

Technical Session A, Tuesday, May 5 – Morning, 8:00 a.m. – 12 noon

	Aerodynamics I Suite 4C-E <i>Session Chair:</i> Philippe Beaumier ONERA	Aircraft Design I Suite 2A-B <i>Session Chair:</i> Dr. Richard Markiewicz Defense Science & Technology Laboratory (DSTL)	Crash Safety I Suite 1B <i>Session Chair:</i> Bryan Pilati US Army AATD	Dynamics I Suite 5C <i>Session Chair:</i> Dr. Jinsong Bao Sikorsky Aircraft Corp.
0800-0830 <i>Paper # 1</i>	Navier-Stokes Assessment of Test Facility Effects on Hover Performance (48) Neal Chaderjian* and Jasim Ahmad, NASA Ames Research Center	Systematic Analysis of Rotor Blade Effective Twist Due to Planform Variation (76) Fu-Shang (John) Wei*, Central Connecticut State U.; David A. Peters, Washington University, St Louis	Evaluation of the Second Transport Rotorcraft Airframe Crash Testbed (TRACT 2) Full Scale Crash Test (73) Martin Annett*, Justin Littell, NASA Langley Research Center	Investigation of Whirl Flutter Stabilization using Active Trailing Edge Flaps (62) Tobias Richter, Tobias Rath*, University of Stuttgart; Oliver Oberinger, Technical University of Munich; Walter Fichter, University of Stuttgart
0830-0900 <i>Paper # 2</i>	Comparing Numerical and Experimental Results for Drag Reduction by Active Flow Control Applied to a Generic Rotorcraft Fuselage (59) Caroline Lienard*, ONERA; Brian G. Allan, NASA Langley Research Center; Arnaud Le Pape, ONERA; Norman W. Schaeffler, NASA Langley Research Center	Development of Conceptual Design Framework with Rotor Structural Design Optimization for Compound Rotorcraft with a Lift Offset (53) Jaehoon Lim, Samsung Heavy Industries; SangJoon Shin*, YooJin Kang, Seoul National University; YoungJung Kee, Korea Aerospace Research Institute	Rotocraft Troop Seat with Selectable Energy Absorber System – Design & Test (145) Stanley Desjardins, Safe Inc.; Lance Labun*, Labun, LLC; Leda Belden, Safe Inc.; Jin Woodhouse, US Army Aviation Development Directorate	Effects of 2/rev Trailing Edge Flap Input on Helicopter Vibrations for Concurrent Vibration and Noise Reduction (56) Alexander Steinwandl*, Walter Fichter, Institute of Flightmechanics and Control, Stuttgart
0900-0930 <i>Paper # 3</i>	Improving the Performance and Flexibility of Grid-Based Vorticity-Velocity Solvers for General Rotorcraft Flow Analysis (9) Glen Whitehouse*, Benjamin Silbaugh, Alexander Boschitsch, Continuum Dynamics, Inc	Optimization of a Lift-Offset Compound Helicopter in a Multidisciplinary Analysis Environment (288) Jeff Sinsay*, U.S. Army; Juan Alonso, Stanford University	Laboratory and Field Evaluations of Textile Energy Absorbers for Crashworthy Cargo Restraints (301) Eric Little*, US Applied Research Laboratory; Charles Bakis, Pennsylvania State University; Lindley Bark, US Navy Naval Air Warfare Center - Aircraft Division; Robert Willis, US Navy Naval Air Warfare Center - Aircraft Div; et al	Investigation of Rotor Vibratory Loads of a UH-60A Individual Blade Control System (213) Hyeonsoo Yeo*, Rohit Jain, U.S. Army Aviation Development Directorate - AFDD; Buvana Jayaraman, Science and Technology Corp.
0930-1000	Refreshment Break			
1000-1030 <i>Paper # 4</i>	Efficient Three-Dimensional Solution for Unstructured Grids Using Hamiltonian Paths and Strand Grids (290) Bharath Govindarajan*; Yong Su Jung, James Baeder, University of Maryland, College Park; Jay Sitaraman, University of Wyoming	Highly-efficient Aerodynamic Design of Rotor with High Performance (155) Wu Qi, Zhao Qi-jun*, Wang Bo, Yin Zhi-zhao, Nanjing University of Aeronautics and Astronautics	The Development of Two Composite Energy Absorbers for Use in a Transport Rotorcraft Airframe Crash Testbed (TRACT 2) Full-Scale Crash Test (388) Justin Littell*, Karen Jackson, Martin Annett, NASA Langley Research Center; Michael Seal, Analytical Mechanics Associates, Inc.; Edwin Fasanella, National Institute of Aerospace	A Physics-Based Hydraulic Damper Model for Rotor Structural Loads (192) Hao Kang*, Matt Floros, US Army Research Laboratory; Jean-Paul Reddinger, Rensselaer Polytechnic Institute
1030-1100 <i>Paper # 5</i>	Numerical Investigation of the Unsteady Loading of a Model Rotor in Hover (326) Justin Hoffman*, Valana Wells, Arizona State University	Multi-point Time-dependent Aero-elastic Adjoint-based Aerodynamic Shape Optimization of Helicopter Rotors (239) Asitav Mishra*, Dimitri Mavriplis, Jay Sitaraman, University of Wyoming	Performance Evaluation of Crash-Recording Technologies in a Full-Scale CH-46 Airframe Crash Test (351) Lindley Bark*, Robert Willis, NAWCAD PAX RIVER	Investigation of Tip-Vortex Modifications on Rotor Loads and Performance (39) Abhishek A.*, Rahul R., Indian Institute of Technology Kanpur
1100-1130 <i>Paper # 6</i>	A Variational Approach to Multipoint Aerodynamic Optimization of Conventional and Coaxial Helicopter Rotors (297) Eli Giovanetti, Kenneth Hall*, Duke University	Comparison of Probabilistic and Fuzzy Multi-Attribute Decision Making Methods for Capturing Uncertainty in Concept Selection (347) Frank Patterson*, Daniel Schrage, Georgia Institute of Technology	Crash Dynamic Model for Rotorcraft Adaptive Seat Energy Absorber Evaluation (105) Muthuvel Murugan*, U.S. Army Research Laboratory; Ala Tabiei, University of Cincinnati; Gregory Hiemenz, Innovital Systems	Performance and Hub Vibrations of an Articulated Slowed-Rotor Compound Helicopter at High Speeds (332) Jean-Paul Reddinger*, Farhan Gandhi, Rensselaer Polytechnic Institute; Hao Kang, US Army Research Laboratory
1130-1200 <i>Paper # 7</i>	High-Order Overset Methods for Rotorcraft CFD (349) Norman Foster*, Penn State Applied Research Laboratory		Reusable Energy Absorbing Lab (REAL) Seat (393) Michael Knott*, Brandon Hall, NAVAIR	Overview of RCAS Capabilities, Validations, and Rotorcraft Applications (328) Hossein Saberi*, Matthew Hasbun*, JinYoung Hong, Advanced Rotorcraft Technology, Inc.; Hyeonsoo Yeo, Robert Ormiston, US Army Aviation Development Directorate – AFDD

