

AHS Specialists' Conference on Aeromechanics Design for Vertical Lift 2016

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20 - 22 January 2016

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Technical Program

AHS Specialists' Conference on Aeromechanics Design for Vertical Lift

Fisherman's Wharf, San Francisco, CA. January 20-22, 2016

General Chair: Wayne Johnson
 Technical Chair: Mahendra Bhagwat
 Administrative Chair: Robert H. Stroub
 Production Chair: Eduardo Solis
 Production Assistant: Meredith Segall
 SFBAC President: Mark Fulton/Carl Russell

Wednesday, January 20, 2016

08:45-09:00	Welcome by Conference General Chair: Dr. Wayne Johnson, NASA Ames Research Center
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Plenary Session: Current Challenges and Future Directions in Rotorcraft Aeromechanics Chair: Wayne Johnson, NASA Ames Research Center	
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09:00-09:30	Updates on Major Aircraft Development Programs at Bell Helicopter™#5 Tom Wood, Bell Helicopters Textron
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09:30-10:00	Aeromechanics Challenges for Tilting Propellor/Rotor Small VTOL UAS Package Delivery™% Daniel P. Schrage, Matt Brown (Georgia Institute of Technology) and Don Shaw (Advanced Tactics, Inc.)
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10:00-10:30	Break
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10:30-11:00	New Products and Technologies at AgustaWestland™#5 Dr. James Wang, AgustaWestland
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11:00-11:30	The V/STOL Performance Gap™#5 Franklin D. Harris, Bell Helicopters (Retired)
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11:30-12:00	Conceptual Design of a Remote Controlled Electric Powered Helicopter for World Record Distance, Endurance, and Climb™™™ Christopher Silva
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12:00-13:30	Lunch
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Session	CFD Applications	Comprehensive Analysis
Chair	Ram Janakiram, Boeing Mesa	Tom Parham, Jr., Bell Helicopters
13:30-14:00	Integrating Modeling and Simulation into an Acquisition Process: Helicopter Mission Assessment™™&* David M. O'Brien, Jr. and Christopher E. Hamm (US Army Aviation Directorate/AMRDEC)	Correlation of RCAS Load Predictions for Active Flap Rotor™™™%\$- Ethan Corle, Sven Schmitz (Pennsylvania State University), Rajneesh Singh, Hao Kang, Matt Floros (US Army Research Laboratory)
14:00-14:30	An Assessment of Empirical Models for Rotorcraft ice Accretion™™™) Jeewoong Kim, Lakshmi Sankar, and Stephen Marone (Georgia Institute of Technology) and Richard E. Kreeger (NASA Glenn Research Center)	Comparison Study of Tiltrotor Whirl Flutter Using Two Rotorcraft Comprehensive Analyses™™™&* Jinwei Shen (University of Alabama) and Hao Kang (US Army Research Laboratory)
14:30-15:00	Numerical Study of Tip Chipped Wing Designed for BVI Noise Alleviation™™™(* Nahyeon Roh and Sejong Oh (Pusan National University)	Pitch-Flap Stability of an Articulated Rotor with Fluidic Pitch Links™™™%*) Shawn M. Treacy, Christopher D. Rahn, Edward C. Smith (Pennsylvania State University), and Conor Marr (LORD Corporation)
15:00-15:30	Prediction and Validation of CFD-Coupled Trim analysis for a flapping WING MAV™™™) ' Camli Badrya, Aaron Harrington, James D. Baeder (University of Maryland), Christopher M Kroninger (US Army Research Laboratory) and Bharath Govindarajan (University of Maryland)	Understanding the Effect of Blade Flexibility on Cycloidal Rotor Performance in Hover™™™%() Atanu Halder and Moble Benedict (Texas A & M University)

15:30-16:00	Break	
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Session	Co-axial Rotors	Conceptual Design
Chair	Ram Janakiram, Boeing Mesa	Tom Parham, Jr., Bell Helicopters
16:00-16:30	Application of a Navier-Stokes Free Wake Hybrid Methodology to the Harrington Coaxial Rotor™™™+ \$ Jeewoong Kim, Lakshmi N Sankar and JVR Prasad (Georgia Institute of Technology)	An Integrated Design Environment for NDARC™™™%&) Jeffrey D. Sinsay (US Army Aviation Development Directorate - AFDD), David M. Hadka, and Sara E. Lego (Pennsylvania State University)
16:30-17:00	Identification of Rotor-Fuselage Aerodynamic Interactions in a Compound Coaxial Helicopter using CFD-CSD Coupling™™™+ + Bradley Passe, Ananth Sridharan, James Baeder (University of Maryland), and Rajneesh Singh (US Army Research Laboratory)	Further Parametric Study using Rotor Structural Design Optimization Framework for Compound Rotorcraft with Lift Offset™™™%&) JiSoo Sim, YooJin Kang, WonJong Eun, JaeHoon Lim, and SangJoon Shin (Seoul National University)
17:00-17:30	Computational Study of Flow Interactions in Coaxial Rotors™™™. , Seokkwan Yoon, Henry C. Lee, and Thomas H. Pulliam (NASA Ames Research Center)	Modeling of Diesel and Diesel-Electric Hybrid Propulsion Systems for Conceptual Design of Rotorcraft™™™%) J. Michael Vegh, Juan Alonso (Stanford University), and Jeffrey Sinsay (US Army Aviation Development Directorate -AFDD)



