



Acoustics

Acoustics I

Technical Session B: Wed. May 8, 2024 - 8:00 AM to 12:15 PM

8:00 AM - 8:30 AM

Numerical Aeroacoustic Simulation of Shrouded and Unshrouded Coaxial Rotors (Paper 1186)

Gabriel Reboul,* French Aerospace Lab (ONERA); Erica Gallo, von Karman Institute Fluid Dynamics;

8:30 AM - 9:00 AM

Experimental Investigation of Coaxial Co-Rotating and Counter-Rotating Rotor Acoustics in Hover (Paper 1287)

Vasha Sedlacek,* Matthew Asper, Jayant Sirohi, Kunal Rahul Yadav, University of Texas Austin;

9:00 AM - 9:30 AM

2023 Cheeseman Best Paper: A Comprehensive Helicopter Acoustic Modeling Tool Based on Simulation and Experiment (Paper 1409)

Frederic Guntzer,* Julien Caillet, Charles Cariou, Pierre Dieumegard, Enric Roco Leon, Jean-Paul Pinacho, Airbus Helicopters;

10:15 AM - 10:45 AM

Investigation of Airfoil Parameterizations and Optimization for Rotor Broadband Noise Reduction (Paper 1115)

Jordon Won,* Seongkyu Lee, University of California, Davis;

10:45 AM - 11:15 AM

Modeling Approach and Departure Noise of the Joby Aviation Aircraft (Paper 44)

Austin Thai,* Jeremy Bain, Joby Aviation;

11:15 AM - 11:45 AM

Computational Acoustic Prediction on the Aerodynamic and Acoustic Rotorprop Test (Paper 1067)

Zhongqi Jia,* Rohit Jain, Joon W. Lim, US Army DEVCOM AvMC;

Acoustics II

Technical Session C: Wed. May 8, 2024 - 1:45 PM to 6:00 PM

1:45 PM - 2:15 PM

An Experimental Evaluation of an Electronic Rotor Phase Synchronization System for Multirotor Aircraft Noise Control (Paper 1194)

Vitor T. Valente, Eric Greenwood,* Eric N. Johnson, Pennsylvania State University;

2:15 PM - 2:45 PM

Frequency Domain gappy-POD for Rotor Acoustic Measurement Optimization (Paper 1121)

Charles Tinney,* John Valdez, Irene Zhao-Dubuc, Applied Research Laboratories;

2:45 PM - 3:15 PM

Understanding Takeoff and Landing Noise for Small Multirotor Vehicles (Paper 1157)

Rupak Chaudhary,* Eric Greenwood, Andrew Jue, Bhaskar Mukherjee, Kenneth S. Brentner, Vitor T. Valente, Pennsylvania State University;

4:00 PM - 4:30 PM

Generalized Linear Modeling of Rotorcraft Acoustic Flight Test Data (Paper 31)

James Stephenson,* US Army DEVCOM AvMC;

4:30 PM - 5:00 PM

Multirotor Noise Source Separation and Characterization from Ground-Based Acoustic Measurements (Paper 1070)

Joel Sundar Rachaprolu,* Ezzeldin El Sharkawy, Eric Greenwood, Vitor T Valente, Pennsylvania State University;

5:00 PM - 5:30 PM

Numerical and Flow Sensitivity Study of Propeller and Wing Interaction Noise (Paper 1240)

Nikos Trembois, Ethan Brown, Seongkyu Lee,* University of California, Davis; Kenneth Brentner, Pennsylvania State University;

Acoustics III

Technical Session D: Thurs. May 9, 2024 - 10:15 AM to 12:15 PM

10:15 AM - 10:45 AM

Aerodynamic and Aeroacoustic Investigation of Installation Effects of the Volocopter-2X Rod Structure (Paper 1098)

Moritz Muth,* Manuel Ke♦Ler, Ewald Kr♦Mer, University of Stuttgart;

10:45 AM - 11:15 AM

Noise Modeling of a Tilt-Rotor Air Taxi Configuration Utilizing a Hybrid Acoustic Analogy Approach (Paper 1085)

Teresa Baerens,* Technical University Munich;

11:15 AM - 11:45 AM

Predictions of eVTOL Broadband Noise from High-Fidelity CFD Loads (Paper 1336)

Brendan Smith,* Ullhas Hebbar, Rensselaer Polytechnic Institute; Farhan Gandhi, North Carolina State University;

11:45 AM - 12:15 PM

Numerical Analysis for Active Noise Control of Rotor based on Dynamic Variable-diameter Method (Paper 1259)

Yan Ding,* Xi Chen, Bo Wang, Guoqing Zhao, Qijun Zhao, Nanjing University of Aeronautics and Astronautics;



Advanced Vertical Flight

Advanced Vertical Flight I

Technical Session A: Tues. May 7, 2024 - 8:00 AM to 12:30 PM

8:00 AM - 8:30 AM

Design and Initial Flight Testing of a Coaxial Tilting-Head Compound Rotorcraft (Paper 8)

James Bennink,* Jack Langelaan, Pennsylvania State University;

8:30 AM - 9:00 AM

Performance Impacts of Wing and Rotor Placement on a Quadrotor Tailsitter (Paper 1244)

Robert Niemiec,* Rensselaer Polytechnic Institute; John Gerdes, Remi Hensel, Jean-Paul Reddinger, DEVCOM Army Research Lab; Farhan Gandhi, North Carolina State University;

9:00 AM - 9:30 AM

Nonlinear Flight Dynamics Modeling of an Air-Launched Tailsitter UAS (Paper 6)

Reuben-Wayne Stewart,* Moble Benedict, Jack Dooher, Texas A&M University;

10:00 AM - 10:30 AM

Parametric Analysis of Rotor Orientation and Location for a Highly Efficient Winged Quadcopter (Paper 1187)

Richard Healy,* Oak Ridge Associated Universities; Phuriwat Anusonti-Inthra, Matthew Floros, DEVCOM Army Research Lab;

10:30 AM - 11:00 AM

Design and Flight Dynamics of a Hand-Launched Foldable Micro Air Vehicle (Paper 26)

Connor Elliott, Nicolas Belgum, Moble Benedict, Hunter Denton, Vishnu Saj,* Texas A&M University;

11:00 AM - 11:30 AM

Transitioning eVTOL Aircraft with Augmentative Cross-Modal Elements (Paper 1250)

Gary Robert Gress,* University of Calgary;

11:30 AM - 12:00 PM

Design and Development of Swashplateless Micro Helicopter with Pitch-Lag Coupling (Paper 1291)

Kirti Bhatnagar, Abhishek Abhishek,* Bidhan Arya, Divyanshi Bansal, IIT Kanpur;

12:00 PM - 12:30 PM

Investigation of Rotor Vertical Offset Effects on Quadrotor Performance (Paper 1388)

Abraham Atte,* Juergen Rauleder, Georgia Institute of Technology;

Advanced Vertical Flight II

Technical Session C: Wed. May 8, 2024 - 1:45 PM to 6:00 PM

1:45 PM - 2:15 PM

Aircraft Design Implications for Urban Air Mobility Vehicles Performing Public Good Missions (Paper 1057)

Christopher Silva,* NASA Ames Research Center; Eduardo Solis, Science and Technology Corporation;

2:15 PM - 2:45 PM

Interactional Aerodynamics between a Rotor and a Blade-Tip-Propeller through Wind Tunnel and Hover Stand Testing (Paper 1217)

Robert Brown,* US Navy Warfare Center (Carderock); Inderjit Chopra, University of Maryland;

2:45 PM - 3:15 PM

Preliminary Investigation into Future Martian Multicopter Configurations (Paper 1266)

Vishal Youhanna,* Leonard Felicetti, Dmitry Ignatyev, Cranfield University;

4:00 PM - 4:30 PM

Why It Takes More Energy to Decrease Rotor/Propeller Noise for eVTOL Aircraft (Paper 1236)

Riccardo Roiati,* Richard Anderson, Xavier Santacruz, VerdeGo Aero;

4:30 PM - 5:00 PM

Impact of the Wind on the Hovering Performance of Stabilized Payload Lifting with a Single Tethered Fixed-Wing Aircraft (Paper 35)

Maxime Doguet,* David Rancourt, Universit  de Sherbrooke, Createk Innovation Group;



Aerodynamics

Aerodynamics I

Technical Session A: Tues. May 7, 2024 - 8:00 AM to 12:00 PM

8:00 AM - 8:30 AM

Quantification of the Aerodynamic Interference for Counter-Rotating Coaxial Rotors In-Ground Effect (Paper 4)
Zachary Moore,* Vrishank Raghav, Lokesh Silwal, Aditya Vijayaraj, Auburn University;

8:30 AM - 9:00 AM

Unsteady Loads of a Scaled Rotor on and near the Landing Deck of the NATO Generic Destroyer with Concurrent Stereo PIV and Surface Pressure Measurements (Paper 1063)
Wei-Han Chen,* Juergen Rauleder, Georgia Institute of Technology;

9:00 AM - 9:30 AM

Volumetric Wake Investigation of a Free-Flying Quadcopter using Shake-The-Box Lagrangian Particle Tracking (Paper 1161)
Claus Christian Wolf,* Johannes Bosbach, Alexander Heintz, Daniel Schanz, Andreas Schröder, Clemens Schwarz, Tobias Ströbing, German Aerospace Center (DLR);

10:00 AM - 10:30 AM

Experiments and Modelling of Multicopter Rotor Response to Sinusoidal Vertical Gusts (Paper 1148)
Anthony Gardner,* Johannes Braukmann, Anna Kostek, Felix Loessle, German Aerospace Center (DLR);

10:30 AM - 11:00 AM

Experimental Whirl Tower Tests Approaching and Surpassing Stall for a Variety of Tip Speeds and Rotor Blades (Paper 1208)
Matti Mitropoulos,* Aaron Barth, Verena Heuschneider, Ilkay Yavrucuk, Technical University Munich;

11:30 AM - 12:00 PM

Experimental Investigation of Rotor Blade Structural Response In Hovering and Advance Flight at Low Reynolds Number Conditions (Paper 1228)
Alexander Croke,* Richard Green, University of Glasgow; Anya Jones, Oliver Wild, University of Maryland;

12:00 PM - 12:30 PM

Comprehensive Aerodynamic Analysis of PIV Measurements in the NFAC 80- by 120-ft Test Section Towards Understanding HVAB Hovering Rotor Characteristics (Paper 1351)
Manikandan Ramasamy,* US Army DEVCOM AvMC; Thomas Norman, NASA; James Heineck, Edward Schairer, Gloria Yamauchi, NASA Ames Research Center;

