

63rd American Helicopter Society International Annual Forum 2007

**Virginia Beach, Virginia, USA
1 – 3 May 2007**

Volume 1 of 3

ISBN: 978-1-61782-930-7

Printed from e-media with permission by:

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



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2007) by the American Helicopter Society International
All rights reserved.

Printed by Curran Associates, Inc. (2011)

For permission requests, please contact the American Helicopter Society International
at the address below.

American Helicopter Society International
217 N. Washington Street
Alexandria, VA 22314-2538

Phone (703) 684-6777

Fax: (703) 739-9279

staff@vtol.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Volume 1

Achieving the Degraded Visual Environment: A Novel Methodology for Handling Qualities Flight Test	N/A
<i>C. Chalk</i>	
U.S. Army Aviation Assessment Teams	N/A
<i>J. Shames</i>	
Is Parts Marking Sufficient to Achieve an Enterprise UID Solution?	N/A
<i>F. Sautter, C. Goes</i>	
Adaptive Guidance and Control for Autonomous Formation Flight	N/A
<i>J. Moon, J. Prasad, A. Calise</i>	
Improved Corrosion Protection for Airframe Mating Surfaces Using Polyurethane Materials	N/A
<i>V. Lin, H. Goode, R. Halsor, J. Ray, G. Sandor, J. Forsythe</i>	
Helicopter Emergency Operations Control System	N/A
<i>W. Wallace</i>	
Analysis of Rotorcraft Aerodynamics/Acoustics During Coordinate Turns of Research Helicopter	N/A
<i>C. Yang, T. Aoyama, H. Okuno, B. Sim</i>	
A Comparison of Helicopter Pressure Error Correction Methods	N/A
<i>M. Roots</i>	
Preliminary Analysis for an Optimized Oil-Free Rotorcraft Engine Concept	N/A
<i>S. Howard, R. Bruckner, C. DellaCorte</i>	
High Pressure Combustion Driven Power Compaction and Material Aspects for Power Transmission Components	N/A
<i>K. Nagarathnam</i>	
On Small UAV Autonomy Needs at the Light Infantry Echelon	N/A
<i>J. Moorthy, J. Lowrie</i>	
Flight Test Guide for ADS-33F	N/A
<i>C. Blanken, R. Hoh, D. Mitchell</i>	
Crack Propagation Test and Analyses of CH-47 Swashplate Rotating Ring	N/A
<i>G. Olsen, R. Vaughan</i>	
Portable Precision Pursuit Guidance System for Rotorcraft Precision Approaches and Acoustics Flight Research	N/A
<i>E. Moralez, G. Tucker, W. Decker, G. Hardy, E. Lewis</i>	
Technologies that Enable Helicopter Dynamic Component Life Cycle Management	N/A
<i>D. White</i>	
Stability and Control Issues Unique to Lightly-Loaded Autorotating Rotors in High-Speed Flight	N/A
<i>J. Rigsby, J. Prasad, J. Khan</i>	
Turboshaft Engine Operability Enhancement via an Active Surge Margin Detection Scheme	N/A
<i>J. Prasad, M. Dhingra, Y. Neumeier</i>	
High Resolution Computational Investigation of Coaxial Rotor Aerodynamics	N/A
<i>V. Lakshminarayan, K. Duraisamy, J. Baeder</i>	
Computational Modeling of the CH-47 Helicopter in Hover	N/A
<i>A. Dimanlig, E. Meadowcroft</i>	
Implementing HOMP for Light Helicopters	N/A
<i>R. Healing</i>	
Time Marching Simulation Modeling in Axial Descending Through the Vortex Ring State	N/A
<i>R. Celi, M. Ribera</i>	
Noise and Vibratory Loads Analysis for Active Twist Rotors	N/A
<i>S. Thepvongs, C. Cesnik, S. Voutsinas</i>	
The Lockheed Martin Common Cockpit Avionics Management System	N/A
<i>T. Gaska, R. Hess, G. Ciccone</i>	
Use of a Portable Programmable Guidance Display in Support of Helicopter Noise Testing	N/A
<i>W. Decker, G. Tucker, E. Moralez III, G. Hardy, E. Lewis</i>	
An Overview of Rotor Noise in Maneuvering Flight	N/A
<i>H. Chen, K. Brentner</i>	
Joint Heavy Lift: Riding the Wave of New Vertical Flight Technology	N/A
<i>T. McDonald, A. Huber</i>	

