<table>
<thead>
<tr>
<th>Session A – Tuesday Morning, May 20 – 8:00 a.m. – 12 noon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operations 1</strong></td>
</tr>
<tr>
<td>Paper # 1 – 8:00 – 8:30 a.m.</td>
</tr>
<tr>
<td>Evaluation of NEPTEC Obscuring Penetrating Autosynchronous Lidar in Degraded Visual Environments (Helicopter Flight Tests): Part II – Lidar view through capability (259) Gilles Roy (Presenter); Simon Roy, DRDC Valcartier; Xiaoying Cao, Lidar Consultant</td>
</tr>
<tr>
<td><strong>Product Support Systems Technology</strong></td>
</tr>
<tr>
<td>Paper # 1 – 8:00 – 8:30 a.m.</td>
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<tr>
<td>Engine Corrosion and Corrosion Prevention (180)</td>
</tr>
<tr>
<td>Robert Poboj, Pratt &amp; Whitney Canada (Presenter)</td>
</tr>
<tr>
<td>Paper # 2 – 8:30 – 9:00 a.m.</td>
</tr>
<tr>
<td>Direct Maintenance Cost After-Market positioning: a strategy based approach (189) Pierre Carpentier, Pratt and Whitney Canada (Presenter)</td>
</tr>
<tr>
<td>Paper # 3 – 9:00 – 9:30 a.m.</td>
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<tr>
<td>Analysis of Health and Usage Monitoring System (HUMS)</td>
</tr>
<tr>
<td>Tanniza Zaman (Presenter); Abdul Bayoumi, University of South Carolina</td>
</tr>
<tr>
<td>Refreshment Break – 9:30 – 10:00</td>
</tr>
<tr>
<td>Paper # 4 – 10:00 – 10:30 a.m.</td>
</tr>
<tr>
<td>Adaptive Distributed Aviation Asset Optimization for Operational Effectiveness (Phase II) (380) Charles Shepard (Presenter); John Merrihew, Norm Geddes; Steve Toney, VELOXITI, Inc.; Raymond Higgins, Army Aviation Development Directorate - Applied Aviation Technology Directorate (ADD-AATD)</td>
</tr>
<tr>
<td>Paper # 5 – 10:30 – 12:00 a.m.</td>
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<tr>
<td>Conducting Helicopter Operations in Northern Labrador and the Arctic (139) Geoff Goodyear, Universal Helicopters Newfoundland and Labrador LP (Presenter)</td>
</tr>
<tr>
<td>Paper # 6 – 11:00 – 11:30 a.m.</td>
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<tr>
<td>V-22 and the Future of Carrier Onboard Delivery (COD): Improving the Way the Navy Re-Supplies Its Carriers and Maritime Forces (256) Ken Karika (Presenter); John Barber, Bell Helicopter Textron Inc.</td>
</tr>
<tr>
<td>Paper # 7 – 11:30 a.m. – 12 noon</td>
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<tr>
<td>COMBAT TEMPERED AIRCRAFT SURVIVABILITY RATING (187)</td>
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<tr>
<td>Jordan Kaye, Sikorsky (Presenter); Mark Robeson, Aviation Applied Technology Directorate</td>
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<tr>
<td><strong>Test &amp; Evaluation 1</strong></td>
</tr>
<tr>
<td>Paper # 1 – 8:00 – 8:30 a.m.</td>
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<tr>
<td>Analysis and Testing of the Bell Model 525 Helicopter Flight Control System (132) Thomas Archer; Chrstos Bais, Bell Helicopter (Presenter)</td>
</tr>
<tr>
<td>Paper # 2 – 8:30 – 9:00 a.m.</td>
</tr>
<tr>
<td>Category A Testing of the Bell 412EPHelicopter Equipped with the PT6T-9 Engine and Bell BasIX-Pro(TM) Integrated Avionics System (142) John Schillings, Bell Helicopter (Presenter)</td>
</tr>
<tr>
<td>Paper # 3 – 9:00 – 9:30 a.m.</td>
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<tr>
<td>Three-dimensional reconstruction of blade tip vortices of a BO 105 using a multi-camera BOS system (274) Andre Baulknecht, (Presenter); Benjamin Ewers; Christian C. Wolf, German Aerospace Center (DLR); Friedrich Leopold, French-German Research Institute of Saint Louis; Markus Raffel, German Aerospace Center</td>
</tr>
<tr>
<td>Refreshment Break – 9:30 – 10:00</td>
</tr>
<tr>
<td>Paper # 4 – 10:00 – 10:30 a.m.</td>
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<tr>
<td>Flight Testing of an In-Flight Tuning System on a CH-53G Helicopter (279) Uwe T. P. Arnold (Presenter); Daniel Fuerst, ZF Luftfahrtechnik GmbH</td>
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<tr>
<td>Paper # 5 – 10:30 – 11:00 a.m.</td>
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<tr>
<td>Paper # 6 – 11:00 – 11:30 a.m.</td>
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<tr>
<td>Unsteady boundary layer transition measurements by differential infrared thermography (358) Christoph Merz (Presenter); Kai Richter; Sina Rafati; Markus Raffel, German Aerospace Center (DLR)</td>
</tr>
<tr>
<td>Paper # 7 – 11:30 a.m. – 12 noon</td>
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<tr>
<td>Helicopter Flight Test Evaluation of NEPTEC Obscuring Penetrating Autosynchronous LiDAR in Degraded Visual Environments (365) Marc Alexander (Presenter); Stephan Carignan, National Research Council of Canada; Gilles Roy; Simon Roy, Defence Research and Development Canada – Valcartier</td>
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<tr>
<td>Wind Energy 1</td>
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<tr>
<td>Paper # 1 – 8:00 – 8:30 a.m.</td>
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<tr>
<td>SOLUTION OF GLAURER’S CONTRACTION/EXPANSION EQUATIONS FOR WIND TURBINES AND POWERED ROTORS WITH SWIRL (70) Andrew Howard, Rensselaer Polytechnic Institute; Ramin Modarres (Presenter); David Peters; Benjamin Rahming, Washington University in St. Louis</td>
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<tr>
<td>Paper # 2 – 8:30 a.m. – 9:00 a.m.</td>
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<tr>
<td>Gurney Flap Control Authority on a Pitching Wind Turbine Airfoil (433) Pourya Nikueueyian; John Strike; Andrew Magstadt; Michael Hind; Jonathan Naughton, University of Wyoming (Presenter)</td>
</tr>
<tr>
<td>Paper # 3 – 9:00 – 9:30 a.m.</td>
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<tr>
<td>Analysis of Vertical Axis Wind Turbine Aerodynamics by Using a Multi-Fidelity Approach (296) Yi Han, University of Wyoming; Jayanarayan Sitaruman, University of Wyoming (Presenter); Yong Dan, Northwest University (China)</td>
</tr>
<tr>
<td>Refreshment Break – 9:30 – 10:00</td>
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<tr>
<td>Paper # 4 – 10:00 – 10:30 a.m.</td>
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<tr>
<td>Numerical Investigations of Upwind and Downwind NREL 5MW Reference Wind Turbines (317) Quyngieng Tao; Jacob Ickes, Chinhua Sheng (Presenter); Abdullah Afjeh, The University of Toledo</td>
</tr>
<tr>
<td>Paper # 5 – 10:30 – 11:00 a.m.</td>
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<tr>
<td>Turbulence Transport Phenomena in the Wakes of Wind Turbines (208) Pankaj Iha; Jessica Bashhoun, The Pennsylvania State University; Earl Duque, Intelligent Light; Sven Schmitz, The Pennsylvania State University (Presenter)</td>
</tr>
<tr>
<td>Paper # 6 – 11:00 -11:30 a.m.</td>
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<tr>
<td>Application of Flow3D code to performance prediction and the wake structure investigation of wind turbines (321) Harutaka Oe (Presenter); Makoto Yamamoto, Tokyo University of Science; Yasutada Tanabe; Masahiko Sugita; Takashi Aoyama, Japan Aerospace Exploration Agency</td>
</tr>
<tr>
<td>Paper # 7 – 11:30 a.m. – 12 noon</td>
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<tr>
<td>UNDERSTANDING THE WIND TURBINE WAKE BREAKDOWN MECHANISM WITH CFO (329) Marina Carrion; Mark Woodgate; Rene Steijl; George Barakos, University of Liverpool (Presenter)</td>
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</table>
Session B – Wednesday Morning, May 21 – 8:00 a.m. – 12:15 p.m.

Acoustics I

Paper # 1 – 8:00 – 8:30 a.m.
AUSTRIAN ASSESSMENT OF 3 METER RADIUS ROTOR WITH WHIRL TOWER TEST AND ANALYSIS (278)
arda yuexiayi (Presenter); Erdem AYAN, TAI

Paper # 2 – 8:30 – 9:00 a.m.
Numerical and Experimental Studies of BVI Noise Control Using Active Flaps Through Feedback Based on Pressure Signals on Blade (325)
Yasutada Tanabe (Presenter); Masahiko Sugura; Noboru Kobi; Takashi Aoyama, JAXA; Hideaki Sugawara, Ryoju Systems Inc.