Technical Session A, Tuesday, May 5 – Morning, 8:00 a.m. – 12 noon

	Handling Qualities I Suite 1C <i>Session Chair:</i> Joseph Driscoll Sikorsky Aircraft Corp.	Structures & Materials I Suite 5D <i>Session Chairs:</i> Dr. Mark Gurvich , United Technologies Research Center and Dr. Yuriy Nikishkov , University of Texas at Arlington	Unmanned VTOL Suite 1D <i>Session Chair:</i> Patrick Fabiani Institut Supérieur de l'Aéronautique et de l'Espace	Wind Energy Suite 5A-B <i>Session Chairs:</i> Prof. Jonathan Naughton , University of Wyoming and Dr. Paul Veers , NREL's National Wind Technology Center
0800-0830 <i>Paper # 1</i>	Towards Establishing Flying Qualities Requirements for Maritime Unmanned Aircraft Systems (265) Thomas Fell*, Michael Jump, Mark D White, University of Liverpool; Ieuan Owen, University of Lincoln	Fatigue Load Spectra for a Conventional Military Rotorcraft (8) Robert Benton*, US Army Aviation Engineering Directorate	Impact of Obstacle Sensor Choice on Preliminary Unmanned Helicopter Design and Mission Performance in Obstacle Fields (340) Joerg Dittrich*, Florian-Michael Adolf, Simon Schopferer, DLR	Single-Shot Pressure-Sensitive Paint Measurements of Static and Dynamic Stall on a Wind Turbine Airfoil (38) Kevin Disotell*, The Ohio State University; Pourya Nikoueeayan, Jonathan Naughton, University of Wyoming; James Gregory, OSU
0830-0900 <i>Paper # 2</i>	Multi-Input Multi-Output Model-Following Control Design Methods for Rotorcraft (327) J. Michael Spires*, Joseph F. Horn, The Pennsylvania State University	Evolution of Fenestron Development in terms of Safety, Design and Substantiation Characteristics (134) Elif Ahci *, Ulrich Denecke, Stefan Emmerling, Gerald Kuntze-Fechner, Patrice Rauch, Airbus Helicopters	Design and Analysis of a Thrust-Vectoring Coaxial-Rotor Micro Air Vehicle (110) Sebastien Prothin*, Nicolas Doué, ISAE Supaéro	Experimental and Computational Investigation of a Small-Scale Vertical Axis Wind Turbine with Dynamic Blade Pitching (78) Moble Benedict*, Texas A&M University; Vinod Lakshminarayan, Science and Technology Corporation; Jeremy Garber, Inderjit Chopra, University of Maryland
0900-0930 <i>Paper # 3</i>	Evaluation of Control Allocation Techniques for a Medium Lift Tilt-Rotor (79) Christina Ivler*, US Army; Ondrej Juhasz, San Jose State Research Foundation	Dual-Use Structures: Apache Empennage Integral Driveshaft Cover Antenna (208) Ronald Lavin*, The Boeing Company, Mark Robeson, U.S. Army AMRDEC ADD; Glenn Pyle, Dennis McCarthy, The Boeing Company	An Unmanned Cargo-Delivery System for Rotorcraft Landing to Unprepared Sites (241) John Wissler, James Paduano, Graham Drozeski*, Aurora Flight Sciences; et al	Dynamic Wake Meandering Model Comparison with Varying Fidelity Models for Wind Turbine Wake Prediction (127) Brandon L. Ennis*, Christopher L. Kelley, David C. Maniaci, Sandia National Laboratories
0930-1000	Refreshment Break			
1000-1030 <i>Paper # 4</i>	ADS-33 Evaluation of the International CH-47 Chinook (50) Christopher Colosi*, Pieter Einthoven*, Erik Kocher, The Boeing Company; Matthew Parsons*, Bryan Carrothers, Canadian Department of National Defence	A Probabilistic Approach for Reliability Quantification of Propulsion Materials (37) Michael Shiao*, Tzikang Chen, Anindya Ghoshal, Department of Army	Towards Autonomous Emergency Landing for an Optionally Piloted Autogyro (285) Danilo Galisteu*, Florian Adolf, Jörg Dittrich, Falk Sachs, Holger Duda, German Aerospace Center (DLR)	A Framework for Modeling Wind-Farm Wake Turbulence from a Database for Simulation and Analysis (184) Kyle Schau, Gopal Gaonkar*, Florida Atlantic University
1030-1100 <i>Paper # 5</i>	Development, Testing and Validation of Transport Category Procedures for the AW609 Tiltrotor (197) Joseph Schaeffer*, David Belt, Kip Campbell, Alessandro Colombo, Mattia Mattaboni, AgustaWestland	Structural Dynamic Modeling for Rotating Blades Using Three-Dimensional Finite Elements (256) Youngjung Kee*, Korea Aerospace Research Institute; Sangjoon Shin, Seoul National University	Development of a 500 gram Vision-based Autonomous Quadrotor Vehicle Capable of Indoor Navigation (248) Stephen Haviland*, Dmitry Bershadsky, Daniel Magree, Eric Johnson, Georgia Institute of Technology	Coupled NS/SPH Analysis of Off-Shore Wind Turbine (304) Vladimir Leble, George Barakos*, University of Liverpool
1100-1130 <i>Paper # 6</i>	Design and Flight Test of a Hybrid External Load Stabilization System for an H-6 Helicopter Testbed (70) Byron Patterson, Russell Enns*, George Lukes, Carl King, Stephen Mohammed, Bryan Kashawlic, The Boeing Company	Determination of Flight Loads for the HH-60G Pave Hawk Helicopter (277) <i>Presentation Only</i> Robert McGinty*, Gregory Wood, Jeff Brenna, MERC; Steven Lamb, USAF		Simulations of Horizontal Axis Wind Turbines in Complex Operational Conditions (365) Yasutada Tanabe*, Takashi Aoyama, JAXA; Harutaka Oe, Yuta Uemura, Tokyo University of Science; Hideaki Sugawara, Ryoyu Systems Inc.
1130-1200 <i>Paper # 7</i>	Flight Evaluation of Variation in Rotor RPM on Low Speed Handling Characteristics of Helicopter (21) Abdul Rashid Tajar*, M. Vijaya Kumar, D.S.D. Prasad Rao, R. Sannathi Muthu, Hindustan Aeronautics Limited	<i>This Session is dedicated to the memory of Jeff Schaff.</i>		

Technical Session B, Wednesday, May 6 – Morning, 8:00 a.m. – 12:15 p.m.

