

The 3rd International Basic Research Conference on Rotorcraft Technology

Nanjing, China, Oct. 14-16 2009

Sponsored by

The American Helicopter Society
 The Pennsylvania State University
 Nanjing University of Aeronautics and Astronautics
 The Chinese Society of Aeronautics and Astronautics



General Chairman: *Prof. Hong Nie, Vice President of NUAA*
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Prof. Ken Brentner, AHS Journal Editor-in-Chief
Organizing Committee Chairman: *Prof. Edward Smith, Penn State University*
Prof. Pinqi Xia, NUAA

Conference Program

Wednesday, Oct. 14, 2009		
9:00~9:30	Opening Ceremony <i>Chairman: Prof. Hong Nie, Vice President of NUAA</i> <i>Room 529, Building A18, NUAA</i>	
9:00~9:05	Welcome Speech	<i>Prof. Fuping Wang, President of NUAA</i>
9:05~9:10	Conference Speech	<i>Official</i> <i>Chinese Society for Aeronautics and Astronautics</i>
9:10~9:30	Photograph	<i>All Participants</i>
INVITED KEYNOTE LECTURES <i>Co-Chairman: Prof. Zheng Gao and Prof. Ed Smith</i> <i>Room 529, Building A18, NUAA</i>		
9:30~10:20	Vibration and Noise Reduction in Rotorcraft Using Active Flaps – Simulation, Experiments and Applications	<i>Peretz P. Friedmann, François-Xavier Bagnoud Professor, Department of Aerospace Engineering, University of Michigan</i>

10:20~11:10	Some Ideas on Heavy Lift Helicopter	<i>Shicun Wang, Professor, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
11:10~12:00	Emerging CFD Methodology to Predict Vibratory Loads in a Maneuvering Flight in a Helicopter	<i>Inderjit Chopra, Alfred Gessow Professor & Director Alfred Gessow Rotorcraft Center University of Maryland</i>
14:00~14:50	A Complete Finite-State Inflow Theory from the Potential Flow Equations	<i>David A. Peters, McDonnell Douglas Professor, Antonio Hsieh, Cristina Garcia-Duffy. Washington University at St. Louis</i>
14:50~15:40	China Commercial Helicopter Market Outlook	<i>Qunlin Xia, VP of AVICOPTER Co. (Helicopter Company of Aviation Industry of China)</i>
15:40~16:30	AgustaWestland's Vision for Future of Vertical Flight	<i>Dr. James M. Wang, VP of Research & Development, AgustaWestland</i>
16:30~16:50	<i>Coffee Break</i>	
16:50~17:40	Use of CFD for Complete Helicopter Configurations	<i>Prof. George Barakos, The University of Liverpool, UK</i>
17:40~18:30	Recent Research in Lab. of Rotorcraft Aeromechanics, NAAA	<i>Renliang Chen, Professor, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
Thursday, Oct. 15, 2009		
Session 1 DESIGN and TESTING <i>Room 429, Building A18, NAAA</i> <i>Chairman: Dr. Wayne Johnson</i>		
9:00~9:40	Rotorcraft Conceptual Design Environment	<i>Wayne Johnson, Aeromechanics Branch. NASA, Jeffrey D. Sinsay, Aeroflightdynamics Directorate (AMRDEC), U. S. Army Research, Development & Engineering Command</i>
9:40~10:20	Design of an Unmanned Rotorcraft Platform RIHA2	<i>Hasan Ibacoglu, Taner Mutlu, Kerem Anbarci, and A. Rustem Aslan, Istanbul Technical University</i>
10:20~10:40	<i>Coffee Break</i>	
10:40~11:20	Design, Development and Flight Testing of a Shrouded Rotor Micro Air Vehicle with Anti-Torque Vanes	<i>Vikram Hrishikeshavan and Inderjit Chopra, University of Maryland</i>