Meeting the USMC Requirements for Amphibious Heavy Lift with the Sikorsky CH-53K	N/A
<i>J. Durno</i>	
Effects of Manufacturing Defects on Fatigue Behavior of Composite Parts	N/A
<i>A. Makeev, Y. He</i>	
Whirl Tower Test and Analysis of the Smart Material Actuated Technology (SMART) Active Flap Rotor	N/A
<i>F. Straub</i>	
UH-60M Upgrade Fly-By-Wire Flight Control Risk Reduction Using the RASCAL JUH-60A In-Flight Simulator	N/A
<i>J. Fletcher, R. Cheng, M. Mansur, E. Morales III</i>	
Advanced Composite Core	N/A
<i>D. Hethcock, H. Wilson, C. Sparks, K. Nunn</i>	
Combat Maneuvering Flight: Expanding the AH-64 and OH-58 Flight Envelope to Meet the Current Threat	N/A
<i>P. Mason, W. Miller</i>	
Assessing Operational and Technical Performance Forward: Experimental Test Pilot Operations in Iraq and Afghanistan	N/A
<i>R. Willis, B. Orwig</i>	
Advanced Classification Methods for CH-47 Swashplate Bearing Fault Detection	N/A
<i>J. Keller, P. Grabill</i>	
Gearbox Diagnostics and Prognostics Using Dynamic Modeling	N/A
<i>E. Wemhoff, H. Chin, M. Begin</i>	
Utility of an MTR Scaled Demonstrator	N/A
<i>D. Baldwin</i>	
Heliplane – Back to the Future!	N/A
<i>D. Groen</i>	
Field Experience with Erosion Resistant Coating on Helicopter Engines	N/A
<i>P. Rodger</i>	
Operational Condition and Superfinishing Effect on High-Speed Helical Gearing System Performance	N/A
<i>R. Handschuh, C. Kilmain, R. Ehinger</i>	
Systems Engineering Initiatives at the Naval Air Systems Command	N/A
<i>D. Cohen</i>	
Student Design Competition Graduate Winner Rambler – Cost-Effective Two Seat Turbine Helicopters	N/A
<i>K. Shrotri, M. Hoepfer</i>	
Student Design Competition Undergraduate Winner Grasshopper – Two Seat Turbine Helicopter	N/A
<i>J. Steiner, J. Erwin</i>	
Validation of F-35 Lightning II Mission Execution Requirements	N/A
<i>M. Maxwell</i>	
The Military Application of Commercial Off-the-Shelf Rotorcraft	1
<i>A. Youngs</i>	
A New Look at Lightweight Energy Absorbing Devices for Heavy Cargo Restraints	9
<i>M. Hagon, C. Bakis, M. Yukish, E. Smith</i>	
Flight Control Development For The Arh-70 Armed Reconnaissance Helicopter Program	20
<i>K. Christensen, K. Campbell, C. Griffith, C. Ivler, M. Tischler, J. Harding</i>	
Preliminary Studies on Health and Usage Monitoring System Architecture for the NH-90 Rotorcraft Platform	45
<i>D. Parekh, A. Sinha</i>	
Conceptual Design of an Interoperable Vertical Take-off Unmanned Aerial Vehicle for Operations with Unmanned Ground Vehicles – An Overview	52
<i>J. Khreish, A. Sinha, L. Winata</i>	
Engineering Analysis of the Helicopter Designs of the Marquis Raul Pateras Pescara	65
<i>B. Johnson, J. Leishman</i>	
V-22 Mechanical Systems Vibration Monitoring Field Operations Experience	84
<i>D. Dousis, M. Strohmeyer</i>	
Digital Range Image Algorithms for Flight Guidance Aids for Helicopter-Low-Level-Flight	96
<i>R. Pire, F. Filias, J. Sequeira, M. Gillet, D. Bouheret</i>	
Placement of the Systems Engineering (SE) Organization within an Aerospace Firm	103
<i>R. Bruff</i>	
The FW-61, Henrich Focke’s Masterpiece	108
<i>W. Geissler</i>	

