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 KeLer, Ewald KrMer, 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)
Kiriti Bhattacharjee, 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;
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, Université de Sherbrooke, Createk Innovation Group;
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 Strübing, 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 Hosseinvandi, Science and Technology Corp.; Ronan Boisard, Stéphane Piron, 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 Boschtsch, 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;

**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;

**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)
Francois 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;

**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 Sitarianman, 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.;

**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
3:30 PM - 4:00 PM
Comparison of Experimental and CFD Results for RAIDER X® 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® 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 Kohlgruber, Michael Pethch, Peter Weiand, 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 Weiand,* 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
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 Blanc,* Quentin Milliat, Antoine Monneau, Airbus Helicopters;

9:00 AM - 9:30 AM
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)

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 (FAILSARSTM) (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
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 Cavalera,* 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 Menmu, 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, Universitesi;

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 Zanoni, Politecnico di Milano;

9:00 AM - 9:30 AM
Pilots' Gaze Behavior During Simulated Helicopter Air-to-Air Refueling (Paper 1294)
Sven Schmidt,* Daniel Grewe, 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 Kinhead, Matt Luszez, 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 Insititute;

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 Ryu, 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 Université, CNRS, LIP6;

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

1:45 PM - 2:15 PM
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 Hashburn,* Hossein Saberi, 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)
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)
Spencer Fishman,* Inderjit Chopra, University of Maryland;

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, Yasmine 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 Quadcotper 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 Matarati, 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 Hayajneh,* 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;

3:45 PM - 4:15 PM
Automatic Flight Control Modes for Pilot Assistance During Helicopter Shipboard Operations (Paper 1249)
**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 TeCan 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

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)
P. 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 Fruittet, 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)

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)
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
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 1316)
Alessandra 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);

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)
Andrudeau 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
Marc Alexander,* National Research Council Canada;
**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, Raghuveer Singh, NASA Ames Research Center;

2:30 PM - 3:00 PM  
**A New Perspective on Coupling Numerator Models**  
(Paper 1292)  
Frederik A. DِRing,* 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 Lukasiewicz,* 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
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
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, 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 Vigano,* Federico Porcacchia, Claudio Punzi, Fabio Riccardi, Leonardo Helicopters;

9:00 AM - 9:30 AM
Engine Installed Performance Testing Activities (Paper 1297)

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

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 Trasportation (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, Yeshi 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 Vlajic, 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 Airoldi, Filippo Brunori, Gerardus Janssen, 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 Systems; 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)

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 ATTILA 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;