Aerodynamics II

Technical Session B: Wed. May 8, 2024 - 8:00 AM to 12:15 PM

8:00 AM - 8:30 AM

A Quasi-Prescribed Vortex Wake Method Capturing Rotor Wake Distortion (Paper 1116)
Racheal Erhard,* Juan Alonso, Stanford University;

8:30 AM - 9:00 AM

Actuator Line and Immersed Boundary Methods for Rotorcraft CFD (Paper 1128)
Dylan Jude,* Shirzad Hosseinverdi, Science and Technology Corp.; Ronan Boisard, Stéphane Ron, French Aerospace Lab (ONERA); Jay Sitaraman, US Army DEVCOM AvMC;

9:00 AM - 9:30 AM

Exploiting of Virtual Blade Modelling on the performance study of a shrouded tail rotor (Paper 1154)
Elena Cerudelli,* James Barber, Gregorio Frassoldati, Leonardo S.p.A.; Christian Spiess, Kopter Group;

10:15 AM - 10:45 AM

Efficient Hybrid Wake Modelling for Advanced Configuration Design and Analysis (Paper 1211)

Glen Whitehouse,* Alexander Boschitsch, Daniel Wachspress, Continuum Dynamics, Inc.;

10:45 AM - 11:15 AM

Rotor Blade Design Optimization with Airfoil Consideration Using Advanced Reduced Order Models (Paper 1261)
Yoonpyo Hong,* German Aerospace Center (DLR); Dawoon Lee, Agency for Defense Development; Yu-Eop Kang, Kwanjung Yee, Seoul National University;

11:15 AM - 11:45 AM

Verification of Radially Continuous Actuator-Based Models for Rotors in Hover (Paper 1323)
Ullhas Udaya Hebbar,* Robert Niemiec, Rensselaer Polytechnic Institute; Jean-Paul Reddinger, DEVCOM Army Research Lab; Farhan Gandhi, North Carolina State University;

11:45 AM - 12:15 PM

A Dual-Step Deep Learning-Based Surrogate Model for Dynamic Stall Predictions (Paper 1325)
Jennifer Abras,* Nathan Hariharan, HPCMP CREATE;

12:15 PM - 12:45 PM

Numerical Investigation of Turbulence Transition Models for the Prediction of Helicopter Rotor Performance in Hover (Paper 1360)
François Richez,* French Aerospace Lab (ONERA);

Aerodynamics III

Technical Session C: Wed. May 8, 2024 - 1:45 PM to 6:00 PM

1:45 PM - 2:15 PM

Full Vehicle Simulations of a Helicopter in Steady Autorotation (Paper 1065)
Steven Tran,* Science & Technology Corp.; Mark Lopez, U.S. Army Combat Capabilities Development Command Aviation & Missile Center;

2:15 PM - 2:45 PM

Tiltwing Transition Flight Analysis Using High-Fidelity CFD (Paper 1229)
David Garcia Perez,* Anthony Sanguinetti, Patricia Ventura Diaz, Seokkwan Yoon, NASA Ames Research Center;

2:45 PM - 3:15 PM

Exploring the Connection between Leading-Edge Suction and Dynamic Stall on Rotors in Forward Flight using Computational Results (Paper 1238)
Yi Tsung Lee, Ashok Gopalarathnam,* Chi-An Yeh, North Carolina State University; Rohit Jain, US Army DEVCOM AvMC;

4:00 PM - 4:30 PM

Effect of Gust on Coaxial Rotors using Free Vortex Methods (Paper 1262)
Shrivathsan Narayanan,* Aaditya Chandel, Bharath Govindarajan, Indian Institute of Technology Madras;

4:30 PM - 5:00 PM

Multi-Fidelity Investigation of Aerodynamics and Acoustics of the Joby Aviation Aircraft using CREATE™ AV Helios (Paper 1282)
Beatrice Roget,* Joon Lim, Jayanarayanan Sitaraman, US Army DEVCOM AvMC; Jeremy Bain, Daniel Escobar, Austin Thai, Joby Aviation; Dylan Jude, Science and Technology Corporation;

5:00 PM - 5:30 PM

Computational Analysis of Behavior and Structures of Coaxial Rotor Hub and Sail Fairing Wake (Paper 1312)
Neal Deore,* James Coder, Pennsylvania State University;

Aerodynamics IV

Technical Session E: Thurs. May 9, 2024 - 1:30 PM to 5:30 PM

1:30 PM - 2:00 PM

Investigation of Modeling Approaches to High-Fidelity Computational Predictions of Tiltrotor Hover Aeromechanics (Paper 1089)
Alex Moushegian, David Farish,* Eric Hayden, Naval Air Warfare Ctr. Aircraft Div. (NAWCAD); Andrew Bodling, Science and Technology Corp.;

2:00 PM - 2:30 PM

Download Investigation Comparing Mid-Fidelity Techniques Against High-Fidelity Computations and Experiment for the ROBIN Tunnel Model (Paper 1090)
Jennifer Abras,* Nathan Hariharan, HPCMP CREATE;

2:30 PM - 3:00 PM

Numerical and Experimental Investigation of Stall on the MERIT Rotor in Hover (Paper 1118)
Giacomo Baldan,* Alberto Guardone, Politecnico di Milano; Verena Heuschneider, Matti Mitropoulos, Ilkay Yavrucuk, Technical

University Munich;

3:30 PM - 4:00 PM

Comparison of Experimental and CFD Results for RAIDER X[reg] Competitive Prototype 1/9th Scale Model
(Paper 1255)

Kalki Sharma,* Patrick Bowles, Colin Bunting, Dylan Dziuba, Katherine Gruber, Vera Klimchenko, Peter Lorber, Nick Tuozzo, Brian Wake, Sikorsky, a Lockheed Martin Co.; Andrew Bodling, Science and Technology Corporation;

4:00 PM - 4:30 PM

Full Vehicle Helios Model Performance Correlation with SB>1 Defiant[reg] Flight Test (Paper 1313)

Byung-Young Min,* Daniel Griffiths, Jeewoong Kim, Vera Klimchenko, Jacob Neiswonger, Brian Wake, Sikorsky, a Lockheed Martin Co.;

4:30 PM - 5:00 PM

Experimental and Computational Investigations of Propeller-Wing Interactions for Varying Propeller Tilt Angles
(Paper 1337)

Shreyas Srivathsan,* Juergen Rauleder, Marilyn Smith, Pranav Sridhar,* Georgia Institute of Technology;

5:00 PM - 5:30 PM

Wind Tunnel Testing Of Heavy Class Attack Helicopter In A Pressurized Wind Tunnel and Validation of CFD Analyses (Paper 1344)

Osman Gungor, Ayberk Caglar, Alper Ezertas, Muhammed Kilic,* Turkish Aerospace;



Aircraft Design

Aircraft Design I

Technical Session B: Wed. May 8, 2024 - 8:00 AM to 12:15 PM

8:00 AM - 8:30 AM

Gearing Matrix Definition via Control Allocation Optimization Applied to an Over Actuated Aircraft (Paper 1064)
Luca Bugliari Armenio,* Davide Cadeddu,* Nicola Cortigiani, Gaspare Vita, Leonardo Helicopters;

8:30 AM - 9:00 AM

Flight Dynamics Conceptual Design Exploration of Multirotor eVTOL (Paper 1106)
Carlos Malpica,* Christopher Silva, NASA Ames Research Center; Peter Suh, NASA Armstrong Flight Research Center;

9:00 AM - 9:30 AM

High Fidelity CFD/CSD Method for Rotor Blade Optimization (Paper 1221)
Mark Woodgate,* George Barakos, University of Glasgow;

10:15 AM - 10:45 AM

Experimental and Analytical Approach Towards Determining an Optimal Wing Arrangement for eVTOL Aircraft based on Aerodynamic Performance and Handling Qualities (Paper 1251)
Shawn Lim,* Philemon Koh Jun Kai, Satish Suppiah, James Wang, Eden Lee Yao Rong, Nanyang Technological University, Singapore;

10:45 AM - 11:15 AM

Deep Learning Framework for Design and Optimization of Rotor Blades (Paper 1269)
Apurva Anand,* University of Maryland; James D Baeder, Koushik Marepally, University of Maryland College Park;

11:15 AM - 11:45 AM

Aerodynamic Optimization and Experimental Analysis of Shrouded Rotor Blades (Paper 1289)
Abdallah Dayhoum,* Robert Martinuzzi, Alejandro Ramirez-Serrano, University of Calgary;

11:45 AM - 12:15 PM

An Open-Source Based Optimization Toolbox for Rotorcraft Airframe (Paper 1295)
Dominik Schwinn,* Kagan Atci, Dieter Kohlgraber, Michael Petsch, Peter Weiland, German Aerospace Center (DLR);

Aircraft Design II

Technical Session C: Wed. May 8, 2024 - 1:45 PM to 6:00 PM

1:45 PM - 2:15 PM

Dragonfly Rotor Optimization using Machine Learning Applied to an OVERFLOW Generated Airfoil Database (Paper 1316)
Jason Cornelius,* NASA Ames Research Center; Sven Schmitz, Pennsylvania State University;

2:15 PM - 2:45 PM

High-Speed Compound Rotorcraft Performance and Design (Paper 1150)
Peter Weiland,* Kagan Atci, Dominik Schwinn, German Aerospace Center (DLR);

2:45 PM - 3:15 PM

Design and Testing of a Highly Redundant Electro-Mechanical Actuator for Aircraft Primary Flight Control Applications (Paper 1395)
Uwe T. P. Arnold,* Jan Haar, Airbus Helicopters Technik GmbH;

4:00 PM - 4:30 PM

Comparison of Aerodynamic Performance of Fenestron and Open Tail Rotors (Paper 1147)
Stephen Strickland,* Roy Hartfield, Auburn University; Jacques Virasak, R1202, LLC; Vivek Ahuja, Research In Flight;

4:30 PM - 5:00 PM

40th Student Design Competition Undergraduate Winner: Georgia Tech & US Military Academy The Harpy High

Speed Take-Off and Landing (HSVTOL) Aircraft (Paper 1411)
Walther Chong,* Gray Simmons,* Georgia Institute of Technology;

5:00 PM - 5:30 PM

40th Student Design Competition Graduate Winner: UMD Arion High-Speed Vertical Takeoff and Landing (HSVTOL) Aircraft (Paper 1410)

Nathan O'Brien,* Xavier Delgado,* University of Maryland;

Aircraft Design III

Technical Session D: Thurs. May 9, 2024 - 10:15 AM to 12:15 PM

10:15 AM - 10:45 AM

Optimization of Electrified, Variable Speed Drivetrain Concepts for Enhanced Vehicle Performance (Paper 1315)