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Thursday, January 21, 2016

Plenary Session: Vertical Lift Design for the Future Military

Chair: Jeffrey D. Sinsay, US Army Aviation Development Directorate - AFDD

08:30-09:00	A Conceptual Design Study of a Vertical Lift Family-of-Systems + Ernest B. Keen and Bruce S. Tenney (US Army Aviation Development Directorate - AFDD)	
09:00-09:35	Coaxial Compound Helicopter for Confined Urban Operations Wayne Johnson (NASA Ames Research Center), Joshua F. Elmore, Ernest B. Keen, Andrew T. Gallaher and Gerardo F. Nunez (US Army Aviation Development Directorate - AFDD)	
09:35-10:10	Design and Assessment of a Size Constrained Advanced Tilt Rotor, Lift Offset Coaxial Compound and Winged Compound Alex M. Moodie, Ernest B. Keen, and Andrew T. Gallaher (US Army Aviation Development Directorate - AFDD)	
10:10-10:40	Break	
10:40-11:25	The High Efficiency Tiltrotor as a Solution to the Needs of a Mobile Military Christopher Silva, Mark Calvert, Andrew T. Gallaher, Gerardo F. Nunez, Robert Scott, Jeffrey D. Sinsay, and Robert D. Vocke III (US Army Aviation Development Directorate - AFDD)	
11:25-12:00	Consideration of Mission Effectiveness and Cost in the Assessment of Future Military Rotorcraft Robert Scott, Jeffrey D. Sinsay, Malcom W. Dinning and Scott R. McMichael (US Army Aviation Development Directorate - AFDD)	
12:00-13:30	Lunch	
Session	CFD Assessment	Design Optimization
Chair	Judah Milgram, Office of Naval Research	Gloria Yamauchi, NASA Ames Research Center
13:30-14:00	Aeromechanics Design With Non-Contiguous Hybrid Methodologies (& Kevin Jacobson, Amanda Grubb, and Marilyn Smith (Georgia Institute of Technology)	Optimization of the Forward Flight Operation for a Reconfigurable Rotor Concept (& Michael Cormier, David Rancourt, Etienne Demers Bouchard, and Dimitri Mavris (Georgia Institute of Technology)
14:00-14:30	Validation of rFlow3D Code for a Helicopter at High Advance Ratios + Masahiko Sugiura, Yasutada Tanabe (JAXA), Hideaki Sugawara (Ryoyu Systems), and Inderjit Chopra (University of Maryland)	Optimal Flight Path of the Tethered Airplanes in the EPR2 VTOL Concept During Moderate Flight Velocity David Rancourt, Etienne Demers Bouchard, and Dimitri N. Mavris (Georgia Institute of Technology)
14:30-15:00	Using Multibody Dynamics for the Flutter Assessment of an Isolated Rotor with Innovative Blade Layout * * Jürgen Arnold (DLR Göttingen)	Design Considerations of a Lift-Offset Single Main Rotor Compound Helicopter + Ananth Sridharan, Bharath Govindarajan, VT Nagaraj and Inderjit Chopra (University of Maryland)
15:00-15:30	Optimal Active Twist Control Scenario for Performance and Vibration Perspective of a Helicopter Rotor + Young H. You, Sung N. Jung (Konkuk University)	Multidisciplinary Optimization for High Speed, High Efficiency Tiltrotors with Wing Extensions (+) Sandilya Kambampati, Taylor Hoover, Edward C. Smith, and Mark. D. Maughmer (Pennsylvania State University)
15:30-16:00	Break	
Session	Flow Control	Modeling & Simulation
Chair	Judah Milgram, Office of Naval Research	Gloria Yamauchi, NASA Ames Research Center
16:00-16:30	Numerical Assessment of Flow Control Technologies for Coaxial High-Speed Rotorcraft , Barbara Botros, Patrick Bowles, Claude Matalanis, Byung-Young Min (UTRC), Derek Geiger (Sikorsky Aircraft), and Brian Wake (UTRC)	Helicopter Non-Unique Trim Strategies for Blade-Vortex Interaction (BVI) Noise Reduction (,) Carlos A. Malpica (NASA Ames Research Center), Eric Greenwood (NASA Langley Research Center), and Ben Sim (US Army Aviation Development Directorate - AFDD)
16:30-17:00	Rounded Trailing Edge Flow Control with Single Dielectric Barrier Discharge Plasma Actuators -) David M. Schatzman (US Army Aviation Development Directorate - AFDD)	Fuselage-Rotor Interference Including Side-Slip Angle - (Berend G. van der Wall and Jianping Yin (DLR Braunschweig)
17:00-17:30	Mechanisms of Active Aerodynamic Load Reduction on a Rotorcraft Fuselage with Rotor Effects (\$, Norman W. Schaeffler, Brian G. Allan, Luther N. Jenkins, Chung-Sheng Yao, Scott M. Bartram (NASA Langley Research Center), W. Derry Mace (Sierra-Lobo), Oliver D. Wong and Philip E. Tanner (US Army Aviation Development Directorate - AFDD)	Ground resonance investigation of slope landing operating conditions () % Oliver Dieterich and Wouter Houg (Airbus Helicopters)
18:30-21:30	Banquet Guest Speaker: Roger Connor, Smithsonian Institute "Helicopters in the City: The Strange Tale of Los Angeles Airways"	



