. Mani, D. Levy, T. Zickuhr, D. Mavriplis, R. Wahls, J. Morrison, O. Brodersen, B. Eisfeld, M. Murayama</i>	
Development of a Common Research Model for Applied CFD Validation Studies	1611
<i>J. Vassberg, S. Rivers, R. Wahls, M. DeHaan</i>	
Wing Deformation Measurements of the DLR-F6 Transport Configuration in the National Transonic Facility (Invited)	1633
<i>A. Burner, W. Goad, E. Massey, O. Bissett, L. Goad, S. Goodliff</i>	
DPW: Reflexions from an Outsider	1653
<i>D. Pelletier</i>	
Hybrid RANS/LES of a Supersonic Combustor	1676
<i>D. Peterson, G. Candler</i>	
Experimental and Computational Analysis of an Expansion Deflection Nozzle in Open-Wake Mode	1689
<i>N. Taylor, T. Sato</i>	
Fuel/Air Mixing Characteristics of Strut Injections for Scramjet Combustor Applications	1705
<i>C. Tam, K. Hsu, M. Gruber, C. Raffoul</i>	
Influence of Downstream Boundary Conditions on Scramjet-Isolator Simulations	1720
<i>C. Tam, D. Eklund, R. Behdadnia</i>	
Behaviors and Effects of Movable Objects in Supersonic Flows	1730
<i>K. Yokota, K. Yamamoto, M. Itoh, K. Sato, S. Tamano</i>	

Use of Lift Superposition for Improved Computational Efficiency of Wing Post-Stall Prediction	1744
<i>H. Segawa, A. Gopalarathnam</i>	
Design and Verification of Airfoils Resistant to Surface Contamination and Turbulence Intensity	1754
<i>C. Bak, P. Andersen, H. Madsen, M. Gaunaa, P. Fuglsang, S. Bove</i>	
Tip Extensions, Winglets, and C-wings: Conceptual Design and Optimization	1765
<i>A. Ning, I. Kroo</i>	
Parametric Analysis of Different Nacelle Positions in the DLR-F6 Model by Means of the CFD++ Code	1795
<i>A. Souza, A. Neto, F. Souza, A. Jesus, G. Oliveira</i>	
Wing Design by Aerodynamic and Aeroelastic Shape Optimisation	1805
<i>A. Morris, C. Allen, T. Rendall</i>	
Experimental and Numerical Investigation of an Aggressive Intermediate Turbine Duct: Part 1 – Flowfield under the Design Inlet Conditions	1816
<i>F. Wallin, C. Osso, T. Johansson</i>	
Experimental and Numerical Investigation of an Aggressive Intermediate Turbine Duct: Part 2 - Flowfield under Off-Design Inlet Conditions	1828
<i>C. Osso, F. Wallin, T. Johansson</i>	
An Inviscid Supersonic Nozzle Design Approach to Perfect Flow Uniformity for Wind Tunnel Applications	1847
<i>J. Yen, W. Martindale</i>	
Multidisciplinary Design of S-Shaped Intake	1862
<i>J. Zhang, C. Wang, K. Lum</i>	
Aerodynamic Fidelity of Sub-scale Two-Dimensional Ice Accretion Simulations	1878
<i>G. Busch, A. Broeren, M. Bragg</i>	

VOLUME 4

Effects of Endplates on a Rotating Cylinder in Crossflow	1900
<i>C. Badalamenti, S. Prince</i>	
Assesment of a Kinetic Eddy Simulation Turbulence Model for 3D Unsteady Transonic Flows	1917
<i>J. Bain, S. Mishra, L. Sankar, S. Menon</i>	
Parallel Unsteady Overset Mesh Methodology for a Multi-Solver Paradigm with Adaptive Cartesian Grids	1929
<i>J. Sitaraman, A. Wissink, M. Potsdam, M. Floros</i>	
Advanced Unstructured Grid Generation for Complex Aerodynamics Applications	1951
<i>S. Pirzadeh</i>	
Efficient CFD Evaluation of Small Device Locations with Automatic Local Remeshing	1973
<i>Y. Ito, B. Soni, M. Murayama, K. Yamamoto, A. Shih</i>	
Numerical Aerodynamic Assessment and Experimental Validation of Innovative Supersonic Business Jet Concepts	1984
<i>S. Vigneron, A. Bugeau, Z. Johan, A. Merlet, M. Stojanowski</i>	
High-Order Unstructured Spectral Finite Volume Scheme for Aerodynamic Applications	2005
<i>C. Breviglieri Jr., E. Basso, J. Azevedo</i>	

