

CALL FOR PAPERS

AHS FORUM 74

AHS International

The Vertical Flight Technical Society

74th Annual Forum & Technology Display

May 14-17, 2018 ★ Phoenix, Arizona, USA

AHS International's Annual Forum & Technology Display is the world's leading international technical event focused on vertical flight. The AHS Forum is the premier opportunity to present and discuss advances in vertical flight technology, design and its applications.

This year's **74th Annual Forum takes place May 14-17, 2018 at the Phoenix Convention Center in Phoenix, Arizona; technical paper sessions will begin on May 15th**. With vertical flight advancing more quickly than it has in decades, the Forum will be focusing on *The Future of Vertical Flight*. Advances in technologies such as autonomy, coupled computational fluid dynamics (CFD)/computational structural dynamics (CSD), innovations in composites and materials, advanced flight controls and more capable sensors are making dramatic impacts. As advanced air vehicle designs like the Joint Multi-Role (JMR)/Future Vertical Lift (FVL) continue to develop, new commercial rotorcraft advance towards certification, and transformative electric Vertical Take-Off and Landing (VTOL) aircraft begin to take flight, this coming year promises to validate numerous advanced technologies and programs showcasing *The Future of Vertical Flight*.

This Call for Papers invites abstracts to be submitted for consideration in any of the technical areas sponsored by the Society's 21 technical committees:

- Acoustics
- Advanced Vertical Flight
- Aerodynamics
- Aircraft Design
- Avionics & Systems
- Crash Safety
- Crew Stations & Human Factors
- Dynamics
- Handling Qualities
- History
- Health & Usage Monitoring/CBM
- Manufacturing Technology & Processing
- Modeling & Simulation
- Operations
- Product Support Systems Technology
- Propulsion
- Safety
- Structures & Materials
- Systems Engineering Tools & Processes
- Test & Evaluation
- Unmanned VTOL Aircraft & Rotorcraft

The Forum Technical Chair for this event is **Dr. Martin Sekula**, NASA Langley Research Center, martin.k.sekula@nasa.gov. The Forum Deputy Technical Chair is **Luigi Ricci-Moretti**, Piasecki Aircraft Corporation, luigirm@piasecki.com.

Abstracts are due by Monday, October 16, 2017 and must be submitted in PDF form to the Mira website via www.vtol.org/mira. The abstract formatting guidelines are also available on the Mira website. **Abstracts should not exceed 5 pages (8.5 inch by 11 inch, 10 point, single-spaced, 1 inch margins), inclusive of all text, figures, tables and references.** They should present the status of the background data to be used, summarize figures and illustrations (with samples), and include a summary of important conclusions.

Abstract acceptance will be based in part on the submitter's prior history in following through with previous commitments. Papers presented previously are not eligible for consideration. This ineligibility includes papers or presentations (or facsimiles thereof) that are submitted for presentation at a national or international meeting of any professional organization at any time prior to the Forum. **One author may present no more than two papers at Forum 74.**

The AHS Forum is open to an international audience. As such, it is the policy of the AHS that all papers submitted for inclusion in the Proceedings and all presentations made at the Forum are completely unrestricted. That is, they are not allowed to contain any proprietary, sensitive, classified or otherwise controlled information. Authors should make note of this policy when submitting abstracts. **It is the author's responsibility to obtain appropriate clearances for their abstract, paper and presentation in time to meet all deadlines.** Please plan well in advance for possible delays in any internal approval process.

KEY DATES:

Abstracts must be submitted to the Mira website via www.vtol.org/mira by Monday, October 16, 2017.

AHS expects to notify authors of paper selection by Monday, November 20, 2017.

Final papers must be submitted to the Mira website via www.vtol.org/mira by Monday, April 2, 2018.