Paper # 3 – 9:00 – 9:30 a.m.
Quantification of Rotor Surface Roughness due to Ice Accretion via Broadband Noise Measurement (374)
Baocheng Zheng (Presenter); Kenneth Brentner; Yiqiang Han; Jose Palacios; Philip Morris, The Pennsylvania State University

Refreshment Break – 9:30 – 10:15

A New Finite-Difference Method for General Long-Range Rotorcraft Acoustics: Initial Comparisons with Intermediate-Range Data (258)
John Steinhoff (Presenter); Subhashini Chitta; Andrew Wilson, Wave CPC Inc; Ben Sim; Frank Caradonna, U.S. Army Aviation Development Directorate; Lakshmi Sanikar, Georgia Tech

Paper # 4 – 10:14 – 10:45 a.m.
A New Finite-Difference Method for General Long-Range Rotorcraft Acoustics: Initial Comparisons with Intermediate-Range Data (258)
John Steinhoff (Presenter); Subhashini Chitta; Andrew Wilson, Wave CPC Inc; Ben Sim; Frank Caradonna, U.S. Army Aviation Development Directorate; Lakshmi Sanikar, Georgia Tech

Paper # 5 – 10:45 – 11:15 a.m.
Optimization Analyzes for Aerodynamic and Noise Characteristics of Helicopter Scissors Tail Rotor (158)
Zheng Zhu; Qijun Zhao, Nanjing University of Aeronautics and Astronautics Nanjing, [Presenter]

Paper # 6 – 11:15 – 11:45 a.m.
Understanding In-Plane Noise and Loading for Active Noise Control (436)
Tianxiao Yang (Presenter); Kenneth Brentner; Ethan Corle; Sven Schmitz, Penn State University

Paper # 7 – 11:45 a.m. – 12:15 p.m.
ACTIVE CONTROL OF TRANSMISSION NOISE IN A BELL 407 HELICOPTER (30)
Yann Pasco, Univesit de Sherbrooke (Presenter); Alain Berry, Univesit de Sherbrooke; Anant Grewal, CNRC; Sebastien Laurier Chapleau, BELL Helicopter Textron

Joint Aerodynamics-Dynamics

Paper # 1 – 8:00 – 8:30 a.m.
Rotor Structural Loads Analysis Using Coupled Computational Fluid Dynamics/Computational Structural Dynamics (207)
Hyeonsoo Yeo, US Army Aeroflightdynamics Directorate (Presenter)

Paper # 2 – 8:30 – 9:00 a.m.
Effects of Structural Properties on Rotor Airloads Prediction Based on CFD/CSD Coupling Method (210)
Juni Yu, Nanjing University of Aeronautics and Astronautics; Qijun Zhao, Nanjing University of Aeronautics and Astronautics (Presenter)

Paper # 3 – 9:00 – 9:30 a.m.
A Novel Parallel Algorithm for Rotor Dynamics Simulation (32)
Seundo Heo, Georgia Institute of Technology (Presenter); Olivier Bauchau, University of Michigan-Shanghai Jiao Tong University Joint Institute

Paper # 4 – 9:30 – 10:15 a.m.
Converged Velocity Field for Rotor by a Blended Potential Flow Method (10)
Jianhe Huang, Washington University; David Peters, Washington University (Presenter); Morgan Nowak, Georgia Tech; JVR Prasad, Georgia Tech

Paper # 5 – 10:15 – 11:00 a.m.
Assessment of RCAS Performance and Loads Prediction for Conventional and Advanced Rotor Configurations (314)
Rohit Jain, US Army; Hyeonsoo Yeo, US Army (Presenter); Mahendra Bhagwat, US Army; Jimmy Ho, Science and Technology Corporation

Paper # 6 – 11:00 – 11:45 a.m.
Optimal Design of Compound Helicopters Using Higher Harmonic Control (361)
Elia Giavante, Duke University (Presenter); Kenneth Hall, Duke University

Paper # 7 – 11:45 a.m. – 12:14 p.m.
Tenzin Choepel, Pennsylvania State University (Presenter)

Crew Stations & Human Factors

Paper # 1 – 8:00 – 8:30 a.m.
Eliminating Avoidable Helicopter Seating-Related Injuries to IMPROVE COMBAT READINESS AND MISSION EFFECTIVENESS (288)
Richard Healing, R Cubed Consulting LLC (Presenter)

Paper # 2 – 8:30 – 9:00 a.m.
Display Symbology for Rotorcraft Air Racing (406)
Karen Feigh, Georgia Institute of Technology (Presenter); Romain Lamour, Thales Avionics

Paper # 3 – 9:00 a.m. – 9:30 a.m.
Select Human Machine Interface Properties for Cockpit Touchscreen Displays (228)
Tim Robinson, Esterline Control and Communication Systems (Presenter); Mickey Jacobson, Esterline Control and Communication Systems; Greg Grabski, Esterline Control and Communication Systems; Steve Humphrey, Esterline Control and Communication Systems

Paper # 4 – 9:30 – 10:15 a.m.
A Strategy for Mitigating Degraded Virtual Environments for Rotorcraft (295)
Larry Trick, NAVAIR (Presenter); Timothy Gowen, NAVAIR (Presenter)

Paper # 5 – 10:15 – 11:15 a.m.
A Simple Short-Term Solution to Helicopter Spatial Disorientation Including Operations in Degraded Visual Environments (319)
Braden McGrath, Engineering Acoustics Inc.; Joe McKay, AED AMROC; John Ramiccio, USAARL; Angus Rupert, USAARL (Presenter)

Paper # 6 – 11:15 – 11:45 a.m.
Terrain and Obstacle Avoidance Displays for Low-Level Helicopter Operations in Degraded Visual Environments (411)
Allon Kahana, Univ. of Haifa (Presenter); Barbara Sleet, NASA; Zoltan Szoboszlay, US Army; Michal Rottam Hovev, Israeli Air Force

Paper # 7 – 11:45 a.m. – 12:15 p.m.
3D-LZ 2013 Flight Test: Landing an EH-60L Helicopter in a Brownout Degraded Visual Environment (286)

Handling Qualities 2

Paper # 1 – 8:00 – 8:30 a.m.
A Process for the Subjective and Objective Evaluation of PIO Tendencies (73)
Michael Jones, University of Liverpool; Michael Jump, University of Liverpool (Presenter)

Paper # 2 – 8:30 – 9:00 a.m.
Effect of Control System Augmentation on Handling Qualities and Task Performance in Good and Degraded Visual Environments (98)
Colin Theodore(Presenter); Carlos Malpica, NASA; Ben Lawrence, San Jose State Foundation; Christopher Blanken; Mark Tischler, US Army Aeroflightdynamics Directorate; James Lindsey, Monterey

Paper # 3 – 9:00 – 9:30 a.m.
Investigation of Personal Aerial Vehicle Handling Qualities Requirements for Warsh Environmental Conditions (109)
Philip Perfect, University of Liverpool (Presenter); Michael Jump, University of Liverpool; Mark White, University of Liverpool

Refreshment Break – 9:30 – 10:15

Paper # 4 – 10:15 – 10:45 a.m.
UH-60 Modernized Control Laws for Improved Hover/Low-Speed Handling Qualities in the Degraded Visual Environment (154)

Paper # 5 – 10:45 – 11:15 a.m.
Investigation of Novel Concepts for Control of a Personal Air Vehicle (332)
Michael Jones, University of Liverpool; Philip Perfect, University of Liverpool; Michael Jump, University of Liverpool (Presenter); Mark White, University of Liverpool

Paper # 6 – 11:15 – 11:45 a.m.
Handling Qualities Based System Identification and Flight Control of an Unmanned Helicopter (26)
Guanglin Wang, China Aerospace Science and Technology Corporation; Yonghong Xiang, China Aerospace Science and Technology Corporation (Presenter); Hongli Chen, China Aerospace Science and Technology Corporation; Song Han, China Aerospace Science and Technology

Paper # 7 – 11:45 a.m. – 12:15 p.m.
Development of Tau-Based Landing Profiles for Personal Aerial Vehicle Applications (404)
Linghai Lu, University of Liverpool (Presenter); Michael Jump, University of Liverpool; Perfect Philip, University of Liverpool; Mark White, University of Liverpool
Session B – Wednesday Morning, May 21 – 8:00 a.m. – 12:15 p.m.