An Effective Crashworthiness Design Optimization Methodology To Improve Helicopter Landing Gear Energy Absorption	126
<i>C. Tho, B. Wang</i>	
A Method of Reducing Blade Sailing through the use of Trailing Edge Flaps	141
<i>M. Jones, S. Newman</i>	
Rigid Body Water Impact: Experimental Tests and Numerical Simulations Using SPH Method.....	153
<i>M. Anghileri, L. Castelletti, E. Francesconi, M. Pittofrati, A. Milanese</i>	
A Centrifugal Force Actuated Variable Span Morphing Helicopter Rotor	163
<i>T. Prabhakar, J. Steiner, D. McLaughlin, F. Gandhi</i>	
12-DoF Dynamics Model of a UAV Helicopter using Analytical and Parameter Identification Techniques.....	178
<i>S. Bhandari, A. Samuel, R. Colgren</i>	
Subspace-based System Identification for Helicopter Dynamic Modelling.....	190
<i>P. Li, I. Postlethwaite, M. Turner</i>	
Validation of Simulated Dynamic Interface Testing as a Tool in the Forecasting of Air Vehicle Deck Limits and Deck Landing Aids	202
<i>B. Ferrier, J. Duncan, D. Carico</i>	
Testing and Evaluation of Landing Aids to Improve Helicopter/Ship Operational Limits.....	219
<i>B. Ferrier, D. Carico</i>	
Testing and Evaluation of Landing Aids to Improve UAV/Ship Operational Limits	235
<i>B. Ferrier, J. Duncan, B. Lumsden</i>	
Investigation of Rotor Blade Structural Dynamics and Modeling Based on Measured Airloads	249
<i>J. Ho, H. Yeo, R. Ormiston</i>	
Obtaining Usage Credits from Monitoring of Helicopter Dynamic Components without Impacting Safe Life Reliability	272
<i>R. Vaughan, J. Chang, M. Rogers</i>	
A Conceptual Method For Mission Based Analysis And Design Of Military Multi Role Helicopters.....	285
<i>C. Heister, V. Gollnick</i>	
Requirements Management: We're All in This Together	295
<i>B. Tammany</i>	
Novel Eulerian Vorticity Transport Wake Module for Rotorcraft Flow Analysis.....	304
<i>G. Whitehouse, A. Boschitsch, T. Quackenbush, D. Wachspress, R. Brown</i>	
Dual-Sensor Use in the AH-64 Crew Station for Urban Combat in Operation Iraqi Freedom	320
<i>J. Heinecke, C. Rash, K. Hiatt</i>	
Flight Investigation of Hyperstereo Vision in Helmet-Mounted Display Designs	340
<i>C. Rash, M. Kalich, W. McLean, J. Ramiccio</i>	
Development of Full Flight Envelope Helicopter Simulation Using System Identification	368
<i>L. Zivan, M. Tischler</i>	
Wind-Tunnel Assessment of the Concept of Active Flaps on a Helicopter Rotor Model.....	394
<i>Y. Delrieux, P. Leconte, P. Crozier, B. Gimonet, H. Rochettes</i>	
The Nature Of Vortex Ring State.....	408
<i>A. Brand, M. Dreier, R. Kisor, T. Wood</i>	
An Enhanced HUMS Foundation for Rotorcraft IVHM	427
<i>M. Schoeller, T. Meyer, C. Armenio, M. Roemer</i>	
Deployable System for Crash-Load Attenuation	442
<i>S. Kellas, K. Jackson</i>	
Gerard Post Herrick (1873 – 1955) America’s Unforgettable “Forgotten” Convertiplane Pioneer	460
<i>B. Charnov</i>	
How the Longest Patent Case in U.S. History Defined the RotaryWing Legacy of Harold F. Pitcairn.....	469
<i>M. Bisanz</i>	
Hovering Helicopter Rotor Experiments And Simulations In A Closed-Circuit Wind Tunnel	477
<i>A. Pape, M. Massignon, P. Crozier</i>	
CFD Simulation Of Helicopter Rotor In The Vortex Ring State Regime	487
<i>E. Hoinville, T. Renaud</i>	
Flight Test, Simulation and Passive Stabilization of a Cargo Container Slung Load in Forward Flight.....	497
<i>L. Cicolani, R. Raz, A. Rosen, R. Gordon, A. Cone, J. Theron, J. Lusardi, M. Tischler, D. Robinson</i>	
Ground Test of a Hub Mounted Active Vibration Suppressor	527
<i>M. Wilson, M. Jolly</i>	
Toward a Real-Time Measurement-Based System for Estimation of Helicopter Engine Degradation Due to Compressor Erosion	542
<i>J. Litt, D. Simon</i>	