Forum 74 Call for Papers information, contact Julie M. Gibbs: 1-703-684-6777 ext. 103, jmgibbs@vtol.org
Forum 74 Exhibit and Sponsorship information, contact David Renzi: 1-703-684-6777 ext. 105, drenzi@vtol.org
www.vtol.org/forum

No Paper — No Podium Rule

Submittal of an abstract is a professional commitment. If the abstract is accepted, the author commits to prepare a final paper, attend the Forum and make a presentation based on that final paper. If an author finds that he or she will be unable to make the presentation, then it is incumbent upon him or her to find a substitute presenter.

The “No Paper – No Podium” policy applies to **all papers and all technical sessions**. Authors who do not submit their paper by the time the technical schedule is finalized will not be scheduled to speak.

Late Paper Submissions

Final papers received after the final submission deadline date are not eligible for a Best Paper Award and may not be included in the Proceedings.

Alfred Gessow Forum Best Paper Award

Each of the authors of the best paper presented at the Annual Forum for each technical discipline — as determined by the Committee Chairs, Session Chairs and the Technical Council — will receive a Best Technical Paper Award certificate. The overall best paper will receive the Alfred Gessow Forum Best Paper Award, consisting of the Gessow plaque, as well as attendant publicity. One of the winning authors will be invited to present his or her paper at the European Rotorcraft Forum (ERF), to be held in Delft, Netherlands from September 18-21, 2018. The ERF organizers provide complimentary registration and accommodations. AHS covers the winner’s travel expenses to ERF.

Registration

Presenters of all papers to be delivered at technical sessions, both regular and special sessions, must register and are eligible for reduced Forum speaker registration fees, whether members or non-members of AHS International.

More information is available at www.vtol.org/forum. Registration fees will be posted prior to the abstract due date.

ANNUAL FORUM TECHNICAL SESSIONS



ACOUSTICS

Papers addressing recent advancements in the study of external and internal rotorcraft noise generation, propagation, and control (active and passive) are invited. Appropriate external noise topics include: rotorcraft component and full system noise prediction methodology development and validation; wind tunnel and full-scale flight test acoustics measurements; new procedures for acoustic data acquisition or analysis; active and passive rotor noise reduction techniques; noise abatement flight operations; acoustic propagation models; the impact of rotorcraft noise on the community; and VTOL Unmanned Aerial Vehicle (UAV) noise. Appropriate interior noise topics include: application of numerical techniques to predict noise in rotorcraft cabins; active and passive noise control technologies to reduce cabin noise; studies of human response to cabin noise; and source noise reduction concepts, such as concepts for the engine and transmission. Additional topics of interest include, but are not limited to: research contributing to a basic understanding of fundamental aerodynamic noise sources, such as rotor harmonic noise, impulsive noise and broadband noise, as well as interaction between various noise sources for rotorcraft and VTOL UAVs. Papers dealing with the development or implementation of national or international civil noise regulations are also encouraged. Finally, papers which explore acoustic aspects of concepts that could transform or revolutionize the future of vertical lift flight are also sought. **Abstracts exceeding the 5 page limit will not be evaluated.**

Session Chair: Dr. Doug Boyd, NASA Langley Research Center, 1-757-846-5947, d.d.boyd@nasa.gov
Deputy Session Chair: Dr. Daniel Shannon, United Technologies Research Center, 1-860-610-7673, shannodw@utcr.utc.com



ADVANCED VERTICAL FLIGHT

Papers are sought that focus on novel and innovative configurations as well as transformative technologies for vertical flight vehicles. Research areas of particular interest include novel air vehicle configurations, new propulsion systems for power/energy management, aerodynamic enhancements, structural efficiency improvements, flight control systems, autonomy, distributed electric propulsion, and multi-rotor systems. Papers on technology advances in unconventional vehicles are encouraged, such as: tiltrotors, tiltwings, ornithopters, cycloidal rotor aircraft, thrust/lift compounded aircraft, slowed/stopped rotor aircraft, lift-fan systems, ducted fan aircraft, hybrid propulsion aircraft and/or all-electric aircraft.