HUMS-CBM 1

Paper # 1 – 8:00 – 8:30 a.m.
A New Spectral Average Based Bearing Fault Diagnostic Approach (254)
Brandon Van Hecke, University of Illinois-Chicago; David He, University of Illinois-Chicago (Presenter); Yongzhi Qu, University of Illinois-Chicago; Eric Bechhoefer, 2Green Power Monitoring Systems, LLC

Paper # 2 – 8:30 – 9:00 a.m.
MH60 Accessory Module Bearing Fault Detection (312)
Jason Hines, NAVAIR (Presenter)

Paper # 3 – 9:00 – 9:30 a.m.
A Novel Gear Condition Monitoring Method Based on Transient Impulse Response (283)
Yan Chen, United Technologies Research Center (Presenter); Zaffir Chaudhry, United Technologies Research Center; Paula Dempsey, NASA Glenn Research Center

Refreshment Break – 9:30 – 10:15

Paper # 4 – 10:15 – 10:45 a.m.
Condition Monitoring of Helicopter Drivetrain Components Using Bispectral Analysis (137)
Mohammed Hassan, University of South Carolina; Alex Cao, University of South Carolina (Presenter); Abdel Bayoumi, University of South Carolina

Paper # 5 – 10:45 – 11:15 a.m.
Enhanced Rotorcraft Drive System Diagnostics (169)
Jeremy Sheldon, Impact Technologies, A Sikorsky Innovations Company (Presenter); David Kasper, Sikorsky Aircraft Corporation; Mark Davis, Sikorsky Aircraft Corporation; Jason Fetty, Army AATD

Paper # 6 – 11:15 – 11:45 a.m.
Non-Metallic Debris Monitor For A Helicopter Transmission (344)
Andrea Chavez, Bell Helicopter Textron Inc. (Presenter); Jason Fetty, Aviation Development Directorate - Aviation Applied Technology Directorate; Joseph Gerardi, Innovative Dynamics, Inc.

Paper # 7 – 11:45 a.m. – 12:15 p.m.
Seeded-Fault Spin-Testing of an Active Rotor Electromechanical Actuator and Mechanism (251)
Claude Matalanis, United Technologies Research Center (Presenter); Andrzej Kucek, United Technologies Research Center; Ulf Jonsson, United Technologies Research Center; Brian Wake, United Technologies Research Center; Paul Brewer, UTC Aerospace Systems

Modeling & Simulation 1

Paper # 1 – 8:00 – 8:30 a.m.
Physics-Based Modeling of Viscous Ground Effect for Rotorcraft Applications (85)
Jinggen Zhao, Advanced Rotorcraft Technology, Inc. (Presenter); Chengjian He, Advanced Rotorcraft Technology, Inc.

Paper # 2 – 8:30 – 9:00 a.m.
Real-Time Simulation of Coupled Rotor Configurations with Combined Finite State Dynamic Wake and VPN (315)
Jinggen Zhao, Advanced Rotorcraft Technology, Inc. (Presenter); Chengjian He, Advanced Rotorcraft Technology, Inc.

Paper # 3 – 9:00 – 9:30 a.m.
Real-Time Simulation of Rotorcraft Downwash in Proximity of Complex Obstacles using Grid-Based Approaches (211)
Ludwig Friedmann, Technische Universität München (Presenter); Phillip Ohmer, Technische Universität München; Manfred Hajek, Technische Universität München

Paper # 4 – 10:15 – 10:45 a.m.
Development of a Finite State Model for a Coaxial Rotor in Forward Flight (413)
Morgan Nowak, Georgia Tech (Presenter); J. V. R. Prasad, Georgia Tech; David Peters, Washington University

Paper # 5 – 10:45 – 11:15 a.m.
Semi-Empirical Physics-Based Modeling of Fuselage-Rotor and Fuselage-Wake Interferences for Comprehensive Codes (29)
Berend G. van der Wall, German Aerospace Center (DLR) (Presenter); André Bauknecht, German Aerospace Center (DLR); Sung N. Jung, Konkuk University; Young H. You, Konkuk University

Paper # 6 – 11:15 – 11:45 a.m.
A Performance Analysis of Compound Helicopter Configurations (129)
Kevin Ferguson, University of Glasgow (Presenter); Douglas Thomson, University of Glasgow

Paper # 7 – 11:45 a.m. – 12:15 p.m.
A Novel, High Fidelity 6-DoF Simulation Model for Tethered Load Dynamics (105)
Daniel Prosser, Georgia Institute of Technology (Presenter); Marilyn Smith, Georgia Institute of Technology

Structures & Materials 1

Paper # 1 – 8:00 – 8:30 a.m.
"Fatigue-Free Platforms": Vision for Future Army Rotorcraft (421)
Dy Le, US Army (Presenter); Volker Weiss, US Army; Jaret Riddick, US Army

Paper # 2 – 8:30 – 9:00 a.m.
In Search of Rotorcraft Airframe Fatigue Assessment Methodology (20)
Suresh Moon, Engility (Presenter); Nam Phan, NAVAIR

Paper # 3 – 9:00 – 9:30 a.m.
A Damage Tolerance and Fatigue Evaluation Approach for Composite Rotorcraft Airframe Structures (65)
Alexander Engleder, AIRBUS Helicopters Deutschland (Presenter)

Paper # 4 – 10:15 – 10:45 a.m.
Structures Perspective for Strength and Fatigue Prognosis in Composites (435)
Guillaume Seon, University of Texas at Arlington (Presenter); Yuri Nikishkov, University of Texas at Arlington; Andrew Makeev, University of Texas at Arlington

Paper # 5 – 10:45 – 11:15 a.m.
Investigation of Probabilistic Failure Predictions with Progressive Damage in Composites (250)
Robert Haynes, US Army Research Laboratory (Presenter); Chi-yu Shiao, US Army Research Laboratory

Paper # 6 – 11:15 – 11:45 a.m.
AFP Monocoque Composite Tailboom Full Scale Fatigue Testing (80)
Alain Collie, Bell Helicopter (Presenter)

Paper # 7 – 11:45 a.m. – 12:15 p.m.
Structural Health Sensing of Damage Precursors using Magnetostriuctive Particles Embedded in Composite Structures (261)
Asha Hall, U.S. Army Research Laboratory (Presenter); Mulugeta Haile, U.S. Army Research Laboratory; Robert Haynes, U.S. Army Research Laboratory; Michael Coatney, U.S. Army Research Laboratory; Jin Hyeong Yoo, U.S. Army Research Laboratory

Paper # 8 – 12:15 – 12:45 a.m.
On Repair Limit Extension for Rotorcraft Composite Structures: General Approach and Demonstration (152)
Mark Gunvich, United Technologies Research Center (Presenter); Xuewei Wang, United Technologies Research Center; JinKyu Choi, Sikorsky Aircraft Corporation; Michael Urban, Sikorsky Aircraft Corporation

Unmanned VTOL Aircraft & Rotorcraft 1

Paper # 1 – 8:00 – 8:30 a.m.
Benchmarking of UAV Guidance Systems in Nap of the Earth (NOE) Flight (143)
Dmitry Bershadsky, Georgia Institute of Technology (Presenter); Eric Johnson, Georgia Institute of Technology

Paper # 2 – 8:30 – 9:00 a.m.
Safe Path Planning with Localization Uncertainty for Urban Operation of VTOL UAV (82)
Yoko Watanabe, ONERA (Presenter); Sylvain Dessus, ONERA; Patrick Fabiani, ONERA

Paper # 3 – 9:00 – 9:30 a.m.
Learning and Adaptation for Autonomous Guidance in Unknown Environments (305)
Abhishek Verma, University of Minnesota; Berenice Mettler, University of Minnesota (Presenter)

Paper # 4 – 10:15 – 10:45 a.m.
Evaluation of a Planner Ensemble on the Obstacle Field Navigation Benchmark (400)
Sanjiban Choudhury, Carnegie Mellon University; Sankalp Arora, Carnegie Mellon University; Sebastian Scherer, Carnegie Mellon University (Presenter)

Paper # 5 – 10:45 a.m. – 11:15 a.m.
"Fatigue-Free Platforms": Vision for Future Army Rotorcraft (444)
Sankalp Arora, Sikorsky Aircraft Corporation (Presenter); Harshad Sane, Sikorsky Aircraft Corporation; Chris Stathis, Sikorsky Aircraft Corporation; Thomas Frewen, United Technologies Research Center; Jason Derenick, United Technologies Research Center

Paper # 6 – 11:15 – 11:45 a.m.
A Principled Approach to Enable Safe and High Performance Maneuvers for Autonomous Rotorcraft (444)
Sankalp Arora, Carnegie Mellon University; Sanjiban Choudhury, Carnegie Mellon University; Sebastian Scherer, Carnegie Mellon University (Presenter)