	Advanced Vertical Flight I Suite 1D <i>Session Chair:</i> Michael Strauss Sikorsky Aircraft Corp.	Aerodynamics II Suite 4C-E <i>Session Chair:</i> Rohit Jain, US Army AFDD	Aircraft Design II Suite 2A-B <i>Session Chair:</i> Dr. Vangalattore T. Nagaraj University of Maryland	Handling Qualities II Suite 2A-B <i>Session Chair:</i> David Klyde Systems Technology Incorporated
0800-0830 <i>Paper # 1</i>	The LIFT! Project – Modular, Electric Vertical Lift System (26) Michael Duffy*, Tony Samaritano, The Boeing Company	Boundary Layer Transition Determination for Periodic and Static Flows using Phase-Averaged Pressure Data (168) A.D. Gardner*, K. Richter, DLR	Conceptual Design of Environmentally Friendly Rotorcraft – A Comparison of NASA and ONERA Approaches (6) Carl Russell*, NASA Ames Research Center; Pierre-Marie Basset, ONERA	Augmented Systems for a Personal Aerial Vehicle Using a Civil Light Helicopter Model (269) Stefano Geluardi*, Frank M. Nieuwenhuizen, Max Planck Institute for Biological Cybernetics; Lorenzo Pollini, University of Pisa; Heinrich H. Bülthoff, Max Planck Institute
0830-0900 <i>Paper # 2</i>	Lichten Runner-Up Design, Development and Flight-Testing of a Robotic Hummingbird (80) David Coleman*, Moble Benedict, Texas A&M University; Vikram Hrishikeshavan, Inderjit Chopra, University of Maryland	Study of an SSC-A09 Airfoil in Compressible Dynamic Stall with Freestream Mach Oscillations (311) Kyle Hird*, Matthew Frankhouser, Shawn Naigle, James Gregory, Jeffrey Bons, The Ohio State University	A Toolbox for Rotorcraft Preliminary Design (186) Max Lier*, Alex Krenik, Philipp Kunze, Dieter Kohlgrüber, Marius Lützenburger, Dominik Schwinn, German Aerospace Center (DLR)	Towards Handling Qualities Evaluations of a Personal Aerial Vehicle in Ground-Based and In-Flight Simulation (115) Bianca I. Schuchardt*, DLR German Aerospace Center
0900-0930 <i>Paper # 3</i>	Design Space Exploration of an Electric-Powered Reconfigurable Rotor VTOL Concept (117) Etienne Demers Bouchard*, David Rancourt, Dimitri Mavris, Georgia Institute of Technology	Dynamic Stall with Circulation Pulse and Hysteresis for NACA 0012 and VR-12 Airfoils (40) Ramin Modarres*, David Peters, Jacob Gaskill, Washington University in St. Louis	Comprehensive Rotorcraft Analysis for Preliminary Design and Optimization (32) Michael Avera*, ORISE; Hao Kang, Rajneesh Singh, US Army Research Laboratory	Investigation of Bandwidth and Disturbance Rejection Properties of a Dynamic Inversion Control Law for Ship-Based Rotorcraft (129) Albert Zheng*, Joseph Horn, The Pennsylvania State University*
0930-1015	<i>Refreshment Break</i>			
1015-1045 <i>Paper # 4</i>	Experimental Investigation of Fan Aerodynamic Performance for Fan-In-Wing Applications (196) Naipei Bi*, Anish Sydney*, Kevin Kimmel, David Haas, Naval Surface Warfare Center Carderock Division	Blowing Flow Control of Dynamic Stall under Coupled Pitch and Freestream Oscillations (125) Shawn Naigle*, James Gregory, Jeffrey Bons, Matthew Frankhouser, Kyle Hird, The Ohio State University	Twin Engine Pack System: a twin piston engine propulsion unit for very light rotorcraft (223) Roberto Alicino*, Luca Cirrottola, Giuseppe Quaranta, Politecnico di Milano; Andrea Albertoni, Marta Massera, Roberto Papetti, Robby Moto Engineering	Non-Iterative Adaptive Vertical Speed Limit and Control Margin Prediction for Fly-By-Wire Helicopter (300) Gonenc Gursoy*, Ilkay Yavrucuk, Middle East Technical University
1045-1115 <i>Paper # 5</i>	CarterCopter Technology Goes Offshore: Commercial Variant with Full Hover Capability (159) Jay Carter*, Jeffrey Lewis, Carter Aviation Technologies	Computations of Dynamic Stall Control with Combustion-Powered Actuation (33) Solkeun Jee*, Claude Matalanis, Byung-Young Min, Patrick Bowles, Brian Wake, United Technologies Research Center; Thomas Crittenden, Ari Glezer, Georgia Institute of Technology	Shear Load Transfer for Corrosion Coated Clamped Joints (179) Monte McGlaun*, Ryan Ehinger, Eric Sinusas, Bell Helicopter	Preliminary Investigation into Rotorcraft Pilot Strategy and Visual Cueing Effects in the Shipboard Environment (99) John Tritschler*, John O'Connor, David Artech, U.S. Naval Test Pilot School; James Pritchard, Ryan Wallace, Daniel Eksuzian, Naval Air Systems Command
1115-1145 <i>Paper # 6</i>	Project Caurus “Nibbio” – A Novel Tilt Rotor Concept For Very High Speed (221) Davide Berbenni, Lorenzo Trainelli*, Luca Sala, Andrea Scaringello, Clovis Paterson Waffo Gatchuessi, et al, Politecnico di Milano	Consideration of Dynamic Stall on Rotorcraft Airfoil Design (348) Bernardo Vieira*, Mark Maughmer, The Pennsylvania State University	A Physics-Based Approach to Trim Optimization of Coaxial Helicopters in High-Speed Flight (44) George Jacobellis*, Farhan Gandhi, Rensselaer Polytechnic Institute; Matthew Floros, U.S. Army Research Laboratory	Optimization of Flight Control System and Handling Quality Evaluation of a Limited Authority Helicopter (243) Umut Ture, Selahattin Burak Sarsilmaz*, Ismail Hakki Sahin, Ugur Zengin, Turkish Aeropace Industries, Inc
1145-1215 <i>Paper # 7</i>		Dynamic Stall Control on Rotor Airfoil via Combination of Synthetic Jet and Droop Leading-Edge (231) Guo-qing Zhao, Qi-jun Zhao*, Nanjing University of Aeronautics and Astronautics		
1215-1245 <i>Paper # 8</i>		Numerical Investigation of Three-Dimensional Effects on Deep Dynamic Stall Experiments (42) Reza Nilifard, Alex Zanotti, Giuseppe Gibertini, Alberto Guardone, Giuseppe Quaranta*, Politecnico di Milano		

Technical Session B, Wednesday, May 6 – Morning, 8:00 a.m. – 12:15 p.m.

	HUMS-CBM I Suite 5D <i>Session Chair:</i> Nathaniel Bordick US Army AATD	Modeling & Simulation I Suite 1B <i>Session Chair:</i> Daniel Spira Pegasus Research & Technologies	Propulsion I Suite 1C <i>Session Chair:</i> Michael Spratt Rolls-Royce Corporation	Test & Evaluation I Suite 5A-B <i>Session Chair:</i> Marc Alexander National Research Council of Canada
0800-0830 <i>Paper # 1</i>	Achieving Usage Based Maintenance with HUMS Regime Recognition (280) Raymond Beale*, Mark Davis, Sikorsky Aircraft Corporation; Paul Swindell, Federal Aviation Administration	A Numerical Investigation of Ground Effect on a Coaxial Rotor System (68) Mark Dreier, Ashley Paredes*, AVX Aircraft Company	Adaptable Gas Turbine Blade Concept Study (200) Muthuvel Murugan*, David Booth, Anindya Ghoshal*, Douglas Thurman, Kevin Kerner, U. S. Army	A Dynamic Calibration Method for Experimental and Analytical Hub Load Comparison (46) Robert Thornburgh*, Andrew Kreshock, Matthew Wilbur, U.S. Army Research Laboratory
0830-0900 <i>Paper # 2</i>	Gross Weight and Center-of-Gravity Estimation System for the V-22 (305) Chris Thaiss, Fred Caplan*, Technical Data Analysis, Inc.	Linear Inflow Model Extraction from High-Fidelity Aerodynamic Models for Flight Dynamics Applications (41) Omri Rand*, Vladimir Khromov, Technion - Israel Institute of Technology; Sean Hersey, Roberto Celi, UM; Ondrej Juhasz, U.S. Army; et al	All-Electric Fuel and Oil Control System Demonstration on the T55 Engine (379) Robert Niebanck*, Theodore Busky*, Richard Brauer*, Triumph Engine Control Systems	Modern Testing Approaches Used to Characterize Dynamic Stall Regimes on Helicopter Airfoils (262) Phillip Davidson*, Jonathan Naughton, Jay Sitaraman, University of Wyoming
0900-0930 <i>Paper # 3</i>	Preliminary Assessment of the Effect of Daily Reporting of HUMS Events on Squadron Maintenance and Logistics (190) Erica Hocking Scates*, Brian Fuller, Naval Surface Warfare Center; Gino Molinaro, Naval Air Systems Command; John Bullock, In-Service Support Center	Store Separation Modeling for Rotorcraft Applications (177) Robert McKillip*, Todd Quackenbush, Continuum Dynamics, Inc.	Multi-Objective Optimization of a Regenerative Rotorcraft Powerplant: Quantification of Overall Engine Weight and Fuel Economy (74) Fakhre Ali*, Konstantinos Tzanidakis, Ioannis Goulos, Pachidis Vassilios, Cranfield University; Roberto D'Ippolito, NOESIS Solutions	Blade Sections in Streamwise Oscillations into Reverse Flow (183) Anya Jones*, Joachim Hodara, Marilyn Smith, Georgia Tech; Kenneth Granlund, Universal Technologies Corp; Karen Mulleners, University of Maryland; Michael Ol, U.S. Air Force Research Laboratory
0930-1015	<i>Refreshment Break</i>			
1015-1045 <i>Paper # 4</i>	Blade Root Integrated Fibre Bragg Grating Sensors - A Highly Redundant Data Source For Future HUMS (270) Manfred Hajek*, Stephanie Manner, Soeren Suesse, Technische Universitaet Muenchen (TUM)	Physics-Based Aerodynamic Simulation Models Suitable for Dynamic Behavior of Complex Bluff Body Configurations (163) Daniel Prosser*, Marilyn Smith, Georgia Institute of Technology	Turbomachinery Blade Thermomechanical Interface Science and Sandphobic Coatings Research (225) Anindya Ghoshal*, Muthuvel Murugan, Blake Barnett, Michael Walock, Marc Pepi, US Army Research Laboratory	Full Scale Testing of a Centrifugally Pumped Pneumatic Deicing System for Helicopter Rotor Blades (222) Matthew Drury*, Jose Palacios, The Pennsylvania State University; Joseph Szefti, Invercon LLC
1045-1115 <i>Paper # 5</i>	A Smart Position Sensor for Articulated Rotors (209) Troy Schank*, Kynn Schulte, Bell Helicopter	Effects of Uncertainty on Slung Load Divergence Speed Determination (254) Brandon Liberi, Sorin Pirau, Narayanan Komerath*, Georgia Institute of Technology; Chau Ton, University of Florida	Overview of the Engine Inlet Barrier Filter Flight Test Efforts on the V-22 (372) Daniel Simpson*, Erasmo Pinero, Bell Helicopter	Durable and Damage Tolerant Composite Aft Fuselage Technology (211) Lisa Chiu*, Dennis McCarthy, Aaron Harris, Clark Andrews, The Boeing Company; Mark Robeson, US Army AMRDEC ADD-AATD
1115-1145 <i>Paper # 6</i>	Rotor Load and Health Monitoring Sensor Technology (128) Mark Davis*, Brian Bouquillon, Sikorsky Aircraft Corporation; Matt Smith, Charles Allred, LORD Corporation; Roberto Sarjeant, Hutchinson Aerospace; Jacob Loverich, KCF Tec; et al	Real Time Free Wake and Ship Airwake Model for Rotorcraft Flight Training Application (275) <i>Presentation Only</i> Jeffrey Keller*, Daniel Wachspress, Continuum Dynamics, Inc.; Jacques Hoffer, NAVAIR	An Advanced Rotorcraft Powerplant Optimization at Mission Level: Towards High Fidelity Engine Design Optimization (72) Fakhre Ali*, Konstantinos Tzanidakis, Ioannis Goulos, Pachidis Vassilios, Cranfield University; Roberto D'Ippolito, NOESIS Solutions	Twist Effects on Rotor Performance, Loads and Vibrations (147) Edward Brouwers*, Thomas Zientek, The Boeing Company; Louis Centolanza, US Army Aviation Development Directorate
1145-1215 <i>Paper # 7</i>	Design and fabrication of Piezoelectric Wafer and Fiber-Based Frequency Steered Acoustic Transducers (279) Matteo Carrara*, Georgia Institute of Technology; Kalyan Nadella, Carlos Cesnik, University of Michigan; Massimo Ruzzene, Georgia Institute of Technology			