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Friday, January 22, 2016

Session	CFD Design Framework	Experimental Techniques
Chair	Matthew Munson, Army Research Office	Vikram Hrishikeshavan, University of Maryland
08:30-09:00	CREATE(TM)-AV Helios Prediction of BVI Loading and Rotor Wakes of HART II Rotor & \$ Buvana Jayaraman (Science & Technology Corp), Rohit Jain and Joon Lim (US Army Aviation Development Directorate - AFDD)	Reduced-Order Dynamic Stall Model with Unsteady Free-Stream -- Experimental Correlation & \$ Ramin Modarres and David A. Peters (Washington University in St. Louis)
09:00-09:30	X3D -- A 3-D Solid Finite Element Multibody Dynamic Analysis for Rotorcraft & - Anubhav Datta (Science & Technology Corp)	Experimental Modeling of Compressible Dynamic Stall in Unsteady Flow through Interpolation of Phase-Matched Conditions in Steady Flow & , Shawn Naigle, Matthew Frankhouser, Kevin Williams, James Gregory, and Jeffrey Bons (Ohio State University)
09:30-10:00	Coupled Aerodynamics and 3-D Structural Dynamics of the Tilt Rotor Aeroacoustic Model (TRAM) Proprotor & , William Staruk, Inderjit Chopra (University of Maryland), and Anubhav Datta (Science & Technology Corp)	Measurements to Characterize Cycle-To-Cycle Variations in Dynamic Stall & , Manikandan Ramasamy, Jacob S. Wilson, William J. McCroskey, and Preston B. Martin (US Army Aviation Development Directorate - AFDD)
10:00-10:30	Break	
Session	CFD Design Framework	Experimental Techniques
Chair	Matthew Munson, Army Research Office	Vikram Hrishikeshavan, University of Maryland
10:30-11:00	RotCFD: An Integrated Design Environment for Rotorcraft & +* Kanchan Guntupalli, Luke A. Novak (Sukra Helitek), and R.Ganesh Rajagopalan (Iowa State University)	Wind Tunnel Testing of a Swashplateless Rotor with Compact Brushless Motor Actuated Flaps for Primary Control & \$& Anand Saxena and Inderjit Chopra (University of Maryland)
11:00-11:30	Using RotCFD to Predict Isolated XV-15 Rotor Performance & - (Witold J. F. Koning, Cecil W. Acree (NASA Ames Research Center) and R. Ganesh Rajagopalan (Iowa State University)	Summary of the Full-Scale Blade Displacement Measurements of the UH-60A Airloads Rotor & \$& Anita I. Abrego, Larry Meyn (NASA Ames Research Center), Alpheus W. Burner (Jacobs Engineering Group), and Danny A. Barrows (NASA Langley Research Center)
11:30-12:00	A Study of Coaxial Rotor Performance and Wake Characteristics & - Natasha Lydia Barbely (NASA Ames Research Center), Narayanan M. Komerath (Georgia Institute of Technology), and Luke A. Novak (Sukra Helitek)	Photogrammetric Deflection Measurements for the Tiltrotor Test Rig (TTR) Multi-Component Rotor Balance Calibration & + ') Eduardo Solis (Monterey Technologies) and Larry Meyn (NASA Ames Research Center)
12:00-12:30	Analysis of Large Civil Tilt Rotor Wind Tunnel Blockage and Validation Using RotCFD & & (S. Esmah Sahin (Science & Technology Corp), Carl Russell (NASA Ames Research Center), Eduardo Solis (Monterey Technologies), and R. Ganesh Rajagopalan (Iowa State University)	Simultaneous boundary-layer transition, tip vortex, and blade deformation measurements of a rotor in hover & + -) - James T. Heineck, Edward T. Schairer , Nettie H. Roozeboom (NASA Ames Research Center), and Manikandan Ramasamy (US Army Aviation Development Directorate - AFDD)