Paper # 7 – 11:45 a.m. – 12:15 p.m.
Scaling Effects in Guidance Systems Benchmarking: the Agility Scale Ratio (372)
Berenice Mettler, University of Minnesota (Presenter); Abhishek Verma, University of Minnesota
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<th>Session C – Wednesday, May 21 – 1:45 p.m. – 6:00 p.m.</th>
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<td><strong>Acoustics 2/Operations 2</strong></td>
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<tr>
<td><strong>Paper # 1 – 1:45 – 2:15 p.m.</strong></td>
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<tr>
<td>The Role of Cable Curvature in Rotorcraft-based Tow Operations for Submerged Loads (425) Ananth Sridharan, University of Maryland, College Park (Presenter); Roberto Cutulli, University of Maryland, College Park</td>
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<tr>
<td><strong>Paper # 2 – 2:15 – 2:45 p.m.</strong></td>
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<tr>
<td>Hydrodynamic Characterization of a Sonar Body for Rotorcraft-based Towing (437) Jayes Fall, United States Naval Academy (Presenter)</td>
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<tr>
<td><strong>Paper # 3 – 2:45 – 3:15 p.m.</strong></td>
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<tr>
<td>Lessons Learned from NNH09 NFH Helicopter-Ship Qualification Testing across the Complete Dutch Fleet (277) Alrik Hoencamp, Royal Netherlands Navy (Presenter)</td>
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<td><strong>Refreshment Break – 3:15 – 4:00</strong></td>
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<tr>
<td><strong>Acoustics 2</strong></td>
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<tr>
<td><strong>Paper # 1 – 4:00 – 4:30 p.m.</strong></td>
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<tr>
<td>Quasi-Steady Analysis of a Bell 430 During Transient Roll-Right and Pitch-Up Maneuvers (68) James Stephenson, University of Texas at Austin (Presenter); Charles Tinney, University of Texas at Austin</td>
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<tr>
<td><strong>Paper # 2 – 4:30 – 5:00 p.m.</strong></td>
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<tr>
<td>Development and testing of optimized Instrument Flight Rules (IFR) noise abatement procedures on EC155 (201) Frédéric Gunter, Eurocopter (Presenter); Vincent Garetton, Eurocopter; Marc Gervais, Eurocopter; Philippe Rollet, Eurocopter</td>
</tr>
<tr>
<td><strong>Paper # 3 – 5:00 – 5:30 p.m.</strong></td>
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<tr>
<td>Segment-wise Measurement of Helicopter Approach Noise with a Reduced Microphone Setup (31) Willem Frederic Jurrien Olsmann, German Aerospace Center (DLR); Bianca Isabella Gursky, German Aerospace Center (DLR) (Presenter)</td>
</tr>
<tr>
<td><strong>Paper # 4 – 5:30 – 6:00 p.m.</strong></td>
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<tr>
<td>Helicopter Noise Abatement Trajectories (90) Sander Hartjes, Delft University of Technology (Presenter); Hendrikus Visser, Delft University of Technology; Marilena Pavel, Delft University of Technology</td>
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<tr>
<td><strong>Test &amp; Evaluation 2</strong></td>
</tr>
<tr>
<td><strong>Paper # 1 – 1:45 – 2:15 p.m.</strong></td>
</tr>
<tr>
<td>First NICETRIP Powered Wind Tunnel Tests Successfully Completed in DNW-LLF (11) Alessandro Stabellini, Agusta; Alberto Verna, Agusta; Joost Hakkaart, National Aerospace Laboratory - NLR (Presenter); Antonio Bruin de, National Aerospace Laboratory - NLR; Juergen Langer, DLR; Oliver Schneider, DLR; Michael Przybilla, DLR; Ivan Philipson</td>
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<tr>
<td><strong>Paper # 2 – 2:15 – 2:45 p.m.</strong></td>
</tr>
<tr>
<td>ICING WIND TUNNEL TEST OF A FULL SCALE HEATED TAIL ROTOR MODEL (104) Jason Wright, Bell Helicopter (Presenter); Roger Aubert, Bell Helicopter</td>
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<tr>
<td><strong>Paper # 3 – 2:45 – 3:15 p.m.</strong></td>
</tr>
<tr>
<td>Rotor Ice Testing of a Centrifugally Powered Pneumatic Deicing System for Helicopter Rotor Blades (113) Jose Palacios, Penn State (Presenter)</td>
</tr>
<tr>
<td><strong>Refreshment Break – 3:15 – 4:00</strong></td>
</tr>
<tr>
<td><strong>Acoustics 2</strong></td>
</tr>
<tr>
<td><strong>Paper # 1 – 4:00 – 4:30 p.m.</strong></td>
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<tr>
<td><strong>Paper # 2 – 4:30 – 5:00 p.m.</strong></td>
</tr>
<tr>
<td>Performance and Flowfield Measurements to Understand the Aerodynamics of a Micro-Air-Vehicle Scale Helicopter Rotor (243) Mobile Benedict, University of Maryland College Park (Presenter); Justin Winslow, University of Maryland; Zohabi Hasnain, University of Maryland; Inderjit Chopra, University of Maryland</td>
</tr>
<tr>
<td><strong>Paper # 3 – 5:00 – 5:30 p.m.</strong></td>
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<tr>
<td>Experimental Demonstration of Tailboom Vibration Reduction Using Fluidic Flexible Matrix Composite Tubes (266) Kentaro Miura, Pennsylvania State University (Presenter); Matthew Krott, Pennsylvania State University; Edward Smith, Pennsylvania State University; Christopher Rahn, Pennsylvania State University; Peter Romano, Bell Helicopter</td>
</tr>
<tr>
<td><strong>Paper # 4 – 5:30 – 6:00 p.m.</strong></td>
</tr>
<tr>
<td>Performance and Vibratory Hub Loads of a Mach-Scale Coaxial Rotor in Hover (367) Christopher Cameron, University of Texas Austin (Presenter); Anand Karpatne, University of Texas Austin; Jayant Sirohi, University of Texas Austin</td>
</tr>
<tr>
<td><strong>Avionics &amp; Systems 1</strong></td>
</tr>
<tr>
<td><strong>Paper # 1 – 1:45 – 2:15 p.m.</strong></td>
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<tr>
<td>Joint Common Architecture Recommendations (242) Thomas DuBois, Boeing (Presenter); Fernando Dones, Boeing; William Kinahan, Sikorsky Aircraft Company</td>
</tr>
<tr>
<td><strong>Paper # 2 – 2:15 – 2:45 p.m.</strong></td>
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<tr>
<td><strong>Paper # 3 – 2:45 – 3:15 p.m.</strong></td>
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<tr>
<td>Honeywell Synthetic Vision Avionics Backbone (SVAB) Program (431) Howard Wiebold, Honeywell (Presenter)</td>
</tr>
<tr>
<td><strong>Paper # 4 – 3:15 – 4:00</strong></td>
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<tr>
<td>Computing Industry Applications to Rotorcraft Avionics (118) Andrew Augenstein, Boeing (Presenter); Mark Hansen, Boeing</td>
</tr>
<tr>
<td><strong>Paper # 5 – 4:00 – 4:30 p.m.</strong></td>
</tr>
<tr>
<td>Active Parallel Actuation Subsystem, An Alternative Approach to Tactile Cuing Without Fly By Wire (33) Joe Irwin, The Boeing Company; Adam Taylor, BAE Systems (Presenter)</td>
</tr>
<tr>
<td><strong>Paper # 6 – 4:30 – 5:00 p.m.</strong></td>
</tr>
<tr>
<td>Apache Mission Processor Software Architecture: Future Airborne Capability Environment Considerations (100) Ronald Koontz, The Boeing Company (Presenter); Dale Johnson, US Army</td>
</tr>
<tr>
<td><strong>Paper # 7 – 5:00 – 5:30 p.m.</strong></td>
</tr>
<tr>
<td>A redundant aircraft attitude system based on fuzzy logic data fusion of the miniaturized inertial sensors (225) Teodor Lucian Grigorie, University of Craiova; Roxandra Mihaela Botz, Ecole de Technologie Superieure (Presenter)</td>
</tr>
<tr>
<td><strong>Paper # 8 – 5:30 – 6:00 p.m.</strong></td>
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<tr>
<td>Geometric Control of Helicopters with Sling Loads (428) Gerardo De La Torre, Georgia Institute of Technology (Presenter); Eric Johnson, Georgia Institute of Technology</td>
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<tr>
<td><strong>Crash Safety</strong></td>
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<tr>
<td><strong>Paper # 1 – 1:45 – 2:15 p.m.</strong></td>
</tr>
<tr>
<td>An investigation into the effects of body-borne equipment on occupant injury under vertical impact with seat ‘bottom-out’ (55) Daniel Aggromoto, Monash University (Presenter); Rodney Thomson, Cooperative Research Centre for Advanced Composite Structures; Bernard Chen, Monash University; Wenyi Yan, Monash University; John Wang, Defence Science and Technology Organisation</td>
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<tr>
<td><strong>Paper # 2 – 2:15 – 2:45 p.m.</strong></td>
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<tr>
<td>Simulation and experimental characterization of crashworthy composite helicopter subfloor impacts on varied surfaces (41) Thomas Billas, The University of Auckland; Matthew David, German Aerospace Center (DLR) (Presenter)</td>
</tr>
<tr>
<td><strong>Paper # 3 – 2:45 – 3:15 p.m.</strong></td>
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<tr>
<td>reusable Energy Absorbing Lab (REAL) Seat (133) Michael Knott, NAVAIR (Presenter); Brandon Hall, NAVAIR</td>
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<tr>
<td><strong>Paper # 4 – 3:15 – 4:00</strong></td>
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<tr>
<td>IMPACT TESTS AND SIMULATIONS OF CRASHWORTHY COMPOSITE STRUCTURES USING VARIABLE LOAD CONCEPT (215) Tiansong Hou, The University of New South Wales; Matthew David, National Aerospace Center (DLR) (Presenter); Gangadhara B Prusty, The University of New South Wales; Garth Pearce, The University of New South Wales; Don Kelly, The University of New South Wales</td>
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<tr>
<td><strong>Paper # 5 – 4:30 – 5:00 p.m.</strong></td>
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<tr>
<td>Development of Smart Seat Energy Absorbers for Enhanced Rotorcraft Crash Safety (227) Muthuvel Murugan, U.S. Army Research Laboratory (Presenter); Jinhyeong Yoo, U.S. Army Research Laboratory; Gregory Hiemenz, Techno-Sciences, Inc.</td>
</tr>
<tr>
<td><strong>Paper # 6 – 5:00 – 5:30 p.m.</strong></td>
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<tr>
<td>Comparison of Mobile Aircrew Restraint Strategies in a Full-Scale CH-46 Airframe Crash Test (340) Lindsey Bark, NAWC-AD PAX RIVER (Presenter)</td>
</tr>
<tr>
<td><strong>Paper # 7 – 5:50 – 6:00 p.m.</strong></td>
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<tr>
<td>Performance of CH-46 Pilot seats in NASA Full Scale Crash Test (356) Alex Harris, BAE Systems (Presenter); Lindsey Bark, Naval Air Warfare Center – Aircraft Division</td>
</tr>
<tr>
<td><strong>Paper # 8 – 6:00 – 6:30 p.m.</strong></td>
</tr>
<tr>
<td>Predicted Performance of an Optimized Energy-Absorbing Crashworthy Seat During Idealized and Actual Crash Pulses (397) Marvin Richards, BAE Systems (Presenter); Edwin Sieveka, NAVAIR</td>
</tr>
</tbody>
</table>
Session C – Wednesday Afternoon, May 21 – 1:45 p.m. – 6:00 p.m.