Session Chair: Carl Russell, NASA Ames Research Center, 1-650-604-0744, carl.r.russell@nasa.gov
Deputy Session Chair: Andrew Kreshock, U.S. Army Research Laboratory, 1-757-864-7262, andrew.r.kreshock.civ@mail.mil



AERODYNAMICS

High-quality papers are invited that address recent accomplishments in all areas of rotorcraft and vertical and/or short take-off and landing (V/STOL) aerodynamics, especially as related to the future of vertical flight. **Abstracts exceeding the 5 page limit will not be evaluated.** Topics of interest include, but are not limited to:

- Computational fluid dynamics techniques
- Analytical methodologies
- Experimental aerodynamics and/or flight test results
- Flow visualization methods
- Correlation
- Aerodynamic design methods
- Unique aerodynamic modeling
- Interactional aerodynamics
- Low Reynolds number aerodynamics
- Aerodynamic flow control
- Unsteady, high angle of attack or vortical flows

Session Chair: Dr. Mahendra Bhagwat, U.S. Army Aviation Development Directorate, 1-650-604-2893, mahendra.j.bhagwat.civ@mail.mil
Deputy Session Chair: Dr. Juergen Rauleder, Technical University Munich, 49-89-289-16303, juergen.rauleder@tum.de



AIRCRAFT DESIGN

Papers are invited on the design of air vehicles and components. Topics ranging from the conceptual design of whole vehicles, through preliminary and detail design activities related to the vehicle system, airframe, dynamic systems and major subsystem components are welcome. Documentation of the application of tools and processes needed for accomplishment of design activities are invited. Topics of interest may include optimization and trade-off analysis as part of the design process. Lessons learned from actual design realization activities are highly encouraged. Papers discussing the interaction of technology, configuration, and requirements in the design of next generation civil and military rotorcraft are also sought.

Session Chair: Jeff Sinsay, U.S. Army Aviation Development Directorate, 1-650-604-6157, jeffrey.d.sinsay2.civ@mail.mil
Deputy Session Chair: Michael Avera, U.S. Army Research Laboratory, 1-410-278-8977, michael.p.avera.civ@mail.mil



AVIONICS & SYSTEMS

The committee invites papers that address Mission, Flight, or Avionics Systems for manned, unmanned, or optionally manned vertical flight aircraft. Potential topics can include but are not limited to the following:

- Aspects of Mission, Flight, or Avionics Management Systems including hardware, firmware, and software design, testing, development, fielding/deployment, or successes/challenges/lessons learned.
- Integration of Net Centric Operations, Sights and Sensors, Weapons and Armament, Navigation and Communications, Aircraft Survivability, Aircraft Management, Controls and Displays, Data Management (concentration or collection), or Electronic Warfare systems.
- Open systems architecture initiatives, technologies, and applications within rotorcraft or adjacent airborne aircraft (e.g., fighter) systems, including, but not limited to FACE™, OMS, HOST, and IMA architectures.
- Complex software-intensive, partitioned, or multi-core avionics, mission, or flight systems including Cognitive Decision Aiding or Automation. Degraded Visual Environments (DVE) or “all weather operation” including synthetic vision, image or data fusion, use of advanced sights and sensors.
- Cyber Security, Anti-Tamper, Information Assurance, airworthiness certification, or other aspects of qualification or certification.
- Fly-by-wire and fly-by-light flight control system architectures including advanced electrical controls, actuators, and emerging technologies.
- Innovative technologies from other industries such as Automotive, Nautical, or Internet of Things applicable to mission, avionics, flight, or software systems that enhance the capabilities of vertical lift aircraft.