Aaron VanLandingham,* Robert Bill, David Hall, Edward Smith, Pennsylvania State University;

10:45 AM - 11:15 AM

Conceptual Design and Proof-of-Concept Demonstration of Electric Unmanned Aerial Vehicle for Logistics at High Altitude (Paper 7)

Nishant Raj, Abhishek Abhishek,* Vardhman Jain, IIT KANPUR; Ram Mohan Padmakumar, EndureAir;

11:15 AM - 11:45 AM

Project Zero Lessons Learned: A Perspective 10 Years On (Paper 1192)

Massimo Brunetti,* Gianni Baldi, Andrea D'Andrea, Luca Medici, Guido Mililotti, Roberto Pretolani, Fabio Veronelli, Jianye Zhang, Leonardo Helicopters; Matteo Redaelli, Luigi Ricci Moretti, Individual;



Autonomy & UAS

Autonomy & UAS I

Technical Session A: Tues. May 7, 2024 - 8:00 AM to 12:00 PM

8:00 AM - 8:30 AM

Autonomous Rotorcraft Project -- Retrospective and Future Outlook (Paper 1071)

Matthew Whalley,* James Carr, Brian Fujizawa, Chad Goerzen, Jeffery Lusardi, LTC Wesley Ogden, LTC (Ret) Carl Ott, Marc Takahashi, David Waldman, US Army DEVCOM; Gregory Schulein, San Jose State Research Foundation; Nathan Mielcarek, Universities Space Research Association;

8:30 AM - 9:00 AM

An Offline Path Planner for Full Scale Helicopters (Paper 1247)

Awantha Jayasiri,* Marc Alexander, Kris Ellis, Derek Gowanlock, Arthur Gubbels, Sion Jennings, National Research Council;

9:00 AM - 9:30 AM

Optimizing Explicit Model-Following Trajectory Control Laws for a Vectored Thrust Configuration (Paper 1277)

Imon Chakraborty,* Anthony Comer, Auburn University;

10:00 AM - 10:30 AM

System Identification of a Hovering Quadrotor Biplane Tailsitter with Canted Motors

(Paper 1190)

Jean-Paul Reddinger, Jonah Whitt,* DEVCOM Army Research Lab; Ondrej Juhasz, United States Naval Academy;

10:30 AM - 11:00 AM

A Data-Driven Approach to Onboard Aerodynamic Sensing and Estimation for Tailsitter UAVs (Paper 1334)

Derrick Yeo,* Elena Shrestha, University of Michigan; Matthew Floros, John Gerdes, Jean-Paul Reddinger, DEVCOM Army Research Laboratory;

11:00 AM - 11:30 AM

Parametric Actuator-Based Numerical Investigation of Rotor-Ground Interaction (Paper 1386)

Ullhas Udaya Hebbar,* Robert Niemiec, Rensselaer Polytechnic Institute; Jean-Paul Reddinger, DEVCOM Army Research Lab; Farhan Gandhi, North Carolina State University;

11:30 AM - 12:00 PM

VTOL UAS Auto-recovery Using A Tested Long-Term Motion Prediction Method to define the Deck Environment

(Paper 1058)

Bernard Ferrier,* Syntek Technologies, Inc; Commander Brad Watson, RN, Royal Navy; Michael Belmont, Jacqueline Christmas, University of Exeter;

12:00 PM - 12:30 PM

Development and Validation of 3D Feature-Based Vision Algorithm for Autonomous Ship-Deck Landing (Paper

1339)

Victoria Britcher,* Inderjit Chopra, Anubhav Datta, University of Maryland;

Autonomy & UAS II

Technical Session B: Wed. May 8, 2024 - 8:00 AM to 12:15 PM

8:00 AM - 8:30 AM

Launched Effects and Advanced Teaming Require System for System MOSA (Paper 1389)

Dave Walsh,* Robin Rajbhandari, Matt Sipe, Parry Labs; Levi Van Oort, Collins Aerospace; Mike Hubler, Tektonux; Glenn Carter, Scott Dennis, Jason Rupert, US Army AvMC; Alan Hammond, US Army PEO Aviation;

8:30 AM - 9:00 AM

Design of a high-performance Flight Control System for Unmanned Helicopters (Paper 1112)

Guillaume Varra,* Anthony Atencia, Damien Billet, Frédéric Ric Blanc,* Quentin Milliat, Antoine Monneau, Airbus Helicopters;

9:00 AM - 9:30 AM

Integrated Flight Control System Architecture and Robustness Analysis for a Lift-to-Cruise Aircraft with Incremental Nonlinear Dynamic Inversion (Paper 1206)

Denis Surmann,* Stephan Myschik, Purav Panchal, University of Bundeswehr Munich;

10:15 AM - 10:45 AM

Handling Qualities Analysis of a Large Multi-Rotor eVTOL Using RPM, Collective and Cyclic Control Allocation Methods (Paper 1299)

Shivansh Agrawal, Kyle Collins,* Patric Hruswicki, Syed Zuhair Ali Razvi, Embry-Riddle Aeronautical University;



Avionics and Systems

Avionics & Systems I

Technical Session C: Wed. May 8, 2024 - 1:45 PM to 6:00 PM

1:45 PM - 2:15 PM

Architectural Enablement for Time Sensitive Communications (Paper 1062)

Gary Gilliland,* DDC-I Inc.;

2:15 PM - 2:45 PM

Airworthiness Certification of Ethernet-Based Networks as a System (Paper 1087)

Michael Mustillo,* Wolfram Zischka, TTTech; Daniel Finnegan, TTTech North America;

2:45 PM - 3:15 PM

Introduction to the US Army PEO Aviation (PEO AVN) Enterprise Architecture Framework (EAF) (Paper 1169)

Thomas A. DuBois,* Aaron Cleary, R. Alan Hammond, Jr., Jonathan Hay, Ethan Scott, John Stough, JHNA; Matthew J. Steiger, Keith B. Zook, Intuitive Research & Technology;

4:00 PM - 4:30 PM

TSN-Based Zonal Architecture for Digital Backbone (Paper 1218)

Abdul Jabbar,* Prabhu Janakaraj, GE Aerospace Research;

4:30 PM - 5:00 PM

Security in Avionics Systems (Paper 1061)

Gary Gilliland,* DDC-I Inc.;

5:00 PM - 5:30 PM

A Mission Systems Flying Testbed to Enable Rapid Evaluation of Innovative Technologies and Integration Approaches against Modular Open Systems Approach (MOSA) Objectives (Paper 1301)

Ashton Farr, Mohammad Al-Husseini, Ayende Ibere,* Georgia Tech Research Institute; Scott Wigginton,* US Army DEVCOM AvMC;

5:30 PM - 6:00 PM

Malfunction Tests in a Laboratory Environment for Vehicle Systems Certification (Paper 1296)

Vincenzo Taumaturgo,* Elena Sofia Abbagnato,* Leonardo Helicopters;

Avionics & Systems II

Technical Session E: Thurs. May 9, 2024 - 1:30 PM to 5:30 PM

1:30 PM - 2:00 PM

Navigating Airworthiness Concerns with Deploying AI/ML Applications – A Brief Survey (Paper 32)

Glenn Carter,* Alexander Chan, Victor Terres, US Army DEVCOM AvMC; Jason Rupert, Modern Technology Solutions Inc.; Allen Scales, Torch Technologies Inc.;

2:00 PM - 2:30 PM

Rotorcraft guidance with sampling based model predictive control (Paper 1051)

Alexej Dikarew,* Tobias Winkler, German Aerospace Center (DLR);

2:30 PM - 3:00 PM

Complementary PNT with Fusion Artificial Intelligence Link Synchronization Array for eVTOL Systems (FAILSAFES™) (Paper 1055)

Wil Myrick,* Tom Matarese, Mike Tolfree, ENSCO, Inc.;

3:30 PM - 4:00 PM

Fault-Tolerant Electric Actuation: A Condition to Make Electric Platforms Certifiable (Paper 1242)

Francesco Biagetti,* Nicola Borgarelli, Frederic Malleret, Stefano Pelliccia, UMBRAGROUP;

4:00 PM - 4:30 PM

The Canadian Vertical Lift Autonomy Demonstration Project – High Level Concepts for the Development of Autonomy (Paper 1331)

Derek Gowanlock,* Bryan Carrothers, Perry Comeau, Kris Ellis, Arthur Gubbels, Sion Jennings, National Research Council Canada;

4:30 PM - 5:00 PM

A Pragmatic Approach to DO-178C-Inclined Software Development for Lift-to-Cruise Aircraft Nonlinear Flight Control (Paper 1293)

Purav Panchal,* Stephan Myschik, Denis Surmann, University of Bundeswehr Munich;

5:00 PM - 5:30 PM

WITHDRAWN / Not Presenting: Navigation Grade Highest performance, LowEST Cswap MEMS 3-axis Accelerometer for VTOL Applications (Paper 1392)

Louis Ross,* MEI Micro, Inc.;



Crash Safety

Crash Safety

Technical Session C: Wed. May 8, 2024 - 1:45 PM to 6:00 PM

1:45 PM - 2:15 PM

Fluid-Structure Interaction of Fuel Tanks and Airframe Structures During a Crash Event (Paper 1173)
Akif Bolukbasi,* Richard Weisenburger, Boeing Company;

2:15 PM - 2:45 PM

Development and Demonstration of a Critical Rotorcraft Safety System: Advanced Helicopter Seating System (Paper 1195)
Tyrone Minton,* Marvin Richards,* Point Blank Enterprises; John Crocco, US Army DEVCOM AvMC;

2:45 PM - 3:15 PM

Full-scale Crash Test of the AW609 Wing (Paper 1222)
Ivan Colamartino, Marco Anghileri, Politecnico di Milano; Davide Cavaleri,* Andrea Di Renzo, Fabrizio Turconi, Leonardo Helicopters;

4:00 PM - 4:30 PM

WITHDRAWN / No Presentation: Impact of Harness-Integrated Crash Restraints (Paper 1373)
Eric Anderson,* Shannon Minnich, Naval Air Warfare Ctr. (PAX);

4:30 PM - 5:00 PM

Component Characterization of an eVTOL Reference Model for Crashworthiness Studies (Paper 1059)
Jacob Putnam,* Nathaniel Gardner, Justin Littell, Matlock Mennu, NASA Langley Research Center;

5:00 PM - 5:30 PM

Study of Advanced Occupant Models to Quantify Injury Risk for eVTOL Vehicles (Paper 1201)
Nathaniel Jones,* Costin Untaroiu, Virginia Tech; Jacob Putnam, NASA Langley Research Center;