Dynamics 2
Paper # 1 – 1:45 – 2:15 p.m.
Generalized Timoshenko and Vlasov Theories for the Oblique Cross-Sectional Analysis of Rotor Blades (53)
Anurag Rajagopal, Georgia Institute of Technology (Presenter); Dewey Hodges, Georgia Institute of Technology

Paper # 2 – 2:15 – 2:45 p.m.
Advanced beam model applied to articulated rotor – Implementation in HOST aeroelastic simulation tool (69)
Yan Skladanek, EUROCOPTER (Presenter); Laurent Boucherie, EUROCOPTER; Bernard Benoît, EUROCOPTER; Paul Cranga, EUROCOPTER

Paper # 3 – 2:45 – 3:15 p.m.
Time Domain Modeling of Nonlinear Viscoelastic Beams (148)
hao kang, US Army Research Lab (Presenter); Bryan Glaz, US Army Research Lab; Matthew Flores, US Army Research Lab

Refreshment Break – 3:15 – 4:00

Paper # 4 – 4:00 – 4:30 p.m.
Gain-Scheduled Higher Harmonic Control for Full Flight Envelope Vibration Reduction (76)
Frank Fan, Massachusetts Institute of Technology (Presenter); Steven Hall, Massachusetts Institute of Technology

Paper # 5 – 4:30 – 5:00 p.m.
H2 Periodic Control on Active Twist Rotor for Vibration Reduction (196)
H2 Periodic Control on Active Twist Rotor for Vibration Reduction (196)

Paper # 6 – 5:00 – 5:30 p.m.
Parametric Study of Helicopter Vibration and Noise Reduction with On-Blade Control Devices (218)
Peretz Friedman, University of Michigan; Miang Chia, University of Michigan (Presenter); Ashwani Padthe, University of Michigan

Paper # 7 – 5:30 – 6:00 p.m.
Robust anti-windup design for active trailing edge flaps in active rotor applications (347)
Rafael Morales, University of Leicester (Presenter); Matthew Turner, University of Leicester

HUMS-CBM 2
Paper # 1 – 1:45 – 2:15 p.m.
Vertical Lift Aircraft Rotor and Blade Mechanical and Dynamic Fault Detection in the field through the use of Revolution to Revolution Blade Track Data Analysis (249)
GILBERT MESEC, SWANGATE INTERNATIONAL (Presenter)

Paper # 2 – 2:15 – 2:45 p.m.
Rotor Track and Balance Improvements (5)
Eric Bechhoefer, Green Power Monitoring Systems (Presenter); Austin Fang, Cornell University; Epharim Garcia, Cornell University

Paper # 3 – 2:45 – 3:15 p.m.
CH146 HUMS Program Financial Benefits Analysis (64)
Alexandre Heroux-Theriault, Bell Helicopter (Presenter)

Refreshment Break – 3:15 – 4:00

Paper # 4 – 4:00 – 4:30 p.m.
Propulsion System Diagnostic and Reasoning Technology Development (216)
Brian LeFevre, Impact Technologies, a Sikorsky Innovations Company; Jason Friel, Sikorsky Aircraft; Greg Kacprzynski, Impact Technologies, a Sikorsky Innovations Company; Nicholas Mackos, Impact Technologies, a Sikorsky Innovations Company; Is

Paper # 5 – 4:30 – 5:00 p.m.
Hydraulic System Internal and External Leakage Diagnostics (214)
Matthew Smith, Sikorsky Aircraft (Presenter); Jared Kloda, Sikorsky Aircraft; Jason Friel, Sikorsky Aircraft

Paper # 6 – 5:00 – 5:30 p.m.
Wire Harness Diagnostics (342)
Mike Mastrianni, Sikorsky Aircraft (Presenter); Brian Drost, Sikorsky Aircraft

Paper # 7 – 5:30 – 6:00 p.m.
HUMS & CBM in the Civil Helicopter Market (280)
Falk Hoffmann, Eurocopter Deutschland GmbH (Presenter)

Modeling & Simulation 2
Paper # 1 – 1:45 – 2:15 p.m.
Subjective and Objective Metrics for the Evaluation of Motion Cuing Fidelity for a Roll-Lateral Reposition Maneuver (239)
Moritz Wiskemann, MPI for Biological Cybernetics; Frank Drop, MPI for Biological Cybernetics (Presenter); Daan Pool, TU Delft; Rene van Paasen, TU Delft; Max Mulder, TU Delft; Heinrich Bulthoff, MPI for Biological Cybernetics

Paper # 2 – 2:15 – 3:45 p.m.
Quantifying the Effects of Motion Cuing Settings on Perceived Simulation Fidelity (300)
Scott Reardon, NASA (Presenter); Steven Beard, NASA; Emily Lewis, Science Applications International Corporation; Bimal Aponso, NASA

Paper # 3 – 2:45 – 3:15 p.m.
Assessing the Fidelity of a Research Simulator (271)
Sylvain Marsco, OSTO (Presenter)

Refreshment Break – 3:15 – 4:00

Paper # 4 – 4:00 – 4:30 p.m.
Effects of Simulator Platform Characteristics and Flight Tasks on Adverse Rotorcraft Pilot Coupling Prediction (339)
Inghal li, University of Liverpool (Presenter); Michael Jump, University of Liverpool; Michael Jones, University of Liverpool; Deniz Yilmaz, Technical University of Delft; Marielena Pavel, Technical University of Delft

Paper # 5 – 4:30 – 5:00 p.m.
Simulation of Coupled Helicopter-Stirling Load-Pilot Dynamics (46)
Kobi Enciu, Technion (Presenter); Aviv Rosen, Technion - Israel Institute of Technology

Paper # 6 – 5:00 – 5:30 p.m.
A Dynamic View for Exercising Functions for Integrated Product and Process Development (430)
Daniel Schrage, Georgia Tech (Presenter)

Paper # 7 – 5:30 – 6:00 p.m.
Rotor Wireless Gateway (341)
Sanjay Bajekal, UTC (Presenter); Brian Bouquillon, Sikorsky Aircraft Corporation

Paper # 8 – 6:00 – 6:30 p.m.
Beyond Technology Readiness Assessment: System Assessment in Rotorcraft (453)
Theodora Saunders, Sikorsky Aircraft (Presenter); Nick Pezzente, Sikorsky Aircraft

Systems Engineering Tool/Processes
Paper # 1 – 1:45 – 2:15 p.m.
Risk Management and Technology Considerations in Rotorcraft Product Development (452)
Theodora Saunders, Sikorsky Aircraft (Presenter); Macide Dunica, Sikorsky Aircraft

Paper # 2 – 2:15 – 2:45 p.m.
Managing Certification for Software & A&H on Military Programs (384)
Susan Lenahan, The Boeing Company (Presenter)

Paper # 2 2:45 – 3:15 p.m.
System Geometrical management (66)
Jean-loup Gatti, EUROCOPTER (Presenter); Francois Martinel, Eurocopter

Refreshment Break – 3:15 – 4:00

Paper # 4 – 4:00 – 4:30 p.m.
AN ALTERNATIVE APPROACH FOR SYSTEM ARCHITECTURE DESIGN (71)
Gemanetti Serge, Eurocopter; Erwan Guillantou, Eurocopter (Presenter)