Session Chair: Andrew Augenstein, Boeing Company, 1-602-793-6801, andrew.e. Augenstein@boeing.com
Deputy Session Chair: Joe Franiak, Northrop Grumman Company, 1-818-519-1701, joe.franiak@ngc.com



CRASH SAFETY

Papers are invited for ALL aspects of crashworthiness and aviation occupant safety relating to rotorcraft, UAVs, and other V/STOL aircraft in applications such as military, civil, offshore transport, mountainous terrain, emergency medical services, and law enforcement. Emphasis will be given to the recent development of new crash safety concepts and technologies focused on minimizing human impact injury; maximizing post-crash survival; development of new crash-resistant design criteria; development and application of improved and more comprehensive human tolerance and injury criteria; development of systems that reduce airframe damage while also reducing injury potential; and the effects of the application of transient dynamic loading on aircraft structure and mission equipment due to impact or crash (e.g. bird strike or cargo system loading). Also of key interest are system integration analyses that demonstrate enhanced occupant safety while minimizing system penalties for aircraft cost and weight. Additional crashworthiness topics of interest include advances in energy absorbing systems such as landing gear, composite airframe structures, seats, cargo and mass item retention systems, and internal/external inflatable devices; crew, troop, and passenger restraint systems; water ditching and post-impact flotation stability; crashworthy fuel systems to include range extension tanks; testing and validation; and methods of mishap data retrieval, collection and analysis. Other safety topics of interest include, but are not limited to, use of mishap data to define crash safety technology deficiencies and support system safety analyses. Analytical simulation of aircraft crash impacts on rigid, massively sloped (mountainous), soil and water impact

surfaces, bird strikes against the canopy and rotor systems, impact of crash-resistant fuel systems, occupant modeling, and simulation of aircraft crash protective systems such as landing gear, energy-absorbing seats, and inflatable devices are of interest. Finally, papers regarding validation of analytical methods that will improve the reliability, accuracy, and scope of computer simulations for crash safety, as well as numerical techniques for crashworthiness optimization to reduce aircraft weight while improving crash safety performance are also sought.

Session Chair: Marv Richards, BAE Systems, 1-602-643-7299, marv.richards@baesystems.com
Deputy Session Chair: Joseph Pelletiere, Federal Aviation Administration, 1-937-822-1073, joseph.pelletiere@faa.gov



CREW STATIONS & HUMAN FACTORS

Papers are invited for all aspects of air vehicle crew stations and/or human factors engineering. Areas of interest include but are not limited to the following:

- New designs facilitating hands-on/eyes-out operations
- Improved seat comfort and safety, facilitating longer missions
- Flight controls that reduce workload or simplify the pilotage task
- Innovative flight control and/or mission grip design
- Cognitive decision aiding and automation
- Improved situation awareness and information management techniques
- New and innovative visual displays, large area displays, touch interfaces, 3-D displays
- Graphical user interface designs and information management
- Tactile cueing and tactile displays
- Voice recognition and auditory displays, advances in 3-D audio
- Secure and night vision goggle-compatible crew station lighting
- Unmanned air system ground station human-machine interface designs
- Workload, stress and fatigue assessment, and impact on crew performance
- Human-machine interface design for maintainer
- MIL-STD-1472, MIL-L-85762, MIL-STD-3009 and RTCA DO-275
- Compliance assessment
- Cost control approaches including design processes, test methodologies, and integration of off-the-shelf technologies

Session Co-Chairs: J. Kristin Little, Boeing Company, 1-480-891-1246, kristin.little@boeing.com and **Dr. Kelly Johnson**, NAVAIR, 1-301-342-9268, kelly.d.johnson1@navy.mil
Deputy Session Chair: Andrew Smith, Boeing Company, 1-480-891-6211, andrew.p.smith@boeing.com



DYNAMICS

Papers are invited in all areas related to rotorcraft dynamics and aeroelasticity, including rotor response and stability, dynamics of coupled rotor/airframe systems, load prediction, vibration reduction, analytic modeling techniques, and experimental measurements as well as computational fluid structure interaction and reduced order models. Papers reporting on the development of rotorcraft dynamic or aeroelastic analyses and experimental validation are especially encouraged. New experimental results are of particular interest, as are advances in dynamics technology and design methodologies. Papers reporting on dynamic aspects of technologies such as active controls, adaptive rotors, UAV/MAVs, and unconventional V/STOL aircraft are also welcome. Priority will be given to completed programs where significant conclusions are substantiated and the results contribute to advancing the state-of-the-art.