Crew Stations and Human Factors

Crew Stations I

Technical Session A: Tues. May 7, 2024 - 8:00 AM to 12:00 PM

8:00 AM - 8:30 AM

Human Readiness Level Assessment of Aviation Sensor (Paper 30)

Christine Simms,* Sarah Wehrkamp, Collins Aerospace;

8:30 AM - 9:00 AM

Development and Flight Demonstration of An Active Seat Mount System for Aircrew Whole-Body Vibration Mitigation on NRC Bell-412 Helicopter (Paper 1041)

Yong (Eric) Chen,* Amin Fereidooni, Viresh Wickramasinghe, National Research Council Canada;

9:00 AM - 9:30 AM

Customized Pilot Cervical Spine Protection Orthosis Development (Paper 1076)

Hakan Isci,* Damla Gezegen, HTM Design Inc.; Nima Heidari, Ramazan Nal, Polat Endur, zeynep Niversitesi;

10:00 AM - 10:30 AM

Full-Body Haptic and Spatial Audio Cueing Algorithms for Augmented Pilot Perception (Paper 1179)

Michael Morcos,* Spencer Fishman, Umberto Saetti, University of Maryland; Martine Godfroy-Cooper, Independent Scholar; Edward Bachelder, San Jose State University;

10:30 AM - 11:00 AM

Evaluation of Virtual and Mixed Reality Technologies in Helicopter Simulation (Paper 1182)

Tanja Martini,* German Aerospace Center (DLR);

Crew Stations II

Technical Session B: Wed. May 8, 2024 - 8:00 AM to 12:15 PM

8:00 AM - 8:30 AM

Comparison of Pilot Workload between Integrated Reality In-Flight Simulation and Flight Test of Helicopter Landings on a Frigate (Paper 1199)

Perry Comeau,* Sion Jennings, Andrew Law, Alanna Wall,* National Research Council;

8:30 AM - 9:00 AM

A meta-model for comprehensive pilot modeling (Paper 1272)

Davide Marchesoli,* Pierangelo Masarati, Andrea Zaroni, Politecnico di Milano;

9:00 AM - 9:30 AM

Pilots' Gaze Behavior During Simulated Helicopter Air-to-Air Refueling (Paper 1294)

Sven Schmidt,* Daniel Greiwe, Tim Jusko, German Aerospace Center (DLR);

10:15 AM - 10:45 AM

Pilot Flight Simulator Performance Under Distraction and Vibrotactile Situation Awareness (Paper 1343)

Bruce Mortimer, Chris Dailey, Engineering Acoustics Inc.; Barbara Chaparro, Jon French, Daniel Graff, Shelby Loftis, Makaila Olson, Embry-Riddle Aeronautical University; Michelle Duffy,* U.S. Army; Angus Rupert, US Army Aeromedical Research Lab;

10:45 AM - 11:15 AM

4D Conformal Pilot Cueing for Rotorcraft Army Operational Scenarios (Paper 1376)

Jeanine Kwon, Ceren Cansu,* Karen Feigh, JVR Prasad, Rahul Tauro-Padival, Georgia Institute of Technology;

Dynamics

Dynamics I

Technical Session A: Tues. May 7, 2024 - 8:00 AM to 12:00 PM

8:00 AM - 8:30 AM

Development and Validation of Full-Aircraft Free-Flight Maneuvering Simulation Using Tightly Coupled CFD-CSD and FCS (Paper 1174)

Jinggen Zhao,* Marco DeFreitas, Matt Kinkead, Matt Luszcz, Sikorsky, a Lockheed Martin Co.;

8:30 AM - 9:00 AM

Multicyclic Control for Vibration Reduction of Lift-Offset Coaxial Rotorcraft (Paper 1284)

Seong Hyun Hong,* Sung Nam Jung, Dong Kyun Kim, Konkuk University; Do-Hyung Kim, Korea Aerospace Research Institute;

9:00 AM - 9:30 AM

Aeromechanics Investigation of a Dual-Wing Lift Compounded Slowed Mach Scale Rotor (Paper 1234)

Vivek Uppoor,* Inderjit Chopra, Mrinalgouda Patil, University of Maryland;

10:00 AM - 10:30 AM

Prediction of Structural Rotor Loads: When to Consider Drivetrain Dynamics? (Paper 1209)

Felix Weiss,* German Aerospace Center (DLR);

10:30 AM - 11:00 AM

Design Investigation and Hover Testing of an On-blade Active Trailing-edge Flap for Higher Harmonic Control (Paper 1286)

Byeonguk Im, Kunhyuk Kong, Changbae Lee, Taekyung Lim, SangJoon Shin,* Seoul National University; Jaeha Ryi, Chungnam National University; Hyunjae Lee, Korean Air; Wonjong Eun, Supernal;

11:00 AM - 11:30 AM

Direct Load Recognition Application to Main Rotor Pitch-Link Load on the H175 Fleet: A New Wavelet Approach (Paper 1205)

Caroline Del Cistia Gallimard,* Frederic Beroul, Konstanca Nikolajevic, Airbus Helicopters; Julien Denoulet, Bertrand Granado, Christophe Marsala, Sorbonne Universit^é, CNRS, LIP6;

Dynamics II

Technical Session C: Wed. May 8, 2024 - 1:45 PM to 6:00 PM

1:45 PM - 2:15 PM

Lichten Runner-up Paper: Aeroelastic Stability of a Hingeless Hub Tiltrotor at High Speeds (Paper 1175)

Nathan O'Brien,* Anubhav Datta, University of Maryland;

2:15 PM - 2:45 PM

A Multidisciplinary Mid-fidelity Approach for Tiltrotor Wing Aeroelastic Design based on Structural Mesh Morphing (Paper 1149)

Claudio Punzi,* Mark Crooks, Eleonora Giovanardi, Andrea Mancini, Leonardo Helicopters; Federico D'Amico, Leonardo;

2:45 PM - 3:15 PM

An Indirect Stability Method Applied to Whirl Flutter using Computational Fluid Dynamics Actuator Disc Models (Paper 1367)

Nicolas Reveles,* Parthiv Shah, Adam Weiss, ATA Engineering, Inc.;

4:00 PM - 4:30 PM

Overview of RCAS Capabilities and Validations for Rotorcraft and eVTOL Applications (Paper 1105)

Matthew Hasbun,* Hossein Saber, Advanced Rotorcraft Technology, Inc.; Hyeonsoo Yeo, US Army Combat Capabilities Development Command;

4:30 PM - 5:00 PM

Analysis of Flap-Lag-Torsion Aeroelastic Stability at High Advance Ratios (Paper 1379)

Spencer Fishman,* Inderjit Chopra, University of Maryland;

5:00 PM - 5:30 PM

Aeroelastic analysis with rapid methods of the double-swept ERATO blade with an homogeneous structure in hover flight (Paper 1342)

Mikel Balmaseda Aguirre,* Fran Ois Richez, Antoine Riols-Fonclare, ONERA, Institut Polytechnique de Paris;

5:30 PM - 6:00 PM

Lichten Award Paper: Correlation of Rotor Loads during Ground Operations in a Turbulent Wind Environment (Paper 1153)

Cristiano Maria Capizzi,* Giuseppe Bucciaglia, Gregorio Frassoldati, Davide Prederi, Leonardo Helicopters;

Dynamics III

Technical Session E: Thurs. May 9, 2024 - 1:30 PM to 5:30 PM

1:30 PM - 2:00 PM

Predicting Whirl Flutter Bifurcations Using Machine Learning (Paper 16)

Maia Gatlin,* Cristina Riso, Georgia Institute of Technology;

2:00 PM - 2:30 PM

Output-Based Approach for Tiltrotor Whirl Flutter Bifurcation Analysis (Paper 1077)

Sai Vishal Gali, Cristina Riso,* Georgia Institute of Technology;

2:30 PM - 3:00 PM

Inflow Model Effects on Propeller Whirl Flutter (Paper 1156)

Sai Vishal Gali, Cristina Riso, Georgia Institute of Technology; Carlos E. S. Cesnik, Jasmine C. Chang,* University of Michigan;

3:30 PM - 4:00 PM

About the Stabilizing Effect of the Torque on Propeller Whirl Flutter (Paper 1178)

Paul Kantzidis, Vincenzo Muscarello,* Royal Melbourne Institute of Technology; Nils Bohnisch, FH Aachen University of Applied Sciences; Pierangelo Masarati, Politecnico di Milano;

4:00 PM - 4:30 PM

Sliding-Window Matrix Pencil Method for Whirl Flutter Bifurcation Analysis (Paper 1271)

Theodore Warren, Cristina Riso,* Georgia Institute of Technology;

4:30 PM - 5:00 PM

Wing and Propeller Aerodynamic Interaction Effects on Whirl Flutter Instability (Paper 1330)

Jasmine C. Chang,* Carlos E. S. Cesnik, Divya Sanghi, University of Michigan;

5:00 PM - 5:30 PM

Comparison between Gimballed and Hingeless Tiltrotor Whirl Flutter Stability with Multibody Dynamics Analyses (Paper 1353)

Jinwei Shen,* Jennifer Baggett, University of Alabama;



Electric Vertical Takeoff and Landing (eVTOL)

eVTOL 1 / Propulsion I Joint

Technical Session A: Tues. May 7, 2024 - 8:00 AM to 12:00 PM

8:00 AM - 8:30 AM

Redundancy Concepts, Considerations and Experiences on Electric Propulsion Systems (Paper 1104)

Johannes Kloetzl,* Oliver Blamberger, Fabian Denk, Johann Oswald, Compact Dynamics GmbH;

8:30 AM - 9:00 AM

Motor and Drive Design for eVTOL Aircraft (Paper 1159)

Ryan Rahn, Robert McDonald, Jack Meyers, Brad Paden, Michael Ricci,* LaunchPoint Electric Propulsion Solutions, Inc.;

9:00 AM - 9:30 AM

Maximizing Power Density in the Design of a 100 kW Geared e-Propulsion Unit (Paper 1152)

Giorgio Valente,* Davide Gottardo, Chris Halse, David Saysell, Phillip Scott, Matthew Wigmore, Hexagon MI; Andrew Johnston, Imagination Technologies;

10:00 AM - 10:30 AM

Post-ESC-Failure Performance of a UAM-Scale Hexacopter with Dual Three-Phase Motors (Paper 36)

Weston Fong,* Robert Niemiec, Ariel Walter, Rensselaer Polytechnic Institute; Farhan Gandhi, North Carolina State University;