An Overview of SensorCraft Capabilities and Key Enabling Technologies	2030
<i>J. Martinez, P. Flick, G. Dale, M. Davis, J. Perdzok</i>	
Aeroservoelastic Testing of a Sidewall Mounted Free Flying Wind-Tunnel Model	2043
<i>R. Scott, T. Vetter, K. Penning, D. Coulson, J. Heeg</i>	
Unsteady Aerodynamic Observable for Gust Load Alleviation and Flutter Suppression	2067
<i>S. Mangalam, A. Mangalam, P. Flick</i>	
GLA and Flutter Suppression for a SensorCraft Class Concept Using System Identification	2077
<i>K. Penning, P. Zink, P. Wei, A. De La Garza, H. Love, J. Marinez</i>	
Aeroservoelastic Design and Test Validation of the Joined Wing Sensorcraft	2090
<i>E. Reichenbach</i>	
Aerodynamic Cruise Design of a Joined Wing SensorCraft	2105
<i>S. LeDoux, J. Vassberg, G. Fatta, M. Dehaan</i>	
Design and Analysis of HiLDA/AEI Aeroelastic Wind Tunnerl Model	2118
<i>J. Bartley-Cho, J. Henderson</i>	
GLA Flight Control System Design for a SensorCraft Vehicle	2133
<i>E. Vartio, E. Shaw, T. Vetter</i>	
CFD Modeling of Laminar-Turbulent Transition for Airfoils and Rotors	2143
<i>N. Sorensen</i>	
Unsteady Navier-Stokes Simulations of a Canard-Controlled Missile Configuration	2161
<i>C. Sheng, X. Wang, M. Hughson, D. Marcum</i>	
Time-Spectral Method for the Prediction of Helicopter Rotor Vibratory Loads	2173
<i>S. Choi, A. Datta</i>	
Proximity Aerodynamics Analyses for Launch Abort Systems	2197
<i>W. Chan, J. Onufer, G. Klopfer, S. Pandya</i>	
Efficient Unstructured Grid Adaptation Methods for Sonic Boom Prediction	2214
<i>R. Campbell, M. Carter, K. Deere, K. Waithe</i>	
Effects of Leading-Edge Shape on the Flow Over 50-deg Delta Wings	2231
<i>N. Verhaagen, M. Elsayed, F. Scarano</i>	
Design of a Third-Generation Boundary Layer Measurement System for In-Flight Measurements	2246
<i>A. Drake, A. Bender, R. Westphal, S. Jordan, D. Frame, A. Wanner Jr., B. Thompson</i>	
Development and Flight Demonstration of Self-Contained Boundary Layer Measurement Devices	2254
<i>A. Drake, A. Bender, R. Westphal, S. Jordan</i>	
Transition due to Surface Steps in the Presence of Favorable Pressure Gradients	2263
<i>A. Drake, A. Bender, R. Westphal</i>	
Laminar Flow Control on a Swept Wing with Distributed Roughness	2272
<i>A. Carpenter, W. Saric, H. Reed</i>	
CFD Analysis of Flight-Test Configuration for LFC on Swept Wings	2281
<i>R. Rhodes, A. Carpenter, H. Reed, W. Saric</i>	
Aerodynamic Optimisation of Hovering Helicopter Rotors using Efficient and Flexible Shape Parameterisation	2292
<i>A. Morris, C. Allen, T. Rendall</i>	

Hybrid Unsteady Simulation of Helicopters: HUSH	2305
<i>S. Ananthan, J. Baeder, J. Sitaraman, S. Hahn, G. Iaccarino</i>	
Time Spectral Method for Rotorcraft Flow with Vorticity Confinement	2334
<i>N. Butsumtorn, A. Jameson</i>	
Rotor Airloads Prediction Using Unstructured Meshes and Loose CFD/CSD Coupling	2353
<i>R. Biedron, E. Lee-Rausch</i>	
The Impact of Advanced Airfoils and Its Impact on Rotor Hover Performance	2371
<i>T. Wong</i>	
An Output-Based Adaptive and Higher-Order Method for a Rotor in Hover	2386
<i>J. Modisette, D. Darmofal</i>	
Discrete Structures in the Radial Flow Over a Rotor Blade in Dynamic Stall	2404
<i>J. DiOttavio, K. Watson, J. Cormey, S. Kondor, N. Komerath</i>	
Analytical/Experimental Comparison for Small Electric Unmanned Air Vehicle Propellers	2414
<i>M. Ol, C. Zeune, M. Logan</i>	
Numerical Simulations of Busemann Hypersonic Inlets At Finite Flight Angles	2431
<i>V. Ramasubramanian, R. Starkey, M. Lewis</i>	
Aircraft Control Augmentation and Health Monitoring Using Flush Air Data System Feedback	2443
<i>J. Vogel, A. Kelkar</i>	
Passive Control of Compressible Dynamic Stall	2458
<i>P. Martin, J. Wilson, J. Berry, T. Wong, M. Moulton, M. McVeigh</i>	
Experimental and Computational Study of Flow Improvement Through Sigmoid Air Intake Ducts Using Flow Deflector	2491
<i>A. Paul, K. Kuppaa, N. Tripathi, T. Rajpathak</i>	
Aerodynamic Design and Analysis of a VTOL Ducted-Fan UAV	2502
<i>H. Zhao, C. Bil</i>	
Pressure Port Placement for Lift Distribution Measurement on a Model Aircraft with Optimized Trailing-Edge Flaps	2511
<i>N. Guerreiro, J. Hubbard Jr.</i>	
Author Index	