A Sequential Shifting Algorithm for Variable Rotor Speed Control	555
<i>J. Litt, J. Edwards, J. DeCastro</i>	
A VTOL Front Line Delivery System UAV Utilizing Counter-Rotating Mono-Tilt-Rotor Technology	566
<i>S. Yassini</i>	
Application Of Computational Fluid Dynamics During The Conceptual Design Of The Bell Jhl Quad Tiltrotor	576
<i>J. Narramore, G. Lancaster, C. Sheng</i>	
The Evolution Of A Rotorcraft Constructive Simulation Model	589
<i>G. Nichols, I. Stone</i>	
Preliminary Design Optimization On Active Twist Rotor Blades Incorporating Single Crystal Macro Fiber Composites	599
<i>J. Park, S. Shin</i>	
Optimum Rotor Performance In Axial Flow By Finite-State Methods	609
<i>D. Peters, C. Garcia-Duffy</i>	
Tilt Rotor Pitch/Flight-Path Handling Qualities	623
<i>N. Cameron, G. Padfield</i>	
Calculation of Hub Loads at Low Airspeeds with Active Control	638
<i>S. Kottapalli</i>	
Investigation of MR Dampers for Enhanced Crashworthiness and Vibration Isolation of Helicopter Crew Seats	661
<i>G. Hiemenz, W. Hu, N. Wereley</i>	
Flight Evaluation of a System for Unmanned Rotorcraft Reactive Navigation in Uncertain Urban Environments	677
<i>J. Howlett, M. Whalley, M. Takahashi, P. Tsenkov, G. Schulein</i>	
Design Optimization for Soft-Inplane Tiltrotor Whirl Flutter Stability Improvement	694
<i>J. Paik, F. Gandhi</i>	
Design and Performance Evaluation of Full Scale On-board Active Flap System	707
<i>K. Noboru, S. Saito, T. Fukami, T. Komura</i>	
A Re-configurable Portable Simulator to Support Rotorcraft Tactical Mission Rehearsal and Advanced Concepts Prototyping	718
<i>R. Seals, R. Lanont, M. Brychcy, P. Redkoles, S. Margetich, J. Taylor</i>	
Longitudinal Tip-Path-Plane Measurement using an Optics-Based System	730
<i>R. Sickenberger, F. Schmitz</i>	
Optimization and Piloted Simulation Results of the AH-64D Modern Control Laws	739
<i>J. Harding, M. Mansur, M. Tischler, S. Moody, R. McCann</i>	
Vertical Takeoff UAV Conceptual Designs and their Key Technologies	753
<i>S. Troutman, J. Patterson III, E. Keen</i>	
Advanced Technology Transition and the CT7-5 Technology Demonstrator Engine	768
<i>S. Spring, M. Coleman, J. Kingery, K. Kirtley</i>	
Windmills to Choppers: The Korean War and the Evolution of the Helicopter	773
<i>R. Connor</i>	

Volume 2

Height-Velocity Testing Of A Growth Rotor For The Bell 407 Aircraft	792
<i>J. Schillings, P. Hollifield, J. Wasylyszyn, J. McCollough, R. Grife</i>	
Use of Physics-based Approach to Enhance HUMS Prognostic Capability	803
<i>D. He, S. Wu, E. Bechhoefer</i>	
Flight Data Recorders as HUMS: A Report on Data Fusion Issues, Including the Accuracy of Manually-Entered Data from an Australian Army Black Hawk Trial	811
<i>C. Knight</i>	
Weapon System Readiness- Metrics, Analysis, and Management	823
<i>G. Skinner</i>	
Feasibility of Helicopter Transported Pods to Support Homeland Security	826
<i>E. Ford, R. Adrezin, T. Filburn, P. Norwood, F. Wei, F. Gallagher, S. Lange</i>	
Lift Fans as Gyroscopes for Controlling Compact VTOL Air Vehicles: Overview and Development Status of Oblique Active Tilting	836
<i>G. Gress</i>	
Ground Resonance History Of The H-34 Helicopter (Sikorsky Model S-58)	845
<i>E. Wood, M. Couch</i>	