Technical Session C, Wednesday, May 6 – Afternoon, 1:45 p.m. – 6:00 p.m.

	Aerodynamics III Suite 4C-E <i>Session Chair:</i> Ed Reed Sikorsky Aircraft Corp.	Crash Safety II/Awards Suite 1B <i>Session Chair:</i> Dr. Cheng-Ho Tho Bell Helicopter	Dynamics II Suite 1D <i>Session Chair:</i> Friedrich Straub The Boeing Company	HUMS/CBM II Suite 5D <i>Session Chair:</i> Doug Knapp The Boeing Company
1345-1415 <i>Paper # 1</i>	Collaborative Investigation of the Aerodynamic Behavior of Airfoils in Reverse Flow (267) Joachim Hodara*, Georgia Institute of Technology; Andrew Lind, Anya Jones, University of Maryland; Marilyn Smith, Georgia Institute of Technology	Step Towards Certification of Fuel System Drop Test Requirement for Different Helicopters by Simulation (95) Clément Breton*, Airbus Helicopters	Experimental Validation of Tailboom Vibration Control Using Fluidic Flexible Matrix Composite Tubes (337) Kentaro Miura*, Matthew Krott, Edward Smith, Christopher Rahn, Pennsylvania State University; Peter Romano, Bell Helicopter	Capability-Based Operations and Sustainment – Aviation (COST-A) Technology Development (122) Preston Bates*, Paul Pantelis, Aviation Development Directorate-Aviation Applied Technology Directorate
1415-1445 <i>Paper # 2</i>	Measurements to Understand the Flow Mechanisms Contributing to Tandem-Rotor Outwash (321) Manikandan Ramasamy*, Mark Potsdam, US Army; Gloria Yamauchi, NASA	Bird Impact Simulation of Polycarbonate Windshield Subject to Brittle Failures (201) Zi Lu*, Michael Seifert, Cheng-Ho Tho, Bell Helicopter	Aeromechanics for a High Advance Ratio Coaxial Helicopter (247) Joseph Schmaus*, Inderjit Chopra, University of Maryland	Lichten Award: Health Management Technology Integration and Verification (126) Isaac Bandy*, Sikorsky Aircraft Corporation
1445-1515 <i>Paper # 3</i>	Effects of Reynolds Number and Advance Ratio on the Drag of a Model Helicopter Rotor Hub (63) David Reich*, Steven Willits, Sven Schmitz, The Pennsylvania State University	Model-Based Structural Integrity Assessment of Helicopter Fuselage During Harsh Landing (230) Marco Giglio, Politecnico di Milano; Slawomir Klimaszewski, Marcin Kurdelski, Andrzej Leski, Air Force Institute of Technology; Andrea Manes, Claudio Sbarufatti*, Politecnico di Milano; et al	Reduction of Structural Vibration on Light Combat Helicopter (258) Hamid Ali*, Sridhar S., Naba Kumar Maiti, Dr. M Vijaya Kumar, RWRDC, HAL	Generalized Prognostic Algorithm Implementing Kalman Smoother (23) Eric Bechhoefer*, GPMS; Rune Schlanbusch, Teknova AS
1515-1600	Refreshment Break			
1600-1630 <i>Paper # 4</i>	Effects of Advance Ratio and Radial Location on the Vortex Structure on a Rotating Blade in Reverse Flow (299) Nandeesh Hiremath, Dhwanil Shukla, Vrishank Raghav*, Sorin Pirau, Narayanan Komerath, Georgia Institute of Technology;	Water Impact of Helicopter Subfloor Panels (228) Thomas Billac*, Mark Battley, Raj Das, The University of Auckland; Rodney Thomson, Cooperative Research Centre for Advanced Composite Structures	CAD-Based 3-D Structural Dynamic Modeling of the Tilt Rotor Aeroacoustic Model (TRAM) Proprotor (287) William Staruk*, Elizabeth Weiner, Inderjit Chopra, University of Maryland	Machine Learning Algorithms for HUMS Improvement on Rotorcraft Components (170) Daniel Wade*, Thongsay Vongpaseuth; AMRDEC, United States Army; Ramon Lugos, Jeffery Ayscue, Andrew Wilson, Avion Solutions, Inc; Lance Antolick, RMCI, Inc; et al
1630-1700 <i>Paper # 5</i>	Aerodynamics of Micro-Rotors in Confined Environments (158) Sebastien Prothin*, Thierry Jardin, Cristian Garcia Magana, ISAE Supaero	Student Design Competition Undergraduate Winner Team Heli-Fast Allison Hefferan, Philip Hampton, Daniel Vogel*, William Scott, Nicholas Craft*, Raymond LeBeau, St. Louis University	Do We Really Need To Study Rotorcraft as Linear Periodic Systems? (152) Aykut Tamer, Pierangelo Masarati*, Politecnico di Milano	Performance Qualification of an On-Board Model-Based Diagnostic System for Fatigue Crack Monitoring (229) Claudio Sbarufatti*, Andrea Manes, Marco Giglio, Politecnico di Milano
1700-1730 <i>Paper # 6</i>	Experimental Investigation of Perpendicular Vortex Interaction by Stereo Particle Image Velocimetry (189) Alex Zanotti, Martino Ermacora, Gabriele Campanardi, Giuseppe Gibertini*, Politecnico di Milano	Student Design Competition Graduate Winner XV-58 Manta Clélia Level, Akshay Pendharkar, Dmitry Bershady, Frank Patterson*, Istvan Keszte, Joachim Hodara, Lee Whitcher, Nathon Woelke, Siti Nur Aqidah Md Azmi, Thomas Fell, Yong Boon Kong, Georgia Institute of Technology	Dynamic Characterization of a Novel Gimbal Two-Blade Helicopter Rotor (88) <i>Presentation Only</i> Lorenzo Trainelli*, Alessandro Croce, Radek Possamai, Politecnico di Milano	Low-Velocity Impact Monitoring System for a Helicopter Frame by Means of an Artificial Neural Network (268) Claudio Sbarufatti*, Andrea Gilioli, Andrea Manes, Marco Giglio, Politecnico di Milano
1730-1800 <i>Paper # 7</i>	Fundamental Characterization of Spanwise Loading and Trailing Wake Vortices (82) Mahendra Bhagwat*, Manikandan Ramasamy, Francis Caradonna, US Army Aviation Development Directorate - AFDD			Data-Informed Structural Diagnostic Framework (20) Mulugeta Haile*, US Army Research Lab; Jaret Riddick, ARL