Paper # 5 – 4:30 – 5:00 p.m.
Transitioning to MBSE in a Large Systems Engineering Organization that Develops Complex Mission System for Helicopters (149)
Stephen Felter, Lockheed Martin (Presenter)

Paper # 6 – 5:00 – 5:30 p.m.
A Dynamic View for Exercising Functions for Integrated Product and Process Development (430)
Daniel Schrage, Georgia Tech (Presenter)

Paper # 7 – 5:30 – 6:00 p.m.
Rotor Wireless Gateway (341)
Sanjay Bajekal, UTC (Presenter); Brian Bouquillon, Sikorsky Aircraft Corporation

Paper # 8 – 6:00 – 6:30 p.m.
Beyond Technology Readiness Assessment: System Assessment in Rotorcraft (453)
Theodora Saunders, Sikorsky Aircraft (Presenter); Nick Pezzente, Sikorsky Aircraft

Spacecraft Dynamics and Motion Control
Advanced Vertical Flight 1

Paper # 1 – 8:00 – 8:30 a.m.
Stability of Rotorcraft for Interplanetary Space Flight (67)
S. Chad Gibbs, Duke University
(Presenter); Jerry E. Warren, NASA Langley Research Center; W. Keats Wilkie, NASA Langley Research Center; Earl H. Dowell, Duke University
Paper # 2 – 8:30 – 9:00 a.m.
Continuous Trailing-Edge Flaps for Primary Flight Control of a Helicopter Main Rotor (91)
Robert Thornburgh, U.S. Army Research Laboratory; Andrew Kreshock, U.S. Army Research Laboratory; Matthew Willbur, U.S. Army Research Laboratory
(Presenter); Martin Sekula, NASA Langley Research Center; Jinwei Shen, University of Alabama
Paper # 3 – 9:00 – 9:30 a.m.
CFD Calculations on the Unsteady Aerodynamic Force of Tilt-rotor in Conversion Mode (273)
Li Peng, National Key Laboratory of Rotorcraft Aeromechanics, Nanjing University of Aeronautics and Astronautics Nanjing; Zhao Qi-Jun, National Key Laboratory of Rotorcraft Aeromechanics, Nanjing University of Aeronautics and Astronautics Nanjing
(Present Refreshment Break – 9:30 – 10:15
Paper # 4 – 10:15 – 10:45 a.m.
Modeling and Control System Design of a Large Scale Multicopter VTOL Aircraft (285)
Rustom Jehangir, Advanced Tactics Inc. (Presenter)
Paper # 5 – 10:45 – 11:15 a.m.
Development of Control Strategies and Flight Testing of a Twin-Cyclocopter in Forward Flight (303)
Elena Shrestha, University of Maryland (Presenter); Moble Benedict, University of Maryland; Vikram Hrishikeshavan, University of Maryland; Indirjit Chopra, University of Maryland
Paper # 6 – 11:15 – 11:45 a.m.
Cyclogyro Thrust Vectoring for Anti-Torque and Control of Helicopter (336)
Louis Gagnon, Politecnico di Milano (Presenter); Marco Morandini, Politecnico di Milano; Giuseppe Quaranta, Politecnico di Milano; Pierangelo Masarati, Politecnico di Milano
Paper # 7 – 11:45 a.m. – 12:15 p.m.
Reversible Airfoil for Stopped Rotors in High Speed Flight (348)
Robert Niemiec, Rensselaer Polytechnic Institute (Presenter); Farhan Gandhi, Rensselaer Polytechnic Institute
Aerodynamics 2

Paper # 1 – 8:00 – 8:30 a.m.
AEROODYNAMIC SHAPE OPTIMIZATION OF A HELICOPTER MAIN ROTOR HUB BEANIE USING ADVANCED MULTI-OBJECTIVE EVOLUTIONARY ALGORITHMS (77)
Lorenzo Dal Mas, University of Padua
(Presenter); Rita Ponzio, HIT05 srl; Ernesto Benini, University of Padua
Paper # 2 – 8:30 – 9:00 a.m.
Advanced CFD based optimization methods applied to the industrial design process of airframe components at Eurocopter (125)
Qinyin Zhang, Eurocopter Germany
(Presenter); Andrea Garavello, Eurocopter Germany; Alessandro D’Alessio, Eurocopter Germany; Dieter Schimke, Eurocopter Germany
Paper # 3 – 9:00 – 9:30 a.m.
Time-dependent adjoint-based aerodynamic shape optimization applied to helicopter rotors (416)
Dimtri Mavriplis, University of Wyoming (Presenter); Karthik Mani, University of Wyoming
Refreshment Break – 9:30 – 10:15
Paper # 4 – 10:15 – 10:45 a.m.
A Computational Framework for Helicopter Fuselage Drag Reduction Using Vortex Generators (224)
Jean-Christophe BONIFACE, ONERA (Presenter)
Paper # 5 – 10:45 – 11:15 a.m.
UH-60A Rotor Tip Vortex Prediction and Comparison to Full-Scale Wind Tunnel Measurements (290)
Buvana Jayaraman, Science and Technology Corp. (Presenter); Mark Potsdam, US Army
Paper # 6 – 11:15 – 11:45 a.m.
Blade Displacement Predictions for the Full-Scale UH-60A Airloads Rotor (293)
Robert Biedron, NASA Langley Research Center (Presenter); Elizabeth Lee-Rausch, NASA Langley Research Center
Paper # 7 11:45 a.m. – 12:15 p.m.
Blade Surface Roughness and Boundary Layer Transition Effects on Rotorcraft Performance and Flight Envelope Limits (429)
Shivaji Medida, University of Maryland (Presenter); Ananth Sridharan, University of Maryland; James Baeder, University of Maryland; Roberto Celi, University of Maryland
Paper # 8 12:15 – 12:45 p.m.
ASSESSMENT OF ICE ACCRETION EFFECTS ON ROTOR DYNAMICS VIA MULTI-BODY AND CFD APPROACHES (255)
Daniel Kelly, McGill University
(Presenter); Roberto Alicino, Politecnico di Milano; Habibollah Foulad, McGill University; Wagiêl Habashi, McGill University; Giuseppe Quaranta, Politecnico di Milano; Pierangelo Masarati, Politecnico di Milano; Marco Fossa
Aircraft Design 1

Paper # 1 – 8:00 – 8:30 a.m.
Framework for Assessing Performance Impact of Rotor Performance Technology Integration (3)
Michael Avera, American Society for Engineering Education (Presenter); Rajneesh Singh, U.S. Army Research Lab
Paper # 2 – 8:30 – 9:00 a.m.
Design and fabrication elements to unmanned rotorcraft ILK-27 (84)
Pawel Gula, Institute of Aviation (Presenter)
Paper # 3 – 9:00 – 9:30 a.m.
Exploration of Novel Powerplant Architectures for Hybrid Electric Helicopters (198)
Inderjit Chopra, University of Maryland; VT Nagaraj, University of Maryland
(Presenter) Refreshment Break – 9:30 – 10:15
Paper # 4 – 10:15 – 10:45 a.m.
Design and Development of the Atlas HPH (232)
Todd Reichert, AeroVelo Inc. (Presenter); Cameron Robertson, AeroVelo Inc.
Paper # 5 – 10:45 – 11:15 a.m.
An Evaluation of Three Technologies for Rotating/Non-Rotating Data Transfer (252)
Claude Matalanis, United Technologies Research Center (Presenter); Nicholas Soldern, United Technologies Research Center; Sanjay Bajekal, United Technologies Research Center; Ulf Jonsson, United Technologies Research Center; Vijay Lakamraju, United Techno
Paper # 6 – 11:15 – 11:45 a.m.
Development of a Hydroformable Skid Landing Gear for Bell Helicopter’s Model 407 (281)
Xavier Elie-Dit-Cosaque, Université Laval (Presenter); Augustin Galwawa, Université Laval; Michel Guilhot, Université Laval; Simon Bernier, Bell Helicopter Textron Canada Limited
Paper # 7 12:15 – 12:45 p.m.
Daniel Schrage, Georgia Tech
Awards Presentation/ Manufacturing Technology and Processing

Award Paper # 1 – 8:00 – 8:30 a.m.
Cheeseman Award
Award Paper # 2 – 8:30 – 9:00 a.m.
Student Design Competition Graduate Winner
Paper # 3 – 9:00 – 9:30 a.m.
Student Design Competition Undergraduate Winner
Refreshment Break – 9:30 – 10:15
Manufacturing Technology and Processing