Fleet Management System for an Advanced Helicopter Platform – Requirements Analysis	851
<i>A. Schauenburg, A. Sinha</i>	
Supporting The Dispatch Decision For Hems Operations	861
<i>A. Sinha, S. Aryeo, K. Young</i>	
The “035” Main GearBox: Strong, Light, Reliable and Silent Heart of the AW139 Helicopter	872
<i>G. Gasparini, N. Motta, G. Straulino</i>	
Improving Fatigue Life of Carburized Pyrowear 53 Gears by Enhanced Quench Hardening	893
<i>A. Freborg, B. Ferguson, D. Schwam, B. Smith</i>	
Towards a Robust System Integration and Test Process	900
<i>R. Hess, G. Townsend, M. Prikazsky</i>	
Damage Comparison of Quasi-isotropic Co-cured Composite Joints under Fatigue Loading	907
<i>X. Tan, E. Armanios</i>	
A Practical Regime Prediction Approach for HUMS Applications	930
<i>S. Wu, E. Bechoefer, D. He</i>	
A Case for Health Indicators vs. Condition Indicators in Mechanical Diagnostics	938
<i>E. Bechoefer, A. Duke, E. Mayhew</i>	
Wake Dynamics and Rotor - Fuselage Aerodynamic Interactions	945
<i>A. Kenyon, R. Brown</i>	
Main Rotor - Empennage Interaction and its Effects on Helicopter Flight Dynamics	963
<i>T. Fletcher, R. Brown</i>	
Toward a Complete Stochastic Model of Airwake Turbulence for Helicopter Shipboard Operation	974
<i>G. Gaonkar</i>	
Analysis, Modeling and Simulation: The Front End of the Systems Engineering Process	986
<i>D. Macpherson, A. Kraay</i>	
The Vortex Dynamics of the Rotor Vortex Ring Phenomenon	997
<i>G. Ahlin, R. Brown</i>	
The Role of Overtorque Testing In the Development and Qualification of Mechanical Drive Systems for VTOL Aircraft	1017
<i>E. Ames, J. Fetty</i>	
Development of a High Torque Density, Flexible, Composite Driveshaft	1028
<i>D. Lawrie</i>	
Trimmed Forward Flight Simulation with CFD Featuring Elastic Rotor Blades with and without Active Control	1038
<i>A. Altmikus, B. Knutzen</i>	
RDS-21 Face-Gear Surface Durability Tests	1051
<i>D. Lewicki, G. Heath, R. Filler, S. Slaughter, J. Fetty</i>	
V-22 Osprey Qualification Testing Leading To Flight In Known Icing Conditions	1061
<i>R. Aubert</i>	
A Model Following Controller Optimized for Gust Rejection during Shipboard Operations	1078
<i>J. Horn, D. Bridges</i>	
CBM Remediation Program: Implemented Improvements and Lessons Learned	1092
<i>R. Vaughan, T. Page</i>	
Structured Adaptive Mesh Refinement (SAMR) Algorithms Applied to Rotor Wake Capturing	1112
<i>R. Vasilescu, N. Yeshala, L. Sankar, T. Egolf</i>	
Innovative Materials/Concepts for Grease-Lubricated Bearings	1129
<i>B. Kinzig, P. Sutor, H. Shinogle, M. Thorsen</i>	
An Investigation Into The Aerodynamics Of Trailing Edge Flap And Flap-Tab Airfoils Using Cfd And Analytical Methods	1140
<i>A. Jose, J. Sitaraman, J. Baeder</i>	
An Improved Method for Estimating Turbulent Vortex Flow Properties from Stereoscopic DPIV Measurements	1161
<i>M. Ramasamy, B. Johnson, T. Huisman, J. Leishman</i>	
Development Status Of The U.S. Army Small Heavy Fuel Engine (SHFE) VAATE Program	1184
<i>W. Troha, K. Kerner, G. Butler</i>	
Active Control of Flight Path and Critical Loads in Tilt-Rotor Aircraft	1189
<i>D. Walker, M. Voskuil</i>	
Enhanced Rescue Lift Capability	1205
<i>L. Young</i>	
Deformable Leading Edge Electromechanical Airfoil	1230
<i>D. Fink, N. Reinhardt, R. Severance, R. Phillips, M. Gaudreau, R. Ormiston</i>	
Analytical Simulation Of ADS-33 Mission Task Elements	1253
<i>R. Celi</i>	