10:30 AM - 11:00 AM

Performance Analysis of a High-Speed Tiltrotor Aircraft Featuring VerdeGo Aero's VH-5 Hybrid-Electric Turbofan Engine (Paper 1235)

Riccardo Roiati,* Richard Anderson, Jasper Nitzsche, Tyler Rice, Brock Steinfeldt, VerdeGo Aero;

11:00 AM - 11:30 AM

Dynamics of a Variable Speed Hybrid-Electric Helicopter Propulsion System (Paper 1252)

Hans DeSmidt,* Zhisheng Ai, University of Tennessee;

eVTOL II

Technical Session C: Wed. May 8, 2024 - 1:45 PM to 6:00 PM

1:45 PM - 2:15 PM

Outwash Measurement of Joby Pre-Production Prototype (Paper 1380)

Jeremy Bain,* Ricardo Chavez, James Denham, Ryan Naru, Sergei Nikolaev, Yasmina Platt, Hiroyuki Tanaka, Joby Aviation;

2:15 PM - 2:45 PM

Extension of the Analytic Vortex Ring State Model for eVTOL Application (Paper 1083)

Taemin Jeong,* Kwanjung Yee, Seoul National University; Yoonpyo Hong, Institute of Advanced Machines and Design;

2:45 PM - 3:15 PM

Coarse Parallelization of RCAS Supporting Multi-Rotor and eVTOL Configurations (Paper 1170)

Hossein Saberi, Pepijn Kessels,* Mina Taheri, Advanced Rotorcraft Technology, Inc.; Hyeonsoo Yeo, US Army DEVCOM AvMC;

4:00 PM - 4:30 PM

Impact of Detailed SFC on Hybrid-Electric VTOL Sizing (Paper 1341)

Matt Arace,* Anubhav Datta, University of Maryland;

4:30 PM - 5:00 PM

Quadcopter Noise Variation Due to Relative Rotor Phasing (Paper 1335)

Brendan Smith,* Rensselaer Polytechnic Institute; Farhan Gandhi, North Carolina State University;

5:00 PM - 5:30 PM

Minimum Energy Performance for Autonomous Control of Tiltrotor eVTOL Operations (Paper 1093)

Namuk Kang,* Linghai Lu, James Whidborne, Cranfield University;

eVTOL III

Technical Session D: Thurs. May 9, 2024 - 10:15 AM to 12:15 PM

10:15 AM - 10:45 AM

Impact of Engine Failure on the Wiring Harness Design of Electric VTOL Aircraft (Paper 1052)

Sebastian Oberschwendtner,* Mirko Hornung, Technical University Munich;

10:45 AM - 11:15 AM

Evaluation of the Potential of Photovoltaics for Extended Flight Times of Small eVTOL UAVs (Paper 1151)

Thomas Seren,* Mirko Hornung, Technical University Munich;

11:15 AM - 11:45 AM

Multifidelity Uncertainty Quantification in Battery Performance for eVTOL Flights Under Material and Loading Uncertainties (Paper 1167)

Alvaro Diaz Flores Caminero, Alexandre Guibert,* H. Alicia Kim, University of California San Diego; Anirban Chaudhuri, University of Texas Austin;

11:45 AM - 12:15 PM

Dynamic Behavior and Passive Vibration Control of a Flexible Tip-Loaded Support Arm System with Bracing Struts and Tailored Particle Impact Dampers (Paper 1361)

Siddhant Sandeep Bapat,* Richard Auhl, George Lesieutre, Siddharth Poreddy, Edward Smith, Nicholas Vlajic, Pennsylvania State University;

eVTOL IV

Technical Session E: Thurs. May 9, 2024 - 1:30 PM to 5:30 PM

1:30 PM - 2:00 PM

Overview of the Subscale RAVEN Flight Controls and Modeling Testbed (Paper 1185)

Steven Geuther,* Kasey Ackerman, Benjamin Simmons, NASA Langley Research Center;

2:00 PM - 2:30 PM

Full Flight Regime Controller Design for a Lift+Cruise eVTOL Aircraft (Paper 1279)

Alexander Keller,* Robert Niemiec, Ariel Walter, Rensselaer Polytechnic Institute; Farhan Gandhi, North Carolina State University;

2:30 PM - 3:00 PM

Flight Testing of Explicit Model-Following Trajectory Control System for Lift-Plus-Cruise and Tilt-Wing Configurations (Paper 1306)

Anthony Comer,* Rajan Bhandari, Imon Chakraborty, Yevhenii Kovryzhenko, Bikash Kunwar, Stefanus Putra, Ehsan Taheri, Auburn University;

3:30 PM - 4:00 PM

Rotary-wing vs. Fixed-wing: A Comparative Study of Pilot Performance in eVTOL Simulators (Paper 1391)

Maria Chaparro Osman,* Samantha Emerson, Cherrise Ficke,* Olivia Fox Cotton, Kent Halverson, Aptima; Steve Ellis, US Air Force;

4:00 PM - 4:30 PM

Active Vibration Damping and Harmonic Vibration Reduction in an eVTOL Aircraft Model Using Electric Rotor Torque (Paper 40)

Changik Cho,* Christopher D. Rahn, Edward Smith, Pennsylvania State University; Puneet Singh, Overair, Inc;

4:30 PM - 5:00 PM

Development of a Turbulence-Based Design Criterion for Vertiports (Paper 1356)

Guy Larose,* Maryam Al Labbad, Sharon Schajnoha, RWDI;



Handling Qualities

Handling Qualities I

Technical Session B: Wed. May 8, 2024 - 8:00 AM to 12:15 PM

8:00 AM - 8:30 AM

Piloted Simulation Evaluation of MTEs for the Assessment of Low-Level Handling Qualities (Paper 1048)

Tim Jusko,* German Aerospace Center (DLR); Tom Berger, US Army CCDC AvMC;

8:30 AM - 9:00 AM

Proposed Yaw-Axis Target Acquisition and Tracking Handling Qualities Requirement Updates (Paper 1132)

Tom Berger,* Ryan Boehringer, Anthony Gong, Jeffery Lusardi, Mohammadreza Mansur, Wesley Ogden, Carl Ott, US Army DEVCOM AvMC; Christopher Borden, US Army PEO Avn; Daniel Brown, David Daniels, US Army RTC AFTD;

9:00 AM - 9:30 AM

Piloted Simulation Handling Qualities Evaluation of a UAM-Scale Quadcopter with Hybrid RPM & Collective Pitch Control (Paper 1091)

Ariel Walter,* Robert Niemiec, Rensselaer Polytechnic Institute; Farhan Gandhi, North Carolina State University; Tom Berger, US Army CCDC AvMC;

10:15 AM - 10:45 AM

Piloted Simulation Evaluation of Damage Tolerant Control for a Tiltrotor (Paper 1348)

Tom Berger,* US Army DEVCOM AvMC; Joseph Horn, Pennsylvania State University; Derek Bridges,* Grey Hagwood, Doug Miller, Piasecki Aircraft Corp.;

10:45 AM - 11:15 AM

Piloted Simulation Evaluation of Maneuver Optimization Control for a Tiltrotor Aircraft (Paper 1172)

Joseph Horn,* Christopher Hendrick, Pennsylvania State University; Derek Bridges, Grey Hagwood, Doug Miller, Piasecki Aircraft Corp.; Tom Berger, US Army DEVCOM AvMC;

11:15 AM - 11:45 AM

Outer Loop Requirements for Vertical Lift Unmanned Aerial System Automated Flying Qualities (Paper 1171)

Christina M. Ivler,* University of Portland; William P. Geyer,* U.S. Naval Test Pilot School;

11:45 AM - 12:15 PM

Utilizing Advanced Air Mobility Rotorcraft Tools for Wildfire Applications (Paper 1079)

Jeremy Aires,* Nicholas Peters, Shannah Withrow, NASA Ames Research Center;

Handling Qualities II

Technical Session C: Wed. May 8, 2024 - 1:45 PM to 6:00 PM

1:45 PM - 2:15 PM

An Uncertainty Propagation Approach to Collective Bounce Rotorcraft-Pilot Couplings Analysis (Paper 1321)

Andrea Zanoni,* Gianni Cassoni, Davide Marchesoli, Pierangelo Masarati, Carmen Talamo, Politecnico di Milano; Francesca Colombo, Michele Zilletti, Leonardo Helicopters;

2:15 PM - 2:45 PM

Parametric Rotor Control Equivalent Turbulence Input (RCETI) Models for Different Rotor Configurations (Paper 1278)

Mahmoud Hayajnh,* J.V.R. Prasad, Georgia Institute of Technology;

2:45 PM - 3:15 PM

PIO and Handling Qualities Prediction Using the USAFTPS Bjorkman PIO Data Set (Paper 1097)

Edward Bachelder,* San Jose State University Research Foundation; Eileen Bjorkman, Air Force Test Center; Bimal Aponso, Federal Aviation Administration;

4:00 PM - 4:30 PM

Automatic Flight Control Modes for Pilot Assistance During Helicopter Shipboard Operations (Paper 1249)

Arti Kalra,* German Aerospace Center (DLR); Laurent Binet, The French Aerospace Lab (ONERA);

4:30 PM - 5:00 PM

Autonomy Demos and the Evolution of Optimally Crewed Vehicles (Paper 1168)

Kevin Christensen,* Francis Govers, Bell; Jeffrey Lusardi, US Army CCDC AvMC;

5:00 PM - 5:30 PM

Development of Model Based Pilot Controller for Automated Testing of Failure Scenarios in Automatic Flight Control System (Paper 1268)

Ahmet Kara,* Umut T◆Re, Can ◆Nen, Turkish Aerospace Industries;

Health and Usage Management Systems

HUMS I

Technical Session C: Wed. May 8, 2024 - 1:45 PM to 6:00 PM

1:45 PM - 2:15 PM

Development of a Common, Open Data Exchange (CODEX) for Rotorcraft HUMS Data (Paper 1196)

Brian Tucker, Bell; Derek Fok, Boeing Company; Eric Carney, Collins Aerospace; Catherine Cheung,* National Research Council; Kenneth T. Royar, Textron Inc;

2:15 PM - 2:45 PM

Estimating the Length of a Bearing Spall Using Tach from Vibration (Paper 1109)

Eric Bechhoefer,* GPMS International Inc.; Jacob Bortman, Omri Matania, Ben-Gurion University of the Negev;

2:45 PM - 3:15 PM

Analytical and Experimental Structural Load Variability in the UH-60A Airloads Program (Paper 1253)

Wesley Viall,* US Army DEVCOM AvMC; Farbod Fahimi, Babak Shotorban, University of Alabama, Huntsville;