11:20~12:00	Aerodynamic Characteristics of a Dragonfly Wing Section	<i>Jingsong Yang and Pinqi Xia, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
<i>Chairman: Dr. James M. Wang</i>		
14:00~14:40	Computational Investigation of Parametric Effects on Isolated Blade-Vortex Interaction Noise	<i>Yongjie Shi, Qijun Zhao and Guohua Xu, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
14:40~15:20	Performance Tests of the RIHA1 Platform	<i>Hasan Ibacoglu, Aytekin Guven, TanerMutlu, Kerem Anbarci, A. Rustem Aslan and H. Temel Belek, Istanbul Technical University</i>
15:20~15:40	Coffee Break	
15:40~16:20	Optimization Design of Tiltrotor's Dynamic Parameters	<i>Lipeng Xue and Chenglin Zhang, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
16:20~17:00	Flight Testing of Model Based H_{∞} Control for Helicopter Vibration Reduction	<i>WassefAyadi, Daniel Y. Reber, University of Stuttgart, Institute of Flight Dynamics and Control</i>
17:00~17:40	Computational Study of Aerodynamic Characteristics of Elliptic Airfoils for Rotor/Wing UAV Applications	<i>Yangping Deng, Zhenghong Gao, Hao Zhan, Northwester Polytechnical University, Xi'an China</i>
Session 2 DYNAMICS and DRIVE SYSTEMS		
<i>Room 431, Building A18, NUAU</i>		
<i>Chairman: Prof. Inderjit Chopra</i>		
9:00~9:40	Neuronal Controller for Blade Stall Suppression	<i>Daniel Y. Reber, Wassef Ayadi, University of Stuttgart. Institute of Flight Dynamics and Control</i>
9:40~10:20	Robust Optimal H_2 dynamic output feedback and Feedforward Hybrid Control of Helicopter Vibration	<i>Laishou Song and Pinqi Xia, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
10:20~10:40	Coffee Break	
10:40~11:20	Study on the blade pitch control of electrically controlled rotor	<i>Yang Lu and Heming Xia, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>

11:20~12:00	Face-Gear-Pair Meshing Concept for Nutating Gear Mechanisms and Pericyclic Variable Speed Transmission	<i>Zihni B. Saribay, Robert C. Bill, Edward C. Smith, Vertical Lift Research Center of Excellence, The Pennsylvania State University</i>
Chairman: Prof. Pinqi Xia		
14:00~14:40	Research on Delamination in Composite Laminates under High-cycle fatigue	<i>Cunwang Ma, Yong Liu and Chenglin Zhang, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
14:40~15:20	Rotor Torque Analysis of Variable Speed Rotor during Resonance Crossing	<i>Dong Han, Edward C. Smith, Vertical Lift Research Center of Excellence, The Pennsylvania State University</i>
15:20~15:40	Coffee Break	
15:40~16:20	Helicopter Rotor Vibration Reduction Optimization by Modal Shaping	<i>Hongzhou Wang, Yong Liu and Chenglin Zhang, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
16:20~17:00	Morphing Aerofoil Camber For Helicopter Vibration Suppression	<i>Wayland Chan, Colin Hatch and Neil Adams, QinetiQ, Cody Technology Park, Farnborough, Hampshire, UK</i>
Session 3 AERODYNAMICS and FLIGHT DYNAMICS		
<i>Room 433, Building A18, NUAU</i>		
Chairman: Prof. George Barakos		
9:00~9:40	A Novel Viscous Vortex Particle Method as Applied to Unsteady Rotor Wake Simulation	<i>Chengjian He and Jinggen Zhao, Advanced Rotorcraft Technology, Inc., Mountain View, CA</i>
9:40~10:20	Load and Response Analysis of Tilting Rotor by Using Wake Bending Unsteady Dynamic Inflow Model	<i>Hailong Yue and Pinqi Xia, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
10:20~10:40	Coffee Break	
10:40~11:20	An Unstructured Hybrid Approach for Computing Rotor Wake Flows	<i>Chunhua Sheng and Qiuying Zhao, University of Toledo, NischintRajmohan and LakshmiSankar, Georgia Institute of Technology, John Bridgeman and Jim Narramore, Bell Helicopter Textron, Inc.</i>
11:20~12:00	Experiment Investigation of Aerodynamic Interaction of Rotor/ Airframe / Wing	<i>Weihong Kong, Renliang Chen, College of Aerospace Engineering, Nanjing University of Aeronautics & Astronautics</i>