Rotorcraft Dispatching In Large-Scale Emergencies Using Sequential Linear Assignment Techniques.....	1266
<i>R. Celi</i>	
Soviet Jet V/STOL Bomber And Transport Concepts Of The 20th Century	1280
<i>M. Hirschberg, T. Muller</i>	
Evaluation Of Isotropic Superfinishing On A Bell Helicopter Model 427 Main Rotor Gearbox.....	1298
<i>R. Ehinger, C. Kilmain</i>	
Development of Autonomy Levels Through Functional Decomposition and Allocation	1313
<i>J. Jones, M. Ragon</i>	
Application And Configuration Issues Of Resin Transfer Molded Composite Transmission Housings – A Program Overview.....	1327
<i>T. Cecil, R. Ehinger, C. Kilmain</i>	
Bell Helicopter Design Visualization, More Than A Virtual Reality.....	1336
<i>J. Valentino, M. Bothwell</i>	
Modus Verticraft	1349
<i>F. Black</i>	
Suppressing Vibrations In The BA609 Tiltrotor: Flight Testing An Innovative Solution.....	1359
<i>J. Mitchell</i>	
Design and Analysis of Trailing-Edge Flaps and Servotabs for Primary Control	1366
<i>J. Falls, A. Datta, I. Chopra</i>	
Progress In Composite Tube Crush Simulation.....	1376
<i>X. Xiao, C. McGregor, R. Vaziri, A. Poursartip</i>	
Automated Damage Assessment For Improved Readiness Of Fielded Aircraft.....	1388
<i>D. Wilke, A. Harris, D. McCarthy</i>	
Component Fatigue Life Reliability with Usage Monitor.....	1395
<i>S. Moon, N. Phan</i>	
Hover Performance Correlation for Full-Scale and Model-Scale Coaxial Rotors	1407
<i>J. Lim, K. McAlister, W. Johnson</i>	
Operating Procedures And Control Laws For Transport Category Performance In The Bell-Agusta 609 Tiltrotor	1426
<i>J. Schaeffer, L. Cullen</i>	
Maneuver Regime Recognition Development and Verification For H-60 Structural Monitoring.....	1437
<i>G. Barndt, S. Sarkar, C. Miller</i>	
HUMS/MMIS as an Aviation Combat Multiplier.....	1449
<i>T. Somers, R. Bonino, B. Cleve, J. Wright, H. Kunselman, R. Medina-Santiago</i>	
Helicopter Noise - What Is Important From A Community Prospective?.....	1498
<i>J. Leverton, A. Pike</i>	
Global Ultrasonic Shear Wave Anti-Icing Actuator for Helicopter Blades	1512
<i>J. Palacios, Y. Zhu, E. Smith, J. Rose</i>	
Multi-objective Constrained Optimization using a Non-Linear Frequency Domain based Adjoint Approach.....	1521
<i>C. Tatossian, S. Nadarajah</i>	
Optimization Approach to Vibration Reduction in Rotorcraft Airframes Using Individual Blade Control.....	1532
<i>A. Epple, W. Ayadi</i>	
Improved Computational Strategies for Rotor Blades Presenting High Gradients in Sectional Properties	1542
<i>O. Bauchau, A. Epple</i>	
Fully-Coupled Simulations of the Rotorcraft / Ship Dynamic Interface.....	1552
<i>E. Alpman, L. Long, D. Bridges, J. Horn</i>	
Active Crash Protection Systems for UAVs.....	1568
<i>A. Bolukbasi</i>	
Adding Realism to Inverse Simulation of Helicopters in Aggressive Maneuvering Flight Using a Receding Horizon Approach.....	1575
<i>M. Bagiev, D. Murray-Smith, D. Thomson, D. Anderson</i>	

Volume 3

Recent Enhancements To SEA For Predicting The High-Frequency Structure-Borne Noise Response Of Aerospace Structures	1584
<i>V. Cotoni, B. Gardner, P. Shorter, J. Carneal, C. Fuller</i>	