4:00 PM - 4:30 PM

Evaluation of Local and Global Diagnostics for the Integration of Stochastic Time Series Models and Variational Autoencoders: Experimental Assessment on a Full Scale Helicopter Blade (Paper 1371)

Yiming Fan, Fotis Kopsaftopoulos,* Peiyuan Zhou, Rensselaer Polytechnic Institute; David Forrester, Rensselaer Polytechnic Institute;

4:30 PM - 5:00 PM

Comparison of Electronic Chip Detectors and Online Debris Monitoring for Rolling Element Bearing Spall Diagnostics (Paper 1214)

Hassan Mahmoud,* Adam Oszmian, Steve Rodger, Gastops Ltd.;

5:00 PM - 5:30 PM

Aircraft Electrical Wiring Organization - Key to an Autonomous AI (Paper 5)

Daryian Rhysing,* United Aircraft Technologies, Inc.;

HUMS II

Technical Session E: Thurs. May 9, 2024 - 1:30 PM to 5:30 PM

1:30 PM - 2:00 PM

How Computer Vision is Changing the New Way of Health Data Analysis (Paper 1181)

Abdelhafid Boutaleb,* Alexandre Diaz,* Airbus Helicopters;

2:00 PM - 2:30 PM

Data-Driven Probabilistic Health Monitoring on a Hexacopter via Time-Series Assisted Machine Learning Methods (Paper 1365)

Shinan Huang, Fotis Kopsaftopoulos,* Cassandra Vining, Peiyuan Zhou, Jingxi Zhu, Rensselaer Polytechnic Institute;

2:30 PM - 3:00 PM

Gross Weight, CG Position, and Rotor Flapping Prediction for a Compound Helicopter using Machine Learning (Paper 1328)

Anubhav Halder,* Farhan Gandhi, North Carolina State University; Gaurav Makkar, Wisk Aero;


3:30 PM - 4:00 PM

Surface Mount On-Blade Optical Telemetry System (Paper 1219)

Robert McKillip,* Continuum Dynamics, Inc.;

4:00 PM - 4:30 PM

From Dampers Estimated Loads to In-Service Degradation Correlations (Paper 1108)

Ammar Mechouche,* Valerio Camerini, Elsa Cansell, Konstanca Nikolajevic, Airbus Helicopters; Caroline Del Cistia Gallimard, Airbus Helicopters / Sorbonne Universit 

4:30 PM - 5:00 PM

Criticality Determination of HUMS Applications for Life-Adjustment (Paper 1102)

Matt Harrigan,* Sikorsky, a Lockheed Martin Co.;



History

History

Technical Session E: Thurs. May 9, 2024 - 1:30 PM to 5:30 PM

1:30 PM - 2:00 PM

That Others May Live: The Courageous Story of MASH Helicopter Detachments during the Korean War, 1950-1953
(Paper 43)

Paul Fardink,* US Army (Ret.);

2:00 PM - 2:30 PM

The Dirigible Helicopter: Korean-American Inventor Young Ho Koun's Ambitious Attempt to Make Aircraft Survivable in the Event of Loss of Control (Paper 1123)

C. Sundiata Cowels,* Future iNCITE!;

2:30 PM - 3:00 PM

F. W. Lanchester: Forgotten Contributions to Rotorcraft Aerodynamic Theory and Vehicle Design (Paper 1369)

Marilyn Smith,* Georgia Institute of Technology;

3:30 PM - 4:00 PM

Airbus Helicopters in America: The Pioneering Years (Paper 1327)

Kenneth Swartz,* Aeromedia Consultants;

4:00 PM - 4:30 PM

History and Future of VTOL Air Freight (Paper 1377)

Kaydon Stanzione,* LogistiWerx, Inc.; Daniel Schrage,* Georgia Institute of Technology;

4:30 PM - 5:00 PM

Invited Presentation: Development of the Next Generation of Army Aviation Systems – Setting the Record Straight
(Paper 1412)

Daniel P. Schrage,* Georgia Institute of Technology;



Manufacturing Technology and Processing

Manufacturing Tech. / Product Support Joint

Technical Session E: Thurs. May 9, 2024 - 1:30 PM to 5:30 PM

1:30 PM - 2:00 PM

System Installation Disparity between Theory and Practice (Paper 1126)

Jean-Loup Gatti,* Hugo Anthonioz, David Dayan, Pierre Fruitet, Airbus Helicopters;

2:00 PM - 2:30 PM

High-Fidelity Digital Twin Autoclave for Quality Informed Composite Fabrication (Paper 1139)

Jim Lua,* Anand Karuppiah, Kalyan Shrestha, Global Engineering and Materials, Inc.; Ian Guay, Nam Phan, Naval Air Warfare Ctr. (PAX); Jinhui Yan, University of Illinois;

2:30 PM - 3:00 PM

Introduction of New Infusion Manufacturing Processes for Main Rotor Blades: Opportunities, Drawbacks and a common Endeavor to make it a Success (Paper 1207)

Markus Zellhuber,* Julien Thivend,* Airbus Helicopters;

3:30 PM - 4:00 PM

Carbon Fiber Roving for Magnet Retention on BLDC Motors (Paper 1210)

Blaine Alderks,* Windings Inc;

4:00 PM - 4:30 PM

Manufacturing of Thermoplastic Composite Parts with Press Forming Technology (Paper 1362)

Marcin G?Odzik,* Aleksander Bana?, Konrad Farbaniec, Tomasz Ga?Aczy?Ski, Jaros?Aw Sienicki, Rados?Aw Wojtuszewski, PZL Mielec;

4:30 PM - 5:00 PM

Multi-Physics Modeling and Optimization Towards a Digital Twin of Quenching Process of Large-Scale Metallic Structures (Paper 1399)

Jim Lua,* Anand Karuppiah, Kalyan Shrestha, Global Engineering and Materials, Inc.; Nam Phan, Joshua Piccoli, Naval Air Warfare Ctr. (PAX); Jinhui Yan, University of Illinois;

5:00 PM - 5:30 PM

Manufacturing of Tools for Support Aviation Production using Fused Filament Fabrication and Fused Deposition Modeling Technologies, on the Example of PZL Mielec a Lockheed Martin Company (Paper 1324)

Aleksander Bana?,* Kamil Burczy, Tomasz Ga?Aczy?Ski, Marcin G?Odzik, Rados?Aw Wojtuszewski, PZL MIELEC;



Modeling and Simulation

Modeling & Simulation I

Technical Session A: Tues. May 7, 2024 - 8:00 AM to 12:00 PM

8:00 AM - 8:30 AM

Finite State Modeling of Ground Effect Using Mass Source Distribution at the Ground Plane (Paper 1258)
Andro Metry,* J. V. R. Prasad, Georgia Institute of Technology; David Peters, Washington University St. Louis;

8:30 AM - 9:00 AM

Verification of Vortex Ring State Avoidance Diagram Using a Comprehensive Flight Dynamics Helicopter Model (Paper 1177)
Maria Ribera Vicent,* Maha Khamlichi, Imperial College;

9:00 AM - 9:30 AM

Investigation Of Rotor Interactional Aerodynamics Using The Lattice Boltzmann Method (Paper 1267)
Andreas Reiser,* Ilkay Yavrucuk, Technical University Munich;

10:00 AM - 10:30 AM

Towards Real-Time Coupled Ship-Rotorcraft Interactional Simulations using GPU-Accelerated Lattice-Boltzmann Method (Paper 1346)
Shreyas Ashok,* Juergen Rauleder, Georgia Institute of Technology;

10:30 AM - 11:00 AM

Vortex Ring State Prediction Using a Mid-fidelity Comprehensive Approach (Paper 1319)
Alessandro Cocco,* University of Maryland; Matteo Dall'ora, Federico Gentile, Giuseppe Quaranta, Politecnico di Milano;

11:00 AM - 11:30 AM

Analytical Linearization of a State-space Free Vortex Wake Model (Paper 1254)
Ashish Kumar Manjhi,* Joseph Horn, Pennsylvania State University; Umberto Saetti, University of Maryland;

11:30 AM - 12:00 PM

Aeroelastic Computations of an Isolated Rotor in Forward Flight with a Dual-Solver Hybrid CFD/CSD Methodology in HPCMP CREATE-AV Helios (Paper 1110)
Alex Moushegian,* Naval Air Warfare Ctr. Aircraft Div. (NAWCAD);

12:00 PM - 12:30 PM

Implementation and Linearization of a State-Space Free Wake Model with a Near-Wake Vortex Lattice Model (Paper 1144)
Umberto Saetti, Batin Bugday,* Alessandro Cocco, University of Maryland; Joe Horn, Ashish Manjhi, Pennsylvania State University;

Modeling & Simulation II

Technical Session B: Wed. May 8, 2024 - 8:00 AM to 12:15 PM

8:00 AM - 8:30 AM

Flight Trajectory Tracking for Training Simulator Qualification Using Model Predictive Control Strategy: A Case Study (Paper 1049)
André Desbiens,* Université Laval; Vincent Myrand-Lapierre, Michel Nadeau-Beaulieu, CAE Inc.;

8:30 AM - 9:00 AM

Estimation of Height-Velocity Dual Engine Failure Diagram for a Twin-engine Helicopter through Simulated Pilot-in-the-Loop Manoeuvres (Paper 1216)
Giulia Rovedatti,* Francesco Battaini, Paolo Marguerettaz, Andrea Ragazzi, Bram Renier, Leonardo Helicopters;

9:00 AM - 9:30 AM

Identification of Higher-Order Rotor Flapping Dynamics Model Structures using Explicit Soft Inplane Hingeless Rotor Hub State Measurements of the NRC Bell 412 Advanced System Research Aircraft (Paper 1396)
Marc Alexander,* National Research Council Canada;

10:15 AM - 10:45 AM

Using the Task-Pilot-Vehicle (TPV) Approach to Investigate Envelope Protection Design for eVTOL Aircraft (Paper 15)

Dakota Musso, Austin Berg, Michael Jones,* Systems Technology, Inc. (STI);

10:45 AM - 11:15 AM

Urban/Advanced Air Mobility Interactional Aerodynamic Modeling for Flight Mechanics Applications (Paper 1226)

Jeffrey D. Keller,* Robert M. McKillip, Jr., Abhinav Sharma, Jean-Pierre Theron, Continuum Dynamics, Inc.;

11:15 AM - 11:45 AM

Flight Testing and Analysis for a Family of Group 2 and 3 Multicopter UAS (Paper 1069)