Session Chair: Dr. Hao Kang, U.S. Army Research Laboratory, 1-410-278-6811, hao.kang2.civ@mail.mil
Deputy Session Chair: Dr. Paul Cranga, Airbus, 33-442-85-7673, paul.cranga@airbus.com



HANDLING QUALITIES

Papers are invited that address all aspects of rotary-wing aircraft handling qualities from basic research through engineering design and development to verification, qualification and certification in piloted simulation and flight tests. Handling Qualities comprise all of the aircraft characteristics which govern the ease and precision with which a pilot is able to perform the tasks in support of an aircraft role. This includes vehicle stability and control/response characteristics, especially when considering piloting strategies driven by the task demands, as well as the pilot-cockpit-vehicle interface. Papers are encouraged that address significant results from research, development, and design of advanced systems and approaches/means to improve handling qualities with respect to operational needs and experience, the impact of handling qualities on safety considerations, and work related to handling qualities of unconventional rotorcraft configurations.

Session Chair: Jared Cooper, Barron Associates, Inc., 1-434-973-1215, cooper@bainet.com

Deputy Session Chair: Dr. Carlos Malpica, NASA Ames Research Center, 1-650-604-1663, carlos.a.malpica@nasa.gov



HEALTH & USAGE MONITORING

Papers are invited on the following topics within the area of rotorcraft health and usage monitoring and management, and condition based maintenance, as they support total lifecycle value (sustainment, operational availability, etc.) of manned and unmanned rotorcraft platforms:

- Advanced monitoring technologies to support aircraft health and condition assessment, including sensors, data acquisition and processing, diagnostic and prognostic algorithms, data analytics/mining, onboard system architecture with HUMS integration, wireless communication and energy harvesting
- Advanced life and usage assessment techniques, including modeling, analysis, and data fusion
- Paradigm shifts in aircraft design, maintenance practices, and operations planning (logistics), enabled through HUMS (e.g., Ultra-Reliable Design and Maintenance-Free Operation Periods)
- Aircraft (onboard) and ground (offboard) decision support system/tools implementation including verification, validation, and certification/qualification including HUMS-related cyber security
- Success stories including improvements in operational availability, safety, costs, and maintenance benefits
- Application areas such as propulsion, drive systems, structures, rotor systems, vehicle management system/flight control, electrical and electronic systems, as well as cross-system integrated solutions

Session Chair: Andrew Brookhart, Sikorsky Aircraft, a Lockheed Martin Co., 1-203-383-6455, andrew.m.brookhart@lmco.com

Deputy Session Chair: Catherine Cheung, National Research Council, 1-613-998-1541, cathy.cheung@nrc-cnrc.gc.ca



HISTORY

The AHS History Committee invites scholarly papers and firsthand accounts that facilitate the preservation and understanding of the world's vertical flight history. Of particular interest are papers documenting important but not well-known developments in vertical flight technologies or vehicles, rediscovery of forgotten pioneers, or events involved in understanding specific phenomena. Accounts of early efforts of developing the helicopter industry and/or interactions with AHS are also encouraged. Personal involvement in the subject matter or extensive research and documentation are highly desirable. Exceptions can be made from the no-paper/no-podium policy for first-hand accounts.