Paper # 1 – 10:15 – 10:45 a.m.
Compression Molding of Composite Tailboom Frames (318)
Steven Roy, National Research Council Canada (Presenter); Felix Bednar, Bell Helicopter Textron Canada Limited; Pierre Beauleiu, Bell Helicopter Textron Canada Ltd.; Ali Yousefpour, National Research Council Canada
Paper # 2 – 10:45 – 11:15 a.m.
Utilizing SELECTIVE LASER SINTERING FOR PRODUCTION FABRICATION OF PECULIAR SUPPORT EQUIPMENT (61)
Dominic Przano, Bell Helicopter Textron Inc (Presenter)
Paper # 3 – 11:15 – 11:45 a.m.
Improving the predictions of distortions throughout the manufacturing process of mechanical parts for a “one shot” industrialization (123)
Jean-bertrand DE LOOZE, EUROCOPTER (Presenter); TIFFANY CAULA, EUROCOPTER; NOLWENN HIMBERT, EUROCOPTER
Paper # 4 – 11:45 a.m. – 12:15 p.m.
Providing a Systems Approach for Digital Manufacturing and Design Innovation (438)
Daniel Schrage, Georgia Tech (Presenter)
Advanced Vertical Flight 2
Paper # 1 – 1:30 – 2:00 p.m.
Aerodynamic Performance Modeling of Ducted Fans and Shrouded Propellers for Preliminary Design (103)
Cooper, Stahlhut, Boeing (Presenter)

Paper # 2 – 2:00 – 2:30 p.m.
Design, Rapid Prototyping and Testing of a Ducted Fan Micro-quadcopter (120)
Chin Gian Hooi, Embry-Riddle Aeronautical University (Presenter)

Investigation of Aerodynamic Interactions in Ducted Rotor Systems (407)
Rajneesh Singh, U.S. Army Research Lab (Presenter); Michael Avera, U.S. Army Research Lab

Paper # 4 – 3:00 – 3:30 p.m.
Multi Fidelity Analysis and Design of Ducted Rotors (323)
Anand Pratap Singh, Univ of Michigan (Presenter); Karthik Duraisamy, Univ of Michigan

refreshment break – 3:30 – 4:00

Paper # 5 – 4:00 – 4:30 p.m.
HELIOS Simulation of a Ducted Fan in Cruise Flight Mode (334)
Hormoz Tadghighi, Boeing Company (Presenter)

Paper # 6 – 4:30 – 5:00 p.m.
Experimental Study of the Environmental Flow-field of Two Impinging Model Scale Jets (394)
Leighton Myers, The Pennsylvania State University (Presenter); Nicholas Rudenko, The Pennsylvania State University; Dennis McClaughlin, The Pennsylvania State University

Paper # 7 – 5:00 – 5:30 p.m.
Technology Identification for a High Performance Fan-in-Wing VTOL Aircraft (412)
Michael Avera, U.S. Army Research Laboratory (Presenter); Hao Kang, U.S. Army Research Laboratory; Rajneesh Singh, U.S. Army Research Laboratory; Matthew Flores, U.S. Army Research Laboratory

Aerodynamics 3
Paper # 1 – 1:30 – 2:00 p.m.
Investigation of three-dimensional dynamic stall on an airfoil using fast response pressure sensitive paint (160)
Anthony Gardner, DLR (Presenter); Christian Klein, DLR; Werner Sachs, DLR; Ulrich Henne, DLR; Holger Mai, DLR; Kai Richter, DLR

Paper # 2 – 2:00 – 2:30 p.m.
Velocity field measurements on a rotating blade through dynamic stall (229)
Vishank Raghav, Georgia Institute of Technology; Narayanam Komarath, Georgia Institute of Technology (Presenter)

Paper # 3 – 2:30 – 3:00 p.m.
Combustion-Powered Actuation for Dynamic Stall Suppression – Simulations and Low-Mach Experiments (253)
Claude Matalanis, United Technologies Research Center; Byung-Young Min, United Technologies Research Center (Presenter); Patrick Bowles, United Technologies Research Center; Brian Wake, United Technologies Research Center; Tom Crittenden, Georgia Instut

Paper # 4 – 3:00 – 3:30 p.m.
Compressible Dynamic Stall of a SSC-A09 Airsfolicted to Coupled Pitch and Freestream Mach Oscillations (424)
Kyle Gompertz, The Ohio State University; James Gregory, The Ohio State University (Presenter); Jeffrey Bons, The Ohio State University

refreshment break – 3:30 – 4:00

Paper # 5 – 4:00 – 4:30 p.m.
Numerical investigation of three-dimensional dynamic stall on an oscillating finite wing (126)
Kurt Kaufmann, German Aerospace Center (DLR) (Presenter); Michel Costes, ONERA - The French Aerospace Lab; François Richez, ONERA - The French Aerospace Lab; Anthony Donald Gardner, German aerospace center (DLR); Arnaud Le Pape, ONERA - The French Aerospa

Paper # 6 – 4:30 – 5:00 p.m.
Unsteady Blade Shape Optimization for Rotorcraft (167)
vineet ahuja, combustion research and flow technology, inc. (Presenter); Chandrashekhar Kannepalli, combustion research and flow technology, inc.; Andrea Zambon, combustion research and flow technology, inc.; Mark Potsdam, US Army Aviation Development D

Paper # 7 – 5:00 – 5:30 p.m.
Aerodynamic Shape Optimization for Alleviating Dynamic Stall Characteristics of Helicopter Rotor Airfoil (156)
Qing Wang, Nanjing University of Aeronautics and Astronautics; Qijun Zhao, Nanjing University of Aeronautics and Astronautics (Presenter); Dl Wu, Nanjing University of Aeronautics and Astronautics

HUMS- CBM 3
Paper # 1 – 1:30 – 2:00 p.m.
Airframe Structural Integrity Management: A UH-60 Application and Demonstration (184)
Andrew Brookhart, Sikorsky Aircraft Corporation (Presenter); Brean Bates, Sikorsky Aircraft Corporation; Nathaniel Bordick, U.S. Army Aviation Development Directorate - AATD

Paper # 2 – 2:00 – 2:30 p.m.
Improved fatigue damage and load time signal estimation for dynamic helicopter components using computational techniques (368)
Catherine Cheung, National Research Council Canada (Presenter); Bruno Rocha, National Research Council Canada; Julio Valdes, National Research Council Canada; Mark Kotwitz-Herniczek, National Research Council Canada; Anton Stefani, National Research Coun;

Paper # 3 – 2:30 – 3:00 p.m.
Applications of Virtual Monitoring of Loads to Engineering Decision Making (182)
Raymond Beale, Sikorsky Aircraft (Presenter); Mark Davis, Sikorsky Aircraft; Brian Morris, Sikorsky Aircraft; Kenneth Kadezakreb, Sikorsky Aircraft; Jeffery Schwaff, Sikorsky Aircraft

Paper # 4 – 3:00 – 3:30 p.m.
Extension of HUMS Data for Estimating Flight Severity for Helicopter Airframe Structures (398)
Gregory Wood, MERC (Mercer Engineering Research Center) (Presenter)

refreshment break – 3:30 – 4:00

Paper # 5 – 4:00 – 4:30 p.m.
V-22 Dynamic Components Fatigue Design Usage Spectrum vs. Fleet History (287)
Stacey Kelly, Bell Helicopter, Textron (Presenter)

Paper # 6 – 4:30 – 5:00 p.m.
System Design and Evaluation of ROF-cachable components supporting RF recharging of UHF semi-passive tags for Rotorcraft Parts Life Tracking applications (14)
Mike Augustin, Benz Airborne Systems (Presenter); Charles Sanzone, Benz Airborne Systems; Bud Coleman, Benz Airborne Systems; Nam Phan, Navy; Daniel Liebschultz, Navy

Paper # 7 – 5:00 – 5:30 p.m.
Method to Allocate Vehicle Health Management Analytics to Subsystems for Maintenance Credit (245)
Kevin Conrad, Bell Helicopter (Presenter); Jonathan Oliver, Bell Helicopter

Propulsion 2
Paper # 1 – 1:30 – 2:00 p.m.
A Complete System Model for Gearbox Loss-of-Lubrication (27)
Sarah McIntyre, The Pennsylvania State University (Presenter); Qintao Yu, The Pennsylvania State University; Robert Kunz, The Pennsylvania State University; Liming Chang, The Pennsylvania State University; Robert Bill, The Pennsylvania State University

Paper # 2 – 2:00 – 2:30 p.m.
Nanolubricant Oil Additives and Its Application in Condition-Based Maintenance of the Intermediate Gearbox of AH-64 Helicopter (72)
Kareem Gouda, University of South Carolina (Presenter); Abdel Bayoumi, University of South Carolina; Joshua Tarbouton, University of South Carolina; Steve Marcus, University of South Carolina; Mohsen Nikkhoo, University of South Carolina

Paper # 3 – 2:30 – 3:00 p.m.
Advanced Approaches to Helicopter Engine System Dynamics (147)
Eric Ho, Pratt & Whitney Canada (Presenter)

Paper # 4 – 3:00 – 3:30 p.m.
Collaboration of Gleason T900 Teeth Contact Analysis (TCA) parameters (175)
Biqiang Xu, Sikorsky Aircraft (Presenter)

refreshment break – 3:30 – 4:00

Paper # 5 – 4:00 – 4:30 p.m.
Predicting Transmission System Reliability Using Physics-Based Computational Simulation (257)
Robert Tryon, Vexter Corporation (Presenter); Animesh Dey, Vexter Corporation; Ganapathi Krishnan, Vexter Corporation

Paper # 6 – 4:30 – 5:00 p.m.
Rotor Resonance Disturbance Rejection Controller (306)
Reza Pedrami, Pratt & Whitney Canada Corp. (Presenter)

Paper # 7 – 5:00 – 5:30 p.m.
Predictive models for the thermo-fluid state of geared systems (311)
MIAD YAZDANI, UNITED TECHNOLOGIES RESEARCH CENTER (Presenter); MARIOS SOTERIOU, UNITED TECHNOLOGIES RESEARCH CENTER; ZAFFIR Chaudhry, UNITED TECHNOLOGIES RESEARCH CENTER; FANPING SUN, UNITED TECHNOLOGIES RESEARCH CENTER; JOE LOU, UNITED TECHNOLOGIES RESE

Paper # 8 – 5:30 – 6:00 p.m.
Improving Wear and Fretting Characteristics with Fiber Reinforced Aluminum Liners (360)
Dwayne Owen, Bell Helicopter (Presenter)
Test & Evaluation 3
Paper #1 – 1:30 – 2:00 p.m.
Comparative Bench Test Assessment of Medium Authority On-blade Actuation Technologies (38)
Troy Schank, Bell Helicopter (Presenter); Joe Sefli, Invercon LLC; Curt Kothera, InnoVital Systems, Inc.