Anthony Gong,* Tom Berger, Mark J. S. Lopez, US Army DEVCOM AvMC; Sung Hyeok Cho, Emily D. Glover, San Jose State University;

11:45 AM - 12:15 PM

Forward Flight System Identification for an Electric Medium-Sized Variable-Rotational Speed Rotor (Paper 1068)

Emily Glover,* Ashwani Padthe, San Jose State University Research Foundation; Matthew Floros, US ARMY DEVCOM ARL; Tom Berger, Mark Lopez, US Army DEVCOM AvMC; Radu Teodorescu, University of Maryland;

Modeling & Simulation III

Technical Session E: Thurs. May 9, 2024 - 1:30 PM to 5:30 PM

1:30 PM - 2:00 PM

Virtual Reality on a Motion Platform for Rotorcraft Shipboard Simulation (Paper 1189)

Donald P. Gaublomme,* Robert V. Calvillo, Zachary F. Smith, Naval Air Warfare Ctr. (PAX); Andrew G. Zinchiak, American Systems; Kyle J. Meyers, JF Taylor Inc.;

2:00 PM - 2:30 PM

Enhancements, Verification, and VMS Integration of VTOL Concept Vehicle Simulation Models (Paper 1225)

Matthew Gladfelter,* Chengjian He, Hossein Saberi, Advanced Rotorcraft Technology, Inc.; David Caudle, Carlos Malpica, Christopher Silva, Raghuvir Singh, NASA Ames Research Center;

2:30 PM - 3:00 PM

A New Perspective on Coupling Numerator Models (Paper 1292)

Frederik A. D♦Ring,* German Aerospace Center (DLR);

3:30 PM - 4:00 PM

A Fundamental Investigation of Ship Airwake Influence on Rotorcraft (Paper 1212)

Abhinav Sharma,* Jeffrey D. Keller, Glen R. Whitehouse, Continuum Dynamics, Inc.;

4:00 PM - 4:30 PM

Framework for Real-Time Closed-Loop Simulation of Advanced Rotorcraft Configurations Using Comprehensive Flight Dynamics Models (Paper 1073)

Ashwani Padthe,* Emily Glover, San Jose State University; Ananth Sridharan, Science & Technology Corporation; Tom Berger, Mark Lopez, US Army CCDC AvMC;

4:30 PM - 5:00 PM

eVTOL Modeling Frameworks: A Comparative Study (Paper 1230)

Kenneth Hui,* National Research Council Canada; Vincent Myrand-Lapierre,* CAE; Claudia Hodonou, NRC;

5:00 PM - 5:30 PM

Haptic Device Embedded in Rotorcraft Seats to Provide Motion Onset Cues in Flight Simulator (Paper 1264)

Marek Lukaszewicz,* Giuseppe Quaranta, Andrea Zanoni, Politecnico di Milano;



Operations

Operations I

Technical Session A: Tues. May 7, 2024 - 8:00 AM to 12:00 PM

8:00 AM - 8:30 AM

Use of Machine Learning Techniques to Support Future Ship-Helicopter Operations Research; an Initial Investigation

(Paper 1378)

Daniel Newton-Young,* Peter Green, Mark White, University of Liverpool;

8:30 AM - 9:00 AM

Deployment Methodologies of Fleet Air Vehicles on New Small Air Capable Ships (Paper 1056)

Bernard Ferrier,* Francesco Greco, Gabriele Librandi, Roberto Olivari, Fincantieri Marinette Marine;

9:00 AM - 9:30 AM

Vertical Flight Infrastructure DATA Quality Shortcomings (Paper 1270)

Rex Alexander,* Five-Alpha LLC; Cliff Johnson, Federal Aviation Administration;

10:00 AM - 10:30 AM

Agent-based Simulation of UAV based Logistics Networks with Real World Data (Paper 1407)

Robin Karpstein,* Florian Holzapfel, Victor Luis De Magalhaes Ross, Technical University Munich;

10:30 AM - 11:00 AM

Manned-Unmanned Teaming Applied To HEMS Missions: A Path Planning Approach Based On The Pilot's Workload Assessment (Paper 1213)

Francesca Roncolini,* Giuseppe Quaranta, Politecnico di Milano;

11:00 AM - 11:30 AM

Field Measurements of the Airflow in the Urban Environment: An RPAS Use-Case in Montréal, Canada (Paper 1133)

Sean McTavish,* Hali Barber, Alanna Wall, National Research Council Canada;

11:30 AM - 12:00 PM

Applying and Testing the ASTM F3673 – 23 Weather Standard Specification for Enhanced Safety and Efficiency in eVTOL and Helicopter Operations (Paper 1142)

Don Berchoff,* Chris Zarzar, TruWeather Solutions Inc.; Clint Harper, Harper4D Solutions;

Operations II

Technical Session D: Thurs. May 9, 2024 - 10:15 AM to 12:15 PM

10:15 AM - 10:45 AM

The Advancement of Aerial Firefighting Concept of Operations (Paper 1160)

Monica Gil, Jordan Gorelick,* Shawn Melhorn, Sikorsky, a Lockheed Martin Corporation;

10:45 AM - 11:15 AM

A Comparison of Proposed Concepts for Vertiport Markings & Symbology (Paper 1275)

Charles Johnson,* Grant Morfitt, Lacey Thompson, Federal Aviation Administration;

11:15 AM - 11:45 AM

Low Noise Helicopter Operations Recommendations to Improve Helicopter Acceptance (Paper 1223)

Julien Caillet,* Pierre Dieumegard, Fr✦D✦Ric Guntzer, Airbus Helicopters; Elise Ruaud, ONERA;



Propulsion

Propulsion II

Technical Session B: Wed. May 8, 2024 - 8:00 AM to 12:15 PM

8:00 AM - 8:30 AM

Dynamic Behaviour of a Rotorcraft Main Rotor System with Variable Speed (Paper 1368)

Thomas Scheu, Agnes Poks, Michael Weigand,* Vienna Technical University of Technology; Jonas Koch, Technical University Munich;

8:30 AM - 9:00 AM

Investigation of Drive Train Coupled Torsional Stability Analysis Methodology for Tiltrotor: the Helicopter Mode case (Paper 1233)

Luca Viganò,* Federico Porcacchia, Claudio Punzi, Fabio Riccardi, Leonardo Helicopters;

9:00 AM - 9:30 AM

Engine Installed Performance Testing Activities (Paper 1297)

An?L Mayda,* Akay Bayat, Burak Daldal, Ahmet Alper Ezerta?, L?Tfullah Okatan, Emre Sancar, Taylan ?Ak?Ro?Lu, Turkish Aerospace;

10:15 AM - 10:45 AM

High-Fidelity Finite Element Modeling of Rotorcraft Shafting System for Critical Speed Prediction (Paper 1303)

Lin Liu,* Therese-Ann Vermillion, Zachary Wright, Sikorsky, a Lockheed Martin Co.;

10:45 AM - 11:15 AM

Preliminary Results from Dynamic Testing of a Pericyclic Drive System (Paper 1304)

Jeremy McGovern,* Robert Bill, Edward Smith, Mark Stevens, Pennsylvania State University; Constandinos Mitsingas, Erik Schroen, DEVCOM Army Research Laboratory; Tanmay Mathur, IIT Kanpur; Hans DeSmidt, University Tennessee Knoxville;

11:15 AM - 11:45 AM

Modeling Activities of Propulsion System Engine Installation Survey (Paper 1352)

Emre Sancar,* Akay Bayat, Abdurrahman Burak Daldal, Ahmet Alper Ezerta?, Taylan ?Ak?Ro?Lu, Turkish Aerospace;



Safety

Safety

Technical Session B: Wed. May 8, 2024 - 8:00 AM to 12:15 PM

8:00 AM - 8:30 AM

Scenario-Based Helicopter Flight Simulation of Accident-Prone Vortex Ring State (VRS) Encounters (Paper 1141)
Eleni Sotiropoulos-Georgiopoulos,* Dimitri Mavris, Alexia Payan, Georgia Institute of Technology; Charles Johnson, Federal Aviation Administration;

8:30 AM - 9:00 AM

Reducing Vibrations Experienced by an Infant During Air Transportation (Paper 1044)
Sophia Piatt, Alexander Deemer, Xiaoxu Ji,* Hilcia Merlos, Davide Piovesan, Isaac West, Sarah Young, Gannon University;

9:00 AM - 9:30 AM

Safety Data Analysis with Machine Learning (Paper 1158)
John Hewitt,* Abby Brulotte, Amanda Downs, Sikorsky, a Lockheed Martin Co.; Alex Monaghan, Yeshe Soleti, Lockheed Martin;

10:15 AM - 10:45 AM

Advancing Cockpit Safety: Cost-Effective Flight Data Monitoring with Deep Learning (Paper 1239)
Amine Khelifi, Nidhal C. Bouaynaya, Giuseppina Carannante, Rowan University; Charles C. Johnson,* Lacey Thompson, Federal Aviation Administration; Mohamed Ali Trabelsi, Private Higher School of Engineering & Technology;

10:45 AM - 11:15 AM

Identification of Weak Cell Blocks in Electric Aircraft Battery Packs (Paper 1358)
Robert Masse,* Lucas Beslow, Shrilakshmi Bonageri, Dan Shea, Astrolabe Analytics, Inc.;

11:15 AM - 11:45 AM

Probabilistic Trajectory Analysis of Debris Items for Crash Investigation (Paper 1408)
Dustin Coleman,* Arild Barrett, Patrick Bowles, Javier Casanova, Sikorsky, a Lockheed Martin Co.;

11:45 AM - 12:15 PM

Scoping, Tailoring, and Abstraction Refinement in Hazard Assessment Processes (Paper 1354)
Mallory Graydon,* Natasha Neogi, NASA Langley Research Center; Frank McCormick, Certification Services Inc (ret.);



Structures and Materials

Structures & Materials I

Technical Session A: Tues. May 7, 2024 - 8:00 AM to 12:00 PM

8:00 AM - 8:30 AM

A Structural Load Comparison of Dynamically Balanced and Imbalanced Main Rotor Blades (Paper 21)

Wesley Viall,* Kit Fry, Emily Meyer, Graham Smith, US Army DEVCOM AvMC;

8:30 AM - 9:00 AM

Overview of Engineering Processes in the Exploratory Development of Main Rotor Blade Technology for Multipurpose Utility Helicopters (Paper 1394)

Marc Alexander,* Yong Chen, Guillaume Renaud, National Research Council of Canada; J♦R♦Mie Matte♦, Department of National Defence, Government of Canada;

9:00 AM - 9:30 AM

Increasing the Fatigue Life of a Structural Web with a Large Rectangular Cutout Under Complex Loading (Paper 18)