Technical Session C, Wednesday, May 6 – Afternoon, 1:45 p.m. – 6:00 p.m.

	Modeling and Simulation II Suite 5A-B <i>Session Chair:</i> Dr. Hon Xin Sikorsky Aircraft Corp.	Operations I Suite 5C <i>Session Chair:</i> Terry Parish Northrop Grumman Corp.	Product Support Suite 1C <i>Session Chair:</i> Treven Baker US Army ADD-AATD	Structures & Materials II Suite 2A-B <i>Session Chair:</i> Dr. Mark Gurvich , United Technologies Research Center and Dr. Yuriy Nikishkov , University of Texas at Arlington
1345-1415 <i>Paper # 1</i>	Flow Sensing for Height Estimation and Control of a Rotor in Ground Effect: Modeling and Experimental Results (91) Chin Gian Hooi*, Frank D. Lagor, Derek A. Paley, University of Maryland	Airborne Flight Reporting System (302) Kaydon Stanzione*, Praxis Technologies, Inc.	Increased Industry Safety Through Education Technology (162) Zekiel Fialho*, Mike Gralish, Clyde Vasey, Larry Wormington, Bell Helicopter	OH-58D Pylon Side Beam Life Using Usage Loads Monitoring vs Traditional Lifting Methodology (19) Christopher Lyman, Chris Hodges*, Katherine Troncalli*, Theresa Kinney*, U.S. Army
1415-1445 <i>Paper # 2</i>	Local Polynomial Method Frequency-Response Calculation for Rotorcraft Applications (93) Benjamin Fragniere*, Johannes Wartmann, DLR	Measured and Predicted Response of a Submerged Towed Sonar Array to Maneuvering Input (362) Jean Loomis, Jaye Falls*, Sarah Mouring, United States Naval Academy	V-22 Osprey Maintenance Cost Savings using SAFE for Fatigue Life Calculations (374) Stacey Kelly*, John Lloyd, Bell Helicopter	Damage Tolerance Studies At The Blade Root Attachment Of Aero Engines (331) Appaji Gowda B M*, Hindustan Aeronautics Limited; H R Yeshovanth, RNSIT; O Germiya, Hindustan Aeronautics Limited
1445-1515 <i>Paper # 3</i>	HeliUM 2 Flight Dynamic Simulation Model: Development, Technical Concepts, and Applications (368) Roberto Celi*, University of Maryland	Joint Future Vertical Lift Initiative (132) COL Erskine Bentley*, DOD	Development and Testing of a Ground Based Health and Maintenance Reasoner (140) James Cotter*, Mark Davis, Sikorsky; Treven Baker, Army ADD-AATD	RotorShield Advanced Rotor Blade Erosion Protection, Application to V-22 (376) Jeffrey Nissen*, Bell Helicopter; Peter Holemans, Jonathan Venezia, The Boeing Company
1515-1600	<i>Refreshment Break</i>			
1600-1630 <i>Paper # 4</i>	A Comprehensive Pilot Model for Voluntary/Involuntary Action in Rotorcraft-Pilot Coupling (151) Pierangelo Masarati*, Vincenzo Muscarello, Giuseppe Quaranta, Politecnico di Milano; Paolo Marguerettaz, Politecnico di Torino; Giorgio Guglieri, Politecnico di Torino; Linghai Lu, Michael Jump, School of Engineering, The University of Liverpool	CHOPPA-M: Development, Capabilities & Applications to Helicopter Operations Research (187) David Anderson, Douglas Thomson, Murray Ireland, Kevin Ferguson, University of Glasgow; Gokhan Ibal, Arvind Chandran*, Defence Science & Technology Organisation	Modeling CT7/T700 Maintenance Costs (344) John Martin*, Greg Duane*, GE Aviation; Bennett Hlavac, Gordon Alexander, US Army	Damage Tolerance Substantiation and Certification of Multiple Fastener Joints (323) Manjunatha M. Reddy*, Textron India Private Ltd.; W. Paul Green, Bogdan Roman Krasnowski, Bell Helicopter
	Simulating HHC/AFCS Interaction and Optimized Controllers using Piloted Maneuvers (319) Mark Lopez*, J.V.R. Prasad, Georgia Institute of Technology; Mark B. Tischler, Marc D. Takahashi, U.S. Army RDECOM; Kenny K. Cheung, University Affiliated Research Center	Mishap Analysis for BORES AoA (316) Joshua Schwartz*, William Greer, Institute for Defense Analyses	Isogeometric Analysis for Vertical Flight Applications (341) Chenglong Wang*, Autsin J. Herrema, Ming-Chen Hsu, Iowa State University; Anindya Ghoshal, US Army Research Laboratory; Yuri Bazilevs, University of California, San Diego	A Discrete Crack Network Based Damage Assessment for Bolted Composite Structures (166) Jim Lua*, Neethi Simon, Eugene Fang, Global Engineering and Materials, Inc.; Anisur Rahman, Nam Phan, Naval Air Warfare Center (PAX)
1700-1730 <i>Paper # 6</i>	Evaluation of Motion Tuning Methods on the Vertical Motion Simulator (207) Scott Reardon*, Steven Beard, NASA		Data Driven Depot Maintenance (D3M) (224) <i>Presentation Only</i> Kevin Rees*, Prasant Chhotu, U.S. Army; Nathan Holland, Lesco	Erosion Protection Coatings: Evidence of Structural Impact (10) Kit Fry*, Robert Benton, AMRDEC
1730-1800 <i>Paper # 7</i>				

Technical Session D, Thursday, May 7 – Morning, 8:00 a.m. – 12:15 p.m.