OH-SB Block II Control Law Upgrades to Support the AAS Demonstrator (62)
Shyphny Shue, Bell Helicopter (Presenter); Eric Carlson, Bell Helicopter; John Schillings, Bell Helicopter; Mike Bothwell, Bell Helicopter

Paper #2 – 2:00 – 2:30 p.m.
Securing a safe firing envelope for Paper # 6 -- 4:30 – 5:00 p.m.
Laboratory (NLR)
Koen Zeilstra, National Aerospace (Presenter); Jasper van der Vorst, Natalie Munninghoff, National

Paper #3 – 2:30 – 3:00 p.m.
-scaled Experimental Validation of Dynamic, Centrifugally Powered, Pneumatic Actuators for Active Rotor Blade Surfaces (83)
Joseph Sefli, Invercon LLC (Presenter); Brian Cormier, Kaman Aerospace Corporation; Luke Ianno, Kaman Aerospace Corporation

Paper #4 – 3:00 – 3:30 p.m.
CFD-CSD Analysis Validation by PIV Experiments for Avian-based Rigid and Flexible Wings for MAV Applications (402)
David Mayo, The University of Maryland (Presenter); James Lankford, University of Maryland College Park; Mobile Benedict, University of Maryland College Park; Inderjit Chopra, University of Maryland College Park

Refreshment Break – 3:30 – 4:00

Paper #5 – 4:00 – 4:30 p.m.
Securing a safe firing envelope for the qualification of a gun installation on a helicopter (378)
Natalie Munninghoff, National Aerospace Laboratory (NLR) (Presenter); Jasper van der Vorst, National Aerospace Laboratory (NLR); Koen Zelista, National Aerospace Laboratory (NLR)

Paper #6 – 4:30 – 5:00 p.m.
Testing-based approach to determining the divergence speed of slug loads (427)
Alexander Forbes, Georgia Institute of Technology; Sorin Piraua, Georgia Institute of Technology; Brandon Liberi, Georgia Institute of Technology; Vishal Raghav, Georgia Institute of Technology; Narayanan Komarath, Georgia Institute of Technology (Presenter)

Unmanned VTOL Aircraft & Rotorcraft 2
Paper #2 – 1:30 – 2:00 p.m.
Siokorsky Autonomous Research Aircraft (47)
Igor Cheremispinsky, Siokorsky Aircraft Corporation (Presenter); Harshad Sané, Siokorsky Aircraft Corporation; Joshua Leland, Siokorsky Aircraft Corporation; Michael Connor, Siokorsky Aircraft Corporation; Vincent Goodson, Siokorsky Aircraft Corporation; Chris St

Paper #2 – 2:00 – 2:30 p.m.
Collaborative Search and Pursuit for Autonomous Helicopters (363)
John Mooney, Georgia Institute of Technology (Presenter); Eric Johnson, Georgia Institute of Technology (Presenter)

Paper #3 – 2:30 – 3:00 p.m.
Optimization of MQ-8 (Fire Scout) UAV Launch and Recovery Performance (36)
Bernard Ferriére, Hoffman Engineering Corp; Ajay Seghal, Wyle Laboratories, Inc. (Presenter); Robert Ernst, Naval Air Systems Command (NAVAIR)

Paper #4 – 3:00 – 3:30 p.m.
A Real Time Expert Control System for Helicopter Autorotation (40)
Zachary Sunberg, Texas A&M University; Nate Miller, Texas A&M University; Jonathan Rogers, Georgia Institute of Technology (Presenter)

Refreshment Break – 3:30 – 4:00

Paper #5 – 4:00 – 4:30 p.m.
Motion feedback improvements in teleoperating UAVs (247)
Johannes Láechle, Max Planck Institute for Biological Cybernetics (Presenter); Joost Venrooij, Max Planck Institute for Biological Cybernetics; Paolo Pretto, Max Planck Institute for Biological Cybernetics; Heinrich H. Bülthoff, Max Planck Institute for B

Paper #6 – 4:30 – 5:00 p.m.
Stability, Control, and Simulation of a Dual Lift System Using Autonomous RMAX Helicopters (309)
Marcas Berriés, Army Aviation Development Directorate (Presenter); Mark Tischler, Army Aviation Development Directorate; Luigi Ciccoli, San Jose State Research Foundation; I; David Powell, Stanford University

Paper #7 – 5:00 – 5:30 p.m.
Application of a Fault Tolerant Integrated Navigation Architecture on an Unmanned Helicopter (241)
Sinan Pakkan, ASELSAN (Presenter); Fahri Erköl Öğler, ASELSAN; Bölent Emre Platin, Middle East Technical University; Volkan Nalbantoğlu, ASELSAN

Dynamics 3/Wind Energy 2
Dynamics 3
Paper #1 – 1:30 – 2:00 p.m.
Integrated Aeromechanics with Three-Dimensional Solid-Multibody Structures (190)
Anubhav Datta, STC / US Army AFOS (Presenter); Wayne Johnson, NASA Ames Research Center

Paper #2 – 2:00 – 2:30 p.m.
Three-Dimensional CAD-Based Structural Modeling for Next Generation Rotor Dynamic Analysis (178)
William Staruk (Presenter); Indrenit Chopra, University of Maryland; Anubhav Datta, U. S. Army Aeroflightdynamics Directorate

Paper #3 – 2:30 – 3:00 p.m.
Ground Resonance and Whirl Stability Analysis Using CAMRAD (359)
Li Liu (Presenter); Vaidyanathan Ayyad; Keith Hair; Friedrich Straub, The Boeing Company

Paper #4 – 3:00 – 3:30 p.m.
Investigation of RCAS-CAMRAD II UH60 Structural Dynamics Model Correlation (150)
Benjamin Silbaugh, American Society for Engineering Education (Presenter); Hao Kang; Matthew Floros; Rajneesh Singh, US Army Research Lab

Refinement Break – 3:30 – 4:00

Wind Energy 2
Paper #1 – 4:00 – 4:30 p.m.
Design Space Exploration of Gyrocopter-Type Airborne Wind Turbines (236)
David Rancourt (Presenter); François Bolduc Teasdale; Étienne Demers Bouchard; Michael J. Anderson; Dimitri N. Mavris, Georgia Institute of Technology

Paper #2 – 4:30 – 5:00 p.m.
GENETIC ALGORITHM BASED AERODYNAMIC SHAPE OPTIMIZATION TOOL FOR WIND TURBINE BLADES AND ITS IMPLEMENTATION TO HELICOPTERS (386)
Ozge Polat (Presenter); Nilay Sezer

The Application of Helicopter Health and Usage Monitoring Techniques within the Wind Turbine Industry (284)
Peter Norris (Presenter); Carole Murray, Heltlune Ltd; Nick Lieven; Matthew Asher, University of Bristol; Michael Mulroy; Chong Ng, National Renewable Energy Centre

Paper #4 – 5:00 – 5:30 p.m.
Structural Health and Prognostic Management: Operating Strategies and Design Recommendations for Mitigating Local Damage Effects in Offshore Turbine Blades (304)
Philip Richards, Georgia Institute of Technology (Presenter); Todd Griffith, Sandia National Laboratories; Dewey Hodges, Georgia Institute of Technology

Paper #6 – 4:30 – 5:00 p.m.
A Physics-based Approach to Trim Optimization of an Articulated Slowly-Rotating Rotor in High%#8208;Speed Flight (362)
Jean-Paul Reddingier, Rensselaer Polytechnic Institute (Presenter); Farhan Gandhi, Rensselaer Polytechnic Institute

Paper #7 – 5:00 – 5:30 p.m.
Robust control for an helicopter using guardian map and genetic algorithm (432)
Georges Ghazi, LARCASE (ETS) (Presenter)