Joseph Truitt,* Columbia Helicopters Inc.;

10:00 AM - 10:30 AM

Adding Digital Twin Concepts to Helicopter Component Structural Life Assessment (Paper 1232)

Guillaume Renaud,* Zohreh Asaee,* Catherine Cheung, Jack Wooldridge, National Research Council Canada;

10:30 AM - 11:00 AM

Sikorsky Crack Initiation versus Propagation Certification Methodology (Paper 1125)

Darryl Toni,* Sikorsky, a Lockheed Martin Co.;

11:00 AM - 11:30 AM

A SUMS Based Usage Spectrum for the UH-60M ITE Equipped Black Hawk (Paper 1119)

Jeffrey Finckenor,* Peraton Inc.;

11:30 AM - 12:00 PM

Further Applications of SUMS-based Regime Recognition in Updating the MH-47G Chinook Usage Spectrum (Paper 1143)

Holly Evans,* Jeff Finckenor,* Peraton Inc.; Michael Chandler, US Army DEVCOM AvMC;

12:00 PM - 12:30 PM

U.S. Army Helicopter Structural Reliability and Fleet Failure Rate Requirement (Paper 1088)

Stephen Janny,* US Army DEVCOM AvMC;

Structures & Materials II

Technical Session E: Thurs. May 9, 2024 - 1:30 PM to 5:30 PM

1:30 PM - 2:00 PM

Circular Acoustic Black Holes Integrated into Carbon/Epoxy Stiffened Panels for Noise Control (Paper 1245)

Avery Brown,* Charles Bakis, Ben Beck, Bhavya Patel, Noah Robertson, Edward Smith, Nicholas Vljajic, Pennsylvania State University; Micah Shepherd, Brigham Young University;

2:00 PM - 2:30 PM

Characterization and Modelling of Composite Fastened Joints for Impact Analysis (Paper 1260)

Edoardo Novembre,* Alessandro Aioldi, Filippo Brunori, Gerardus Janszen, Politecnico di Milano; Benedetta Cacchione, Leonardo S.p.a.;

2:30 PM - 3:00 PM

Lightning Strike Experiments and Their Direct Effects on Flax Fiber-Reinforced Polymer Panels for Rotorcraft Components (Paper 1307)

Lukas Gaugelhofer,* Manfred Hajek, Jonas John, Ilkay Yavrucuk, Technical University Munich;

3:30 PM - 4:00 PM

Fatigue Simulation Method based on the Calculation of the J-Integral in the Cohesive Zone Delamination Model (Paper 1372)

Gennadiy Nikishkov,* Andrew Makeev, Yuri Nikishkov,* Guillaume Seon, University of Texas Arlington; Peter Matthews, US Army DEVCOM AVMC;

4:00 PM - 4:30 PM

Shot Peen Surface Repair: The Impact of Residual Stress (Paper 1227)

Craig Conklin,* Arild Barrett, Ric Flores, Sikorsky, a Lockheed Martin Co.;

4:30 PM - 5:00 PM

Usage Spectrum Contribution to Rotorcraft Dynamic Component Reliability (Paper 42)

Allen Craven,* US Army CCDC AvMC;

5:00 PM - 5:30 PM

Six Nines Reliable Army Fatigue Critical Component Using Operational Loads Data (Paper 1113)

Jeffrey Finckenor,* Holly Evans, Aniekan Ruffin, Peraton Inc.; Michael Chandler, US Army Combat Capabilities Development Command Aviation & Missile Center;

5:30 PM - 6:00 PM

Corrosion Prediction for Helicopter Application for Maintenance (Paper 1273)

David Sinopoli,* GEORGES DEVILLIERS, PATRICIA Miranda Dias, Airbus Helicopters;



System Engineering Tools/Processes

Systems Engineering

Technical Session E: Thurs. May 9, 2024 - 1:30 PM to 5:30 PM

1:30 PM - 2:00 PM

Systems Engineering - Requirements Development (Paper 1100)

Brad Pelletier,* Columbia Helicopters Inc.;

2:00 PM - 2:30 PM

Helicopters Cost Too Much - Revisited (Paper 1145)

Robert Scott,* Gerardo Nunez,* US Army;

2:30 PM - 3:00 PM

Maturing Scalable Model-Based Acquisition (Paper 1263)

Garrett Thurston,* Dassault Systems; Andre Cotan, Dassault Systèmes; Jake Engle,* Jason Kollings, STC; Kevin Fowler, Zoltana Consulting;

3:30 PM - 4:00 PM

Updates in Development to the Digital Thread and CFD Modeling Framework for Robust Rotorcraft Design (Paper 1326)

Daniel Bernier,* Michael Alexander, Dustin Coleman, Rebecca Cotton, Lindsey Dusablon, Ritu Eshcol, Stanrich Fernandes, Dana Halline, Stephanie Keomany, Donald Lamb, Shyam Neerarambam, Ryan Willmot, Sikorsky, a Lockheed Martin Co.;

4:00 PM - 4:30 PM

Adoption Of Virtual Twin Technologies For eVTOL Manufacturers, Infrastructure Providers, And Operators (Paper 1134)

Roberto Licata,* Dassault Systems;



Test and Evaluation

Test & Evaluation I

Technical Session A: Tues. May 7, 2024 - 8:00 AM to 12:00 PM

8:00 AM - 8:30 AM

Structural Blade Loads of a Mach-Scaled Rotor During Dynamic Stall in Hover (Paper 1383)

Verena Heuschneider,* Manfred Hajek, Ilkay Yavrucuk, Technical University of Munich;

8:30 AM - 9:00 AM

Full-Scale eVTOL Rotor Icing Wind Tunnel Testing (Paper 34)

Geoffrey Karli,* Jose Palacios, Pennsylvania State University; Sihong Yan, Georgia Institute of Technology;

9:00 AM - 9:30 AM

CH-53K Aircraft Performance Verification (Paper 1366)

Michael Pollack,* Michael Gerardo, Vera Klimchenko, Jacob Neiswonger,* Sikorsky, a Lockheed Martin Co.; John Steward, NAVAIR; Marc Regan, RCM Technologies;

10:00 AM - 10:30 AM

Application of BOS Velocimetry to Full-scale Helicopter Flight Tests (Paper 1060)

Johannes N. Braukmann,* Anthony D. Gardner, C. Christian Wolf, German Aerospace Center (DLR);

10:30 AM - 11:00 AM

Characterizing Rotor Performance Changes with Scale in Compressed Air (Paper 1082)

Mark Miller,* Eric Greenwood, Constantinos Kandias, Geoffrey Karli, Jose Palacios, Zarif Rahman, Pennsylvania State University;

11:00 AM - 11:30 AM

Flow Diagnostics of Scaled-Model Coaxial Rotor Hub Flows (Paper 1130)

Sven Schmitz,* Tim Durachko, Nicholas Jaffa, Adam Nickels, Rommel Pabon, Alexander Pique, David Reich, Pennsylvania State University;

11:30 AM - 12:00 PM

Performance Analysis and Data Processing for the Mars Sample Recovery Helicopter in the Jet Propulsion

Laboratory 25-ft Space Simulator (Paper 1357)

Natasha Schatzman,* Larry Meyn, NASA Ames Research Center; Michael Fillman, Paulina Ridland, AeroVironment, Inc; Vinod Gehlot, Kenneth Glazebrook, Diego Santillan, NASA Jet Propulsion Lab; Athena Chan, Science and Technology Corp.;

Test & Evaluation II

Technical Session B: Wed. May 8, 2024 - 8:00 AM to 12:15 PM

8:00 AM - 8:30 AM

Extraction of a Dynamic Inflow Model from Wake Measurements on a Hovering Rotor (Paper 23)

Daniel Yu,* Jayant Sirohi, University of Texas Austin; Patrick Mortimer,* Piasecki Aircraft Corporation;

8:30 AM - 9:00 AM

Wind Tunnel Testing of X2 Technology Spinning Coaxial Hubs with Aspirated Inlets – Comparison Between Two Wind Tunnel Models and with CFD (Paper 1176)

Dylan Dziuba,* Patrick Bowles, Colin Bunting, Benjamin Hein, Jeewoong Kim, Peter Lorber, Byung-Young Min, Antonio Rivera, Shawn Sandor, Brian Wallace, Sikorsky, a Lockheed Martin Co.;

9:00 AM - 9:30 AM

Wind Tunnel Testing of RPAS in Representative Urban Flow Fields (Paper 1137)

Alanna Wall,* Hali Barber, National Research Council Canada; Sukriti Kumar, Richard McKercher, Isaac Tabachnick, Carleton University;

10:15 AM - 10:45 AM

A Rotary Union to Provide Active Flow Control to a Mach Scale Rotor (Paper 1193)

Peter Copp,* US Army CCDC AvMC;

10:45 AM - 11:15 AM

System Identification of a Free-Flying Quadrotor in a Wind Tunnel using Motion Capture Feedback (Paper 1220)

Robert Brown,* US Navy;

11:15 AM - 11:45 AM

Development Flight Test Campaign for Automatic Flight Control System (Paper 1231)

Kaan Ege T?Rman,* O?Uzhan G◆Ltekin, Umut T◆Re, Derya ◆Etin, Turkish Aerospace Industries;

Test & Evaluation III

Technical Session D: Thurs. May 9, 2024 - 10:15 AM to 12:15 PM

10:15 AM - 10:45 AM

Rotor Icing and De-icing at DLR's Whirl Tower Test Facility (Paper 1317)

Rainer Bartels,* Steffen Kalow, Ralf Keimer, Robert Konrath, Dominic Sahyoun, Oliver Schneider, German Aerospace Center (DLR);

10:45 AM - 11:15 AM

Whirl Flutter Testing of ATILA Tiltrotor Testbed - Initial Results (Paper 1117)

Stefan Van 'T Hoff,* Royal Netherlands Aerospace Centre (NLR); Oliver Schneider, Keith Soal, German Aerospace Center (DLR); Kees Kapteijn, German-Dutch Wind Tunnels (DNW); Federico Fonte, Leonardo Helicopters;

11:15 AM - 11:45 AM

Automated Calculation of Aerodynamic Coefficients for sUAV Using Ardupilot Logging Data and Inexpensive Sensors (Paper 1046)

Christian Rieger,* Mirko Hornung, Paula Zimmermann, Technical University Munich;

11:45 AM - 12:15 PM

Quadrotor Aerodynamic Interaction Model Identification using Free-Flight Data (Paper 1311)

Sage Herz,* Matthew McCrink, Michael Valcarcel, Ohio State University;