	Acoustics I Suite 1C <i>Session Chair:</i> Dr. Charles Tinney University of Texas at Austin	Aerodynamics IV Suite 4C-E <i>Session Chair:</i> Philippe Beaumier ONERA	Crew Stations & Human Factors Suite 1B <i>Session Chair:</i> Jeff Erwin Bell Helicopter	History Suite 5A-B <i>Session Chair:</i> Dr. Bruce Charnov Hofstra University
0800-0830 <i>Paper # 1</i>	A Maneuvering Flight Noise Model for Helicopter Mission Planning (24) Eric Greenwood*, Robert Rau, NASA Langley Research Center; Benjamin May, Christopher Hobbs, Wyle	Lifting Surface Blade Model for Comprehensive Rotorcraft Analysis (75) Daniel Wachspress*, Michael Yu, Continuum Dynamics Inc.	Novel Features for Aircraft-Crew Interaction Provided by the Airbus Helicopters Helionix® Avionics Suite (116) Carl Ockier, Valérie Juppet*, Juergen Steiner, Airbus Helicopters	The Man Who Beat Amelia Earhart: The Fabulous Aviation Life of John McDonald Miller (1905 – 2008) (2) Bruce Charnov*, Hofstra University
0830-0900 <i>Paper # 2</i>	Effects of Vehicle Weight and True Versus Indicated Airspeed on BVI Noise During Steady Descending Flight (28) James Stephenson*, US Army; Eric Greenwood, NASA Langley	Validation of Rotorcraft Comprehensive Analysis Performance Predictions for Coaxial Rotors in Hover (212) Jimmy Ho*, Science and Technology Corporation; Hyeonsoo Yeo, Mahendra Bhagwat, U. S. Army Aviation Development Directorate - AFDD	Strategy for Incorporating DAFIF into a Modern Military Cockpit Interface (252) Andrew Smith*, The Boeing Company	Sikorsky's YR-4 and R-6 Helicopter Rescue Missions at the China-Burma-India (CBI) Theater of World War II (102) Jacques Virasak*, Sikorsky Aircraft Corporation
0900-0930 <i>Paper # 3</i>	Aeroacoustic Simulation of an EC145-T2 Rotor in Descent Flight (113) Ulrich Kowarsch*, Daniel Lippert, University of Stuttgart; Sascha Schneider, Airbus Helicopters Deutschland GmbH; Manuel Keßler, Ewald Krämer, University of Stuttgart	A Higher-Order, Free-Wake Method Applied to the Problem of Hovering Rotors (324) Tenzin Choephel*, Sven Schmitz, Mark Maughmer, Pennsylvania State University	Development of a Magneto-Rheological Fluid-Based Trim Actuator with Active Tactile Cueing Capabilities (274) Guifré Julió*, Jean-Sébastien Plante, Exonetics Design Inc.; Geoffrey Latham, Bell Helicopter	Major General Chia-Jen Chu, China's Helicopter and Fighter Designer (104) Jacques Virasak*, Sikorsky Aircraft Corporation
0930-1015	<i>Refreshment Break</i>			
1015-1045 <i>Paper # 4</i>	A Dual Compact Model for Rotor Noise Prediction (234) Tianxiao Yang*, Kenneth Brentner, Greg Walsh, Yaowei Li, The Pennsylvania State University	Cheeseman Award Paper: Consideration Of Structural Constraints In Passive Rotor Blade Design For Improved Performance (392) Joon Lim*, US Army AFDD	Mission Utility of a Tactile Display in Rotary Wing Operations (121) Braden McGrath*, University of Canberra; Jeffrey Cox, Aviation Development Directorate - AATD; Joe McKay, U.S. Army Aviation Missile Cmd ; Angus Rupert, U.S. Army Aeromedical Research Laboratory	The U.S. ARMY's CH-54 Skycrane Helicopter: History and Contributions (106) Paul Fardink*, U.S. ARMY (Retired)
1045-1115 <i>Paper # 5</i>	Comprehensive Modeling Approach for High-Frequency Structural Properties and Noise Transmission of Composite Panels (210) Abderrazak Mejdi*, Bryce Gardner, Chadwyck Musser, ESI Group	Investigation of Centrifugal Pumping Rotor Blades as a Means of Vortex Diffusion (216) Daniel Kuerbitz*, Joseph Milluzzo, US Naval Academy	Audiotactile Displays for Improving Situation Awareness and Mitigating Spatial Disorientation (149) Christopher Brill, Old Dominion University; Ben Lawson, Angus Rupert*, U.S. Army Aeromedical Research Laboratory; Isabella Gagliano, Old Dominion University	The Full Story of the Hover Barge Photo (249) Robert Roedts*, Columbia Helicopters
1115-1145 <i>Paper # 6</i>	Numerical Optimization for Rotor Blade-tip Planform with Low HSI Noise Characteristics in Forward Flight (87) Zheng Zhu, QiJun Zhao*, Nanjing University of Aeronautics and Astronautics Nanjing	Minimum Loss Load and Twist Distributions for Coaxial Helicopter Rotors in Hover (282) Eli Giovanetti*, Kenneth Hall, Duke University		Augustine's Law and Unit Cost Growth in the Rotorcraft Industry (130) Eric Streich*, The Boeing Company
1145-1215 <i>Paper # 7</i>	Development of Closed Loop Control System Applicable to Active Technique for Helicopter BVI Noise Reduction (188) Noboru Kobiki*, Shigeru Saito, JAXA	Far-Field Analysis of Hovering Helicopter Rotor (61) Arnaud Le Pape*, Simon Verley, Daniel Destarac, ONERA		Westland 1915-2015 – From Fixed Wings to Better Things (Special Presentation) David Gibbings*, Westland (Retired) Plus: "Remembering Ray Prouty" Discussion Led by Prof. Bruce Charnov
1215-1245 <i>Paper # 8</i>	Automated Design of Quiet Trajectories Using Land Use Models (45) <i>Presentation Only</i> Robert Morris*, NASA Ames Research Center; Matthew Johnson, Institute for Human and Machine Cognition; Kristen Venable, Tulane University			

Technical Session D, Thursday, May 7 – Morning, 8:00 a.m. – 12:15 p.m.