<i>Chairman: Dr. Chengjian He</i>		
14:00~14:40	Handling Qualities Assessment of a Model Inversion Controller for a Tiltrotor Aircraft	<i>Thanan Yomchinda, Joseph F. Horn, Vertical Lift Research Center of Excellence, The Pennsylvania State University</i>
14:40~15:20	Aerodynamics Analysis of a Rotor Undergoing Maneuvers Using an Efficient Time Marching Free Vortex Method	<i>Pan Li, Renliang Chen, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
15:20~15:40	<i>Coffee Break</i>	
15:40~16:20	Significance of All-speed scheme in Application to Rotorcraft CFD Simulations	<i>Yasutada Tanabe and Shigeru Saito, Aviation Program Group, JAXA, Japan</i>
16:20~17:00	Effects of Blade Tip Sweep on the Flowfield and Aerodynamic Characteristics of Rotors	<i>Qijun Zhao, Guohua Xu and Guang Xu,, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
17:00~17:40	Prediction for the Rotor Noise in Hover and Forward Flight Based on CFD/Kirchhoff Method	<i>Qijun Zhao, Bo Wang, Liang Ye and Guohua Xu, College of Aerospace Engineering, University of Aeronautics and Astronautics</i>
Friday, Oct. 16 2009		
Session 1 DESIGN and TESTING <i>Room 429, Building A18, NUAA</i> <i>Chairman: Prof. Joseph F. Horn</i>		
9:00~9:40	Analytical prediction of rotor blade flapping angles for use in rotor state feedback flight control systems	<i>Mark Voskuijl, Marilena D. Pavel, Delft University of Technology, Daniel J. Walker, University of Liverpool, Arthur W. Gubbels, National Research Council of Canada</i>
9:40~10:20	Implementation of Variable RPM in Helicopter Flight Control Laws	<i>Wei Guo, Joseph F. Horn, GurbuzOzdemir, Vertical Lift Research Center of Excellence, The Pennsylvania State University</i>
10:20~10:40	<i>Coffee Break</i>	
10:40~11:20	Numerical Analysis on Aerodynamic Interaction Characteristics among Tilt-Rotor/Wing/Fuselage in Conversion State	<i>Baofeng Cheng, Bo Wang, Qijun Zhao and Guohua Xu, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
11:20~12:00	Numerical simulation of rotor-fuselage-engine interaction in forward flight	<i>Yihua Cao, Ming Zhao and Li Hu, Institute of Aircraft Design, Beijing University of Aeronautics and Astronautics</i>

Session 2 DYNAMICS and DRIVE SYSTEMS

Room 431, Building A18, NUA

Chairman: Dr. Wayland Chan

9:00~9:40	Dynamic Behavior of Gear Systems in Rotorcraft Applications	<i>Tugan Eritenel and Robert G. Parker, Department of Mechanical Engineering, Ohio State University</i>
9:40~10:20	Experimental Research of Propulsive Wing Using Cross-flow Fan	<i>Yinghui Zhang, Ruiheng He and Zhengfei Tang, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
10:20~10:40	<i>Coffee Break</i>	
10:40~11:20	Ultrasonic De-icing System for Helicopter Blade Skin with Tailored Waveguide	<i>Yun Zhu, Edward C. Smith, Joseph Rose, Vertical Lift Research Center of Excellence, The Pennsylvania State University</i>
11:20~12:00	Multi-Objective Optimization of Helicopter Rotor Vibration Reduction by Modal Shaping	<i>Hongzhou Wang, Yong Liu and Chenglin Zhang, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>

Session 3 AERODYNAMICS and FLIGHT DYNAMICS

Room 433, Building A18, NUA

Chairman: Prof. Renliang Chen

9:00~9:40	A High Fidelity Brownout Model for Real-Time Flight Simulations and Trainers	<i>Michael K. Yu, Continuum Dynamics Inc., USA</i>
9:40~10:20	Simulation of Rotor Flowfield Based on Unstructured Embedded Grid Technique	<i>Liang Ye, Guohua Xu and Qijun Zhao, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>
10:20~10:40	<i>Coffee Break</i>	
10:40~11:20	A Vorticity Confinement Based Numerical Method for Fast Rotorcraft Aerodynamic Computations	<i>Yonghu Wenren and John Steinhoff, Flow Analysis, Inc., Tullahoma, TN</i>
11:20~12:00	Application of Set-Membership Identification Method to the Helicopter Flight Dynamics Modeling	<i>Wei Wu and Renliang Chen, College of Aerospace Engineering, Nanjing University of Aeronautics and Astronautics</i>