Session Chair: Dr. Bruce H. Charnov, Hofstra University, 1-858-598-6284, bruce.h.chnov@hofstra.edu
Deputy Session Chair: Jacques Virasak, Enstrom Helicopter Corporation, 1-906-863-1200 x185, jacques.virasak@yahoo.com



MANUFACTURING TECHNOLOGY

Within the next decade, the US government will be investing in the largest rotary-wing acquisition program ever, Future Vertical Lift. New and novel manufacturing approaches will be vital to achieve affordable implementation of the technologies that will differentiate these aircraft. Papers are invited on topics that are likely to be employed in the manufacture of FVL aircraft, such as additive manufacturing, augmented reality assembly, and nano- and micro-scale machining. Other subjects would be adaptive and smart manufacturing equipment and systems, resource efficient factory design, data management for increased production performance, human-centered manufacturing (designing work places of the future), and networked factories linking supply chains to local production. Papers related to regulatory impacts and environmental issues; quality assurance approaches, and applications of innovative process measurements; advanced bonding, joining and assembly techniques; manufacturing modeling and simulation; and accelerating readiness levels are welcome. Papers from industry, government and academia are solicited.

Session Chair: Dr. Dhiren Marjadi, Altair, 1-508-330-3880, dkm@altair.com

Deputy Session Chair: Heather Woodworth, Sikorsky Aircraft, a Lockheed Martin Co., 1-203-386-6509, heather.a.woodworth@lmco.com



MODELING & SIMULATION

The AHS Modeling and Simulation (M&S) Technical Committee seeks papers on the application of modeling and simulation to the Future of Vertical Lift, VTOL aircrew flight training & rehearsal, flight operations, design, and safety and certification requirements. Papers on the following topics are invited:

- Improving VTOL safety and operations quality assurance through flight simulation.
- Rigorous quantification of benefits and Return on Investment of flight modeling and simulation for design, flight testing, training, and other activities compared to traditional practices.
- Application of M&S to improve design, flight test, and certification; and to support virtual engineering lifecycle concepts for VTOL aircraft, especially rotorcraft.
- Specialized topics in physics-based modeling, system identification, model-based control architectures, and simulation/simulator verification and validation with respect to ADS-33E-PRF, 14 CFR Part 60, CS-FSTD(H) or similar standards.
- Flight modeling and simulation of sling loads, urban operations, alpine operations, shipboard operations, Degraded Visual Environments, and in-flight collisions with birds or unmanned aircraft.
- Methods and techniques for flight modeling and simulation to UAVs; advanced lifting mechanisms for rotor, wing, or body; and future vertical lift aircraft configurations.
- Rotorcraft simulator fidelity ratings, fidelity metrics, pilot cueing requirements for specific air vehicle configurations or mission tasks, transfer of training, and application of simulation to study pilot-rotorcraft interactions.
- Advanced or novel simulation technologies, including in-flight simulation, parallel computing for real time simulation, and distributed simulation.

Session Chair: Matthew T. Smith, Sikorsky Aircraft, a Lockheed Martin Co., 1-203-386-5723, todd.t.smith@lmco.com

Deputy Session Chair: Dr. Mike Jones, German Aerospace Center (DLR), 49-531-295-2936, michael.jones@dlr.de



OPERATIONS

Papers are invited that address commercial and military rotorcraft operations (manned or unmanned) on the following topics:

- Concepts of Operations (CONOPS)
- Extreme weather
- Public safety and emergency medical service operations
- Offshore operations
- Rotorcraft survivability, vulnerability and operational effectiveness analysis
- Tools, technologies, and methodologies
- Electronic decision-aids/aiding
- Command, control, and communications

Session Chair: Scott Swinsick, Boeing Company, 1-480-891-8429, scott.swinsick@boeing.com



PRODUCT SUPPORT SYSTEMS

The Product Support committee is calling for technical papers that present the perspective of the air vehicle, power plant, ground support equipment, training device or mission equipment from the manufacturer, maintainer or end user. Some of the reliability, maintainability and supportability considerations in product introduction may be entirely new to the user and/or manufacturer, requiring new and innovative support concepts. Legacy systems also have unique supportability challenges as systems are in service longer. Key product support topics include:

- Designing for Reliability and Maintainability
- Platform Maintenance Applications (PMA)
- Maintenance Apps
- 3-D technical publications
- Performance Based Logistics (PBL)
- Condition Based Maintenance (CBM)
- Data Management
- Data Analytics
- Increasing the Life of Legacy Systems
- Soldier Focused Logistics (SFL)
- Contractor Logistics Support (CLS)
- Fleet Information Management (FIM)
- Flight Operations Quality Assurance (FOQA)
- Centralized Automated Flight Records Systems
- Site activation
- Pre-Operational Support Planning
- Service Center Support
- Training
- Lessons Learned from Previous Fieldings
- Environmental Conditions
- Support within budgetary constraints
- Pre-production prototyping and field evaluation/support programs

Session Chair: JinKyu Choi, Sikorsky Aircraft, a Lockheed Martin Co., 1-203-944-3854, jin.choi@lmco.com

Deputy Session Chair: Kevin Rees, U.S. Army Aviation & Missile Research Development & Engineering Center, 1-361-961-3850, kevin.s.rees.civ@mail.mil



PROPULSION

The AHS Propulsion Technical Committee invites papers that present new and innovative information on propulsion for rotorcraft and other vertical flight aircraft, including unique propulsion challenges of UAVs, FVL and V/STOL aircraft configurations with variable/multi-speed propulsion concepts. Recommended topics for these configurations include rotorcraft engines, rotorcraft drive systems, platform energy requirements, propulsion system integration and related airframe/engine technologies. Centered around these topics and of specific

interest are papers addressing recent approaches or technologies that enhance safety and improve performance, provide methods and design analyses that improve engine and drive system reliability, enable a reduction in customer component-repair/replacement burden, reduce propulsion contribution to fuel/energy cost and environmental footprint, provide a reduction in operations and sustainment costs, and/or present weight/noise reduction technologies. Recommended topics also include system integration considerations, environmental impacts and requirements, integrated/advanced electronic control systems (to include sensors), advanced materials, gear and bearing technology, shafting advancements, and alternative fuels and lubricants. The Committee also request papers that demonstrate the use of simulation to enhance propulsion systems and subsystems, detail design tools that support the above technologies, and provide creative validation/testing methods aimed at reductions in development/qualification costs. Prominent other areas of interest include alternatives to conventional rotorcraft propulsion/drive systems, including hybrid/electric drives, batteries, fuel cells and electric motors and their integration.

Session Chair: Dr. Kelsen LaBerge, U.S. Army Research Laboratory, 1-216-433-2078, kelsen.e.laberge.civ@mail.mil

Deputy Session Chair: Rosandra Scheppa, Sikorsky Aircraft, a Lockheed Martin Co., 1-561-775-5319, rosandra.scheppa@gmail.com



SAFETY

Papers are invited to address technologies and processes for the prevention of vertical lift accidents in both new design and legacy fleet aircraft. Of particular interest are current or emerging technologies to address specific accident cause factors; system safety engineering processes to proactively improve aircraft safety; safety risk assessment processes which mitigate accident recurrence; operational procedures for accident avoidance such as enhanced pilot training; fleet-wide safety lessons learned from the application of advanced flight/crew monitoring technologies; and current and new accident investigation techniques specifically those techniques which aid in accident investigations when actions in the cockpit are not known. Also of interest are safety analyses of transformative VTOL design concepts such as autonomous copiloting/piloting and electric/hybrid distributed propulsion systems. The safety committee is particularly concerned with the application of technology in order to negate the safety critical hazards to commercial, private and military rotorcraft. Off aircraft solutions in other areas such as certification, airspace structure, management tools, risk assessment tools and techniques, simulation and training to include actual accident scenario-based training, and others when particularly related to rotorcraft safety are also of interest.