	Modeling & Simulation III/Systems Engineering Suite 2A-B <i>Session Chair:</i> Daniel Spira Pegasus Research and Technologies	Operations II Suite 5C <i>Session Chair:</i> Terry Parish Northrop Grumman Corp.	Propulsion II Suite 5D <i>Session Chair:</i> Michael Spratt Rolls-Royce Corporation	Test & Evaluation II Suite 1D <i>Session Chair:</i> Dr. Jose Palacios The Pennsylvania State University
0800-0830 <i>Paper # 1</i>	Coupled Flight Dynamics and CFD Simulations of the Helicopter / Ship Dynamic Interface (283) Ilker Oruc*, Joseph F. Horn, The Pennsylvania State University; Susan Polsky, NAVAIR; Jeremy Shipman, James Erwin, CRAFT Tech	Numerical Simulations and Measurements of the Wake from a Helicopter Operating in Ground Effect (237) Masahiko Sugiura*, Yasutada Tanabe, Japan Aerospace Exploration Agency; Hideaki Sugawara, Ryoyu Systems Co., Ltd.; Naoki Matayoshi, Hirokazu Ishii, Japan Aerospace Exploration Agency	Concepts for Multi-Speed Rotorcraft Drive System - Status of Design and Testing at NASA GRC (339) Mark Stevens*, David Lewicki, Robert Handschuh, NASA John H. Glenn Research Center	Development and Testing of the AW609 All-Engines-Inoperative Emergency Re-Conversion (172) Dan Wells*, Paul Edwards*, AgustaWestland Tilt-Rotor Company
0830-0900 <i>Paper # 2</i>	Unsteady CFD Modelling of Ship Engine Exhaust Gases and Over-Deck Air Temperatures and the Implications for Helicopter Operations (310) Paul Scott*, Mark White, University of Liverpool; Ieuan Owen, University of Lincoln	Passive Stabilization and Stability Quantification of Helicopter Sling Load Payloads (66) Daniel Nyren*, Marc Tardiff, Dr. Kenneth Desabrais, U.S. Army Natick Soldier, Research, Development and Engineering Center	Automated Power Assurance Refinement for a Turboshift Engine (131) Alvaro Soares*, GE Aviation; Brian LeFevre, Mark Davis, Sikorsky Aircraft Corporation; Treven Baker, U.S. Army Aviation Development Directorate	A Rotor Tip Vortex Tracing Algorithm for Image Post-Processing (5) Austin Overmeyer*, U.S. Army ADD/AFDD
0900-0930 <i>Paper # 3</i>	Sensitivity Study of a Small Maritime Rotary UAS Operating in a Turbulent Airwake (286) Thomas Fell*, Mark D. White, Michael Jump, University of Liverpool; Ieuan Owen, University of Lincoln; Sylvain Manso, Defence Science and Technology Organisation	Fatigue failure of the EC225 Main Gearbox bevel wheel (89) Arnaud Delabie*, Jean-Marc Besson, Julien Poux, Airbus Helicopters	Design and Testing of the Bell FARDS Tail Rotor Driveshaft (194) Steven Spears*, Andrea Chavez, Bell Helicopter; Jason Fetty, Treven Baker, AATD	525 Aircraft Zero, The Relentless Advanced Systems Integration Lab (176) Stephanie Hoelscher*, Mike Bothwell, Bell Helicopter
0930-1015	<i>Refreshment Break</i>			
1015-1045 <i>Paper # 4</i>	Simulation of Helicopter Shipboard Operations with Spatial Velocity Gradients in the Ship's Airwake (97) Ngo Tri*, Sultan Cornel, Virginia Tech	An Evaluation of the Residual Structural Integrity of a Helicopter Tail Rotor Shaft Subjected to a Ballistic Impact (156) Andrea Gilioli, Andrea Manes*, Marco Giglio, Politecnico di Milano	Mathematical Modeling and Internal Clearance Optimization of Helicopter High Speed Bearing Systems Considering Temperature Variations (120) Aydin Gündüz*, Zihni Burçay Saribay, Sinan Yilmaz, Emre Kaynar, Turkish Aerospace Industries (TAI)	Helicopter Engine Performance Determination using Analysis of Variance (101) Alex Duarte Gomes*, João Otávio Arantes Filho, Instituto de Pesquisas e Ensaios em Voo; Donizeti de Andrade, Cleverson Bringhenti, Instituto Tecnológico de Aeronautica
	Systems Engineering <i>Session Chairs:</i> Dr. Joan Pham , Sikorsky Aircraft Corp. and Dr. Stephen Felter , Lockheed Martin Systems Integration			
1045-1115 <i>Paper # 1</i>	An Approach to Military Airworthiness Certification of a Previously Developed Helicopter from a Flying Qualities Perspective (303) Benjamin Kangas*Kevin Schurek, Shawn Disarufino, The Boeing Company	<i>Paper # 5</i> A Historical Survey of Operational Effectiveness in Relation to Preliminary Design (52) Robert Scott*, US Army	<i>Paper # 5</i> Thermal Behavior of Aerospace Spur Gears in Normal and Loss-of-Lubrication Conditions (67) Robert Handschuh*, NASA	<i>Paper # 5</i> Experimental Investigation of Rotorcraft Outwash in Ground Effect (25) Philip Tanner*, Austin Overmeyer, U.S. Army Aeroflightdynamics Directorate; Luther Jenkins, Chung-Sheng Yao, Scott Bartram, NASA Langley Research Center
1115-1145 <i>Paper # 2</i>	A DAVBA Approach for Complex VTOL Aircraft Development (359) Daniel Schrage*, Georgia Tech; Alexx VanderVelden, Dassault Systemes		<i>Paper # 6</i> Aluminum Metal Matrix Composite Liner Testing (314) Bruce Hansen*, Sikorsky Aircraft	<i>Paper # 6</i> Flight Test Measurement of Ship Airwake Disturbances using Small-Scale Rotorcraft (298) Sylvie Schafer*, The Pennsylvania State University; Joseph Horn, The Pennsylvania State University; Jared Cooper, Barron Associates, Inc.
1145-1215 <i>Paper # 3</i>	Rotorcraft Tradespace Exploration incorporating Reliability Engineering (13) Saikath Bhattacharya, Vidhyashree Nagaraju, University of Massachusetts; Eric Spero, Anindya Ghoshal, Army Research Laboratory; Lance Fiondella*, University of Massachusetts			<i>Paper # 7</i> Thermo-mechanical Characterization and Analysis of the H-60 Lag Damper (357) Norman Wereley*, Wei Hu, Grum Ngatu, University of Maryland; Curt Kothera, Ashish Purekar, Innovital Systems Inc; Roberto Semidey, Nam Phan, Naval Air Warfare Center

Technical Session E, Thursday, May 7 – Afternoon, 1:30 p.m. – 6:00 p.m.

	Advanced Vertical Flight II Suite 2A-B <i>Session Chair:</i> Michael Strauss Sikorsky Aircraft Corporation	CFD/CSD/Icing Room Suite 4C-E <i>Session Chairs:</i> Ed Reed , Sikorsky Aircraft Corp. Dr. Jinsong Bao , Sikorsky Aircraft Corp.	Avionics & Systems Suite 1C <i>Session Chair:</i> Dr. Walter Rawle , Ultra Electronics Flightline Systems and Andrew Augenstein , The Boeing Company	Manufacturing Technology & Processing Suite 5C <i>Session Chair:</i> Prof. Dan Schrage Georgia Institute of Technology
1330-1400 <i>Paper # 1</i>	Conceptual Design Of A High-Speed Variable Configuration Compound Helicopter (276) Fabio Riccardi*, Radek Possamai*, Politecnico di Milano	Performance Validation of CFD/CSD for Active and Passive Rotor Systems (226) Brian E. Wake, Byung-Young Min*, United Technologies Research Center; T. Alan Egolf, Stephen M. Makinen, Sikorsky Aircraft; Claude G. Matalanis, UTRC	Joint Common Architecture (JCA) Demonstration Architecture Centric Virtual Integration Process (ACVIP) Shadow Effort (309) Alex Boydston*, US Army AMRDEC; Peter Feiler*, Carnegie Mellon Software Engineering Institute; Steve Vestal, Adventium Labs; Bruce Lewis, US Army AMRDEC	Thermoplastic Composite Driveshafts for Vertical Flight: Progression to TRL 6 (246) John Michasiow*, Zachary August, David Hauber, Automated Dynamics
1400-1430 <i>Paper # 2</i>	Laser Doppler Velocimeter Measurements in the Ground Interaction Region of an Impinging Scale Model Jet (358) Scott Hromisin*, Nicholas Rudenko, Leighton Myers, Dennis McLaughlin, Pennsylvania State University	Investigation of the Rotor Stall Boundary Using CFD/CSD Analysis for Passive Rotor Systems (175) Brian Wake*, UTRC; Stephen Makinen, Sikorsky Aircraft Corp; C. Aaron Reimann, Byung-Young Min, UTRC; Edward Reed, Sikorsky Aircraft Corp	Innovative Integration Approaches (377) David Boyett, Jason York*, AMRDEC SED / Intrepid; H. Glenn Carter, AMRDEC AED; Anthony Edwards, AMRDEC SED / GTRI*; Scott Dennis, AMRDEC SED	Utilizing Additive Manufacturing / 3-D Printing to Optimize Design and Support Solutions for One-Off Spares and Support Product Requirements (204) Thomas Reilly*, Dominic Przano, Bell Helicopter
1430-1500 <i>Paper # 3</i>	Flight Dynamics Modeling and System Identification of a Cyclocopter in Forward Flight (334) Elena Shrestha*, Vikram Hrishikeshavan, Derrick Yeo, Moble Benedict, Inderjit Chopra, University of Maryland	Rotor Performance of a Full-Scale Heated Tail Rotor (306) Robert Narducci, The Boeing Company; Jason Wright*, Roger Aubert, Bell Helicopter	Joint Common Architecture Demonstration Lessons Learned – Honeywell Perspective (220) Alex Boydston*, US Army; John Cunningham*, Matt Warpinski, Honeywell Aerospace	Interactive Work Instructions for Bell 525 Relentless (164) Isabelle Grenier*, Bell Helicopter
1500-1530 <i>Paper # 4</i>	Development of a Quad-Rotor Biplane MAV with Enhanced Roll Control Authority in Fixed Wing Mode (330) Christopher Bogdanowicz*, Vikram Hrishikeshavan, Inderjit Chopra, University of Maryland	Active Aerodynamic Load Reduction on a Rotorcraft Fuselage with Rotor Effects - A CFD Validation Effort (219) Brian Allan*, Norman Schaeffler, Luther Jenkins, Chung-Sheng Yao, NASA Langley Research Center; Philip Tanner, Oliver Wong, US Army	Joint Common Architecture Demonstration Lessons Learned - Sikorsky/Boeing Perspective (205) Scott Wigginton*, Aviation Applied Technology Directorate; Thomas DuBois, The Boeing Company; Bill Kinahan, Sikorsky Aircraft*; Andrew Bereson, The Boeing Company	New Developments in the Manufacture of Invar® Tooling for Composite Components (154) Christian Duquenne, Ferry Capitain ; Simon Durham*, Monmet
1530-1600	Refreshment Break			
1600-1630 <i>Paper # 5</i>	New Trimming Strategy for Predicting of the Unsteady Aerodynamic Characteristics of Tilt-rotor/Wing in Conversion Mode (236) Li Peng, Zhao Qi-Jun*, Zhu Qiu-Xian* Nanjing University of Aeronautics and Astronautics Nanjing	Trailing-Edge Flap Control for Minimum Vibrations Using CFD/CSD Analysis (215) Brian Wake, United Technology Research Center; Stephen Makinen*, Jinsong Bao, Sikorsky Aircraft Corporation; C. Aaron Reimann, Milos Ilak, UTRC	Future Avionic System Hybrid Processor Pooled Architectures (60) Thomas Gaska*, Lockheed Martin; Aaron Carpenter, Yu Chen, Binghamton University	Additive Manufacturing for FVL - The V-280 Roadmap (214) <i>Presentation Only</i> Tom Chiang*, Scott Allen, Bell Helicopter
1630-1700 <i>Paper # 6</i>		Assessment of CFD/CSD Analytical Tools for Improved Rotor Loads (343) Loren Ahaus*, Bell Helicopter ; Stephen Makinen, Sikorsky Aircraft Corporation; Ted Meadowcroft, Hormoz Tadghighi, The Boeing Company; Lakshmi Sankar, Georgia Tech; James Baeder, University of Maryland	Flight and Mission System Segregation in Military Avionics Systems (171) <i>Presentation Only</i> Glenn Dunham*, Rockwell Collins	
1700-1730 <i>Paper # 7</i>		Coupled CFD/CSD Analysis of an Active-Twist Rotor in a Wind Tunnel with Experimental Validation (90) Steven Massey*, NASA Langley Research Center; Andrew Kreshock, U.S. Army Research Laboratory; Martin Sekula, NASA Langley Research Center		