Capability Driven Architecture: An Approach to Airworthy Reusable Software	1596
<i>R. Zepeda, D. Kennan, S. Mulholland, S. Simi, E. Crom, V. Swadley</i>	
Testing of New Terrain Following Guidance Algorithms for Rotorcraft Displays	1606
<i>D. Rozovski</i>	
Fatigue Analysis Of Helicopter Landing Probe By Helicopter/Ship Dynamic Interface Simulation	1612
<i>M. Larosa, J. Ma, Z. Zhu</i>	
Analysis Of The Aerodynamically Deployable Wings Of The Mono Tiltrotor	1621
<i>J. Samscock, J. Leishman</i>	
Integrated Product and Process Development For the Front End Of Rotorcraft Systems Engineering	1640
<i>D. Schrage</i>	
Efficient and Robust Approaches for Rotorcraft Stability Analysis	1658
<i>O. Bauchau, J. Wang</i>	
Application of Flexible Fixturing to Aluminum and Composite Bonded Aerospace Structures	1673
<i>R. Stephens, A. Luscher</i>	
Affordable Flight Simulation In An Educational Environment	1682
<i>D. Landrum, J. Cerny, L. Warden, A. Meyer</i>	
US Navy Roadmap to Structural Health and Usage Monitoring – The Present and Future	1693
<i>S. Maley, J. Plets, N. Phan</i>	
Helicopter Design Cost Minimization using Multidisciplinary Design Optimization	1705
<i>A. Khalid, D. Schrage</i>	
Visible Band Camouflage Paint Study for the CH-47F	1726
<i>F. Bacon, F. Iannarilli, J. Conant, T. Deas, M. Dinning</i>	
Advanced Dynamic Simulation for Determination of Landing Gear Loads	1740
<i>J. Nicholas</i>	
HUMS Condition Based Maintenance Credit Validation	1749
<i>B. Larder, M. Davis</i>	
Hybrid Feedforward-Feedback Control for Active Helicopter Vibration Suppression	1757
<i>J. Walchko, K. Wang, J. Kim, E. Smith</i>	
Recent Development On Piezoelectric Actuation Systems For Rotor Active Control	1774
<i>P. Jancker, F. Hermle, S. Friedl, K. Lentner, B. Grohmann, T. Lorkowski</i>	
A Retrospective Survey of Pilot-Structural Coupling Instabilities in Naval Rotorcraft	1783
<i>R. Walden</i>	
New Opportunities for High Efficiency, Low Penalty Sand and Dust Protection in Rotorcraft	1801
<i>P. Snyder</i>	
Fatigue Reliability Analysis of Dynamic Components with Variable Loadings without Monte Carlo Simulation	1807
<i>C. Smith, J. Chang, M. Rogers</i>	
Detection Of Incipient Bearing Faults In A Gas Turbine Engine Using Integrated Signal Processing Techniques	1818
<i>J. Sheldon, E. Carney</i>	
ADS-33E Predicted and Assigned Low-speed Handling Qualities of the CH-47F with Digital AFCS	1827
<i>J. Irwin, P. Einthoven, D. Miller, C. Blanken</i>	
A Statistical Turbulence Model for Shipboard Rotorcraft Simulations	1857
<i>H. Xin, C. He</i>	
Helicopter External Noise Radiation in Turning Flight: Theory and Experiment	1867
<i>E. Greenwood, F. Schmitz, G. Gopalan, B. Sim</i>	
Design and Evaluation of the UH-60M CAAS Crew Station	1889
<i>J. Kennedy, N. Nickles</i>	
Performance and Design Investigation of Heavy Lift Tiltrotor with Aerodynamic Interference Effects	1905
<i>H. Yeo, W. Johnson</i>	
Main Rotor Blade Tracking Solutions for High Strain Environments	1924
<i>R. Loftus</i>	
Control System Development and Flight Test Experience with the MQ-8B Fire Scout Vertical Take-Off Unmanned Aerial Vehicle (VTUAV)	1933
<i>J. Downs, C. Ivler, R. Prentice, M. Tischler, S. Dalzell, A. Besachio, M. Mansur</i>	
High Ambient Temperature Thermal Analysis of the AH-64D Composite Main Rotor Blade	1960
<i>T. Reinert, A. Llanos</i>	
Measurement and Characterization of Helicopter Noise in Steady-State and Maneuvering Flight	1974
<i>F. Schmitz, E. Greenwood, R. Sickenberger, G. Gopalan, B. Sim, D. Conner, E. Morales III, W. Decker</i>	
Rotor Blade Stall Flutter, Stable or Unstable? An Exploratory Investigation of Nonlinear Aeroelasticity	1991
<i>R. Ormiston, P. Martin</i>	