Session Chair: Gary Braman, Sikorsky Aircraft, a Lockheed Martin Co., 1-256-327-5356, gary.d.braman@lmco.com

Deputy Session Chair: Tony Randall, Bell Helicopter Textron, 1-817-280-3836, wrandall@bh.com



STRUCTURES & MATERIALS

AHS Structures and Materials Committee invites papers which address the development, design, analysis, testing, service experiences, or novel application of structures and materials to manned and unmanned rotorcraft, powered lift and fixed-wing V/STOL aircraft. Topics of interest include, but are not limited to:

- Durability and damage tolerance
- Fatigue and fracture mechanics
- Impact mechanics
- Advanced metallic and composite materials and structures
- Probabilistic mechanics and structural reliability methods

- Repair concepts and methodology
- Structural integrity assurance via health monitoring and non-destructive evaluation and prognosis of remaining useful service life
- Stress and finite element modeling and analysis
- Structural design criteria, loads development, and optimization
- Verification and validation of structural methodologies
- Certification of rotorcraft structural parts

In general, related topics on affordability, weight reduction, material and structural qualification, and stress prediction accuracy improvements are desirable. Papers on practical applications of high strain, high durability, or adaptive materials to advanced structural concepts for improved performance or affordability are also solicited.

Session Chair: Leigh Altman, Bell Helicopter Textron, 1-817-280-5662, laltman@bh.com

Deputy Session Chair: Katherine Fry, U.S. Army Aviation & Missile Research Development & Engineering Center, 1-256-313-9025, katherine.a.fry4.civ@mail.mil



SYSTEMS ENGINEERING

The AHS Systems Engineering Tools/Processes Technical Committee invites papers that will promote the advancement of system design, development, integration and management across specialty areas associated with the engineering of helicopter systems. Papers in this session may include topics that span several other helicopter technical subject areas and address problems unique to trade-offs and optimization across those areas. New tools and methods (Model Based Systems Engineering, etc.) to perform requirements development and management; system architecture, especially at the System-of-Systems level; system modeling and simulation; system verification and validation; systems reliability; system qualification and certification; program/ project management for System-of-Systems; risk management; systems engineering tools, processes and best practice; systems engineering quality management; systems engineering education and training; and "Systems Thinking" benefit are also of interest.

Session Chair: Serge Germanetti, Airbus, 33-442-857-019, serge.Germanetti@airbus.com

Deputy Session Chair: James Garman, Sikorsky Aircraft, a Lockheed Martin Co., 1-203-386-5510, jim.garman@lmco.com



TEST & EVALUATION

Papers are invited that address all aspects of legacy and future VTOL aircraft test and evaluation. This includes the evaluation of advanced technologies (components and subsystems) and vehicles (manned and unmanned) in laboratory, ground, and flight-test scenarios. Insightful papers illustrating the applied methodology for testing of advanced technologies and vehicles are highly desirable. The Committee strongly encourages papers covering research agency, industrial, academic and military activities performed in representative operational and environmental conditions. Aspects of the complex flight envelopes of conventional and unconventional vertical lift vehicles (low-speed, transition, maneuvering, conversion, and high-speed) are of interest, as well as testing techniques involving vehicle safety in aspects of technological design, scientific evaluation, event investigation, and airworthiness compliance. The status, including milestones, of any pending research/work required for the completion of the paper should be included. The abstracts will be evaluated based on the appropriateness of the work to the vertical flight industry, originality, technical quality and completion status. **Abstracts exceeding the 5 page limit will not be evaluated.**

Session Chair: Larry Meyn, NASA Ames Research Center, 1-650-604-5038, larry.meyn@nasa.gov

Deputy Session Chair: Joost Hakkaart, Netherlands Aerospace Centre (NLR), 31-88511-3452, joost.hakkaart@nlr.nl



UNMANNED VTOL AIRCRAFT & ROTORCRAFT

Papers are invited on the concepts, design, development, operation, and