Technical Session E, Thursday, May 7 – Afternoon, 1:30 p.m. – 6:00 p.m.

	Structures & Materials III Suite 1B <i>Session Chairs:</i> Dr. Mark Gurvich , United Technologies Research Center and Dr. Yuriy Nikishkov , University of Texas at Arlington	Test & Evaluation III Suite 1D <i>Session Chair:</i> Marc Alexander , National Research Council of Canada	Unmanned VTOL Aircraft & Rotorcraft II Suite 5D <i>Session Chair:</i> Chad Goerzen San Jose State University	Safety Special Session Suite 5A-B <i>Session Chair:</i> William (Tony) Randall Bell Helicopter
1330-1400 <i>Paper # 1</i>	A Multiscale Bondline Damage Characterization and Hybrid Analysis Approach for Adhesively Bonded Composite Structures (167) Eugene Fang, Jim Lua*, Global Engineering and Materials, Inc.*; Jessica Zhang, Carnegie Mellon University; Anisur Rahman, Nam Phan, Naval Air Warfare Center (PAX)	Analysis of Chinook AFCS Induced Divergent Pitch Oscillations with Reference to an Australian Army Accident (391) Rhys Lehmann*, Defence Science and Technology Organisation	Instrumented Deck Landing Cueing in Unmanned Aircraft Systems (150) Bernard Ferrier, Hoffman Engineering LLC*; Robert Ernst, Naval Air Systems Command (NAVAIR); Ajay Sehgal, Wyle Laboratories, Inc.	A Review of Accident and Incident Cause Factors Tony Randall, Bell Helicopter
1400-1430 <i>Paper # 2</i>	Nondestructive Inspection of Composite Structures based on Limited Angle X-ray Computed Tomography (361) Yuriy Nikishkov*, Ekaterina Bostaph, Andrew Makeev, University of Texas at Arlington	ONERA S1MA Wind Tunnel Testing Capabilities of a Modern Tilt Rotor (109) Frederic Lebrun*, Dominique Munier, Julien Decours, Philippe Beaumier, ONERA	A Control Architecture For Fast And Precise Autonomous Landing Of A VTOL UAV Onto An Oscillating Platform (325) Botao Hu, Rensselaer Polytechnic Institute*; Lu Lu, Rensselaer Polytechnic Institute; Sandipan Mishra, Rensselaer Polytechnic Institute	
1430-1500 <i>Paper # 3</i>	A Numerical Optimization of Lightweight Multilayer Armour (263) Andrea Manes*, Marco Giglio, Politecnico di Milano	Design, Fabrication, Test, and Evaluation of Small-Scale Tiltrotor Whirl Flutter Wind Tunnel Models (320) Guillermo Costa*, Sandilya Kambampati, Samuel Johnson, Edward Smith, Penn State VLRCOE	System Identification and Controller Optimization of a Quadrotor UAV (49) Wei Wei, University of Cincinnati*; Mark Tischler, AMRDEC, US ARMY; Kelly Cohen, University of Cincinnati	Case Study of IIMC Event and the Potential of Technology Seth Buttner, AB Helicopters
1500-1530 <i>Paper # 4</i>	Integration of 3D Scan Data into the Finite Element Analysis Workflow for Simulation of Rotorcraft Components (373) Jonathan Knoll*, Jeffrey Nissen, Bell Helicopter	Autorotation: Building a Live Man's Curve (96) José Ricardo Scarpari, João Otávio Arantes Filho*, Flight Tests and Research Institute; Donizeti de Andrade, Technological Institute of Aeronautics		
1530-1600	Refreshment Break			
1600-1630 <i>Paper # 5</i>	Multi-Body Peridynamics for Failure Prediction in Rotating Thick Composites (198) Erdogan Madenci*, Atila Barut, University of Arizona; Nam Phan, Naval Air Systems Command (NAVAIR)	Pilot Head and Body Vibration in Response to Main Rotor Track-and-Balance Tuning (143) G. Lorne Craig*, Heather Wright-Beatty, Jocelyn Keillor, Marc Alexander, National Research Council of Canada		Single IFR Certification Initiative Paul Schaaf, AHS International Advisor for Technology in Regulations
1630-1700 <i>Paper # 6</i>	Surrogate Modeling Method Applied to a Typical Multivariable Structural Stress Evaluation Problem (182) Guillaume Biron*, Maxime Lapalme, Marc Ouellet, Bell Helicopter	Improving the US Army Rotor Smoothing Algorithm and Coefficient Development Process (77) James Hunt*, US Army Ronald Bednarczyk, US Army; Douglas Ott*, US Army (Avion Solutions)		
1700-1730 <i>Paper # 7</i>		Development Of A Generic Test For Transient Recovery Handling From Helicopter Active Inceptor System Failures To A Near-Zero Control Force Condition (338) Mario Muellhaeuser, DLR; Miles Barnett*, ETPS		