Advances In Rotorcraft Simulations With Unstructured CFD	2007
<i>J. Abras, C. Lynch, M. Smith</i>	
Simulation-Based Bandwidth Analysis of a Swashplateless Rotor Helicopter	2021
<i>C. Malpica, R. Celi</i>	
Bearing Thermal Performance And Cage Slip Measurement For All-Steel And Ceramic Hybrid Compressor Thrust Bearings	2043
<i>L. Begin, E. Lopez, K. Kerner</i>	
Damage and Usage Monitoring for Vertical Flight Vehicles	2054
<i>N. Goldfine, D. Grundy, C. Craven, A. Washabaugh, M. Davis, J. Schaff, T. Hullander, P. Kulowitch, W. Davis, G. Contag, A. Timmons, B. Hardman</i>	
Inversion of the Modified Universal Slopes Equation for Real Time Monitoring of Fatigue Life Expenditure	2063
<i>S. Zaat, C. Balestra</i>	
A Systems Engineering Approach: Working With The Customer To Establish A Cost Effective Request for Proposal	2070
<i>S. Botta, P. Hensley</i>	
Comprehensive Analysis, Prediction, and Validation of UH-60A Blade Loads in Unsteady Maneuvering Flight	2101
<i>A. Abhishek, A. Datta, I. Chopra</i>	
Helicopter Vibration Reduction Throughout the Entire Flight Envelope Using Surrogate Based Optimization	2123
<i>B. Glaz, P. Friedmann, F. Bagnoud, L. Liu</i>	
Tracking Pitch Link Dynamic Loads with Energy Harvesting Wireless Sensors	2139
<i>S. Arms, M. Augustin, N. Phan</i>	
Performance And Surface Pressure Measurements On A Mav-Scale Shrouded Rotor In Translational Flight	2147
<i>J. Pereira, I. Chopra</i>	
Application of CFD/CSD Coupling for Analysis of Rotorcraft Airloads and Blade Loads in Maneuvering Flight	2171
<i>M. Bhagwat, R. Ormiston, H. Saberi, H. Xin</i>	
System Identification of a Miniature Electric Helicopter using MEMS Inertial, Optic Flow and Sonar Sensing	2201
<i>J. Conroy, D. Pines</i>	
Tiltrotor Airframe And Landing Gear Development – XV-3, XV-15, 609, And Beyond	2215
<i>M. Isaac</i>	
Aerodynamics and Lifting Performance of a Quad Tilt Rotor In Ground Effect	2225
<i>A. Radhakrishnan, F. Schmitz</i>	
System Modeling For Reusability	2237
<i>J. Haiar, J. Lewis</i>	
Mission Processor Software Open Systems Architecture for the Apache Helicopter	2253
<i>R. Koontz</i>	
Derivative Expansion Technologies for Structural and Manufacturing Enhancements to Attain Weight and Life Cycle Cost Reduction	2262
<i>L Reid, D. Reddy</i>	
Cross-sectional Design of Composite Rotor Blades Considering Manufacturing Constraints	2270
<i>L. Li, V. Volovoi, D. Hodges</i>	
Utilizing On-Aircraft Distributed Fault Data to Improve the Removal Decision Process	2281
<i>T. Suggs, D. Wade</i>	
Improved Methods Of Alert Generation In HUMS	2289
<i>K. Pipe</i>	
Mach Scaled Wind Tunnel Tests On A 4-Bladed Half-Span Advanced Tilt-Rotor	2303
<i>E. Bianchi, G. Preatoni, N. Rovere</i>	
Compact Pericyclic Continuously Variable Speed Transmission Systems: Design Features and High-Reduction Variable Speed Case Studies	2312
<i>Z. Saribay, A. Lemanski, K. Wang, E. Smith, R. Bill, S. Rao</i>	
Balancing CH-53K Handling Qualities and Stability Margin Requirements in the Presence of Heavy External Loads	2323
<i>V. Sahasrabudhe, A. Faynberg, M. Pozdin, R. Cheng, M. Tischler, A. Stumm, M. Lavin</i>	
The Shaft Driven Lift Fan Propulsion System for the Joint Strike Fighter	2341
<i>P. Bevilaqua</i>	

System Engineering Approaches for Performance Critical Avionics Embedded Computer Systems Using the Architecture Analysis and Design Language (AADL)	2350
<i>B. Lewis</i>	
Development of an Integrated Electrical Swashplateless Primary and Individual Blade Control System	2369
<i>U. Arnold, D. Fuerst, T. Neuheuser, R. Bartels</i>	
Active/Passive Aircraft Survivability (APAS) Program	2383
<i>J. Clifford, M. Misner</i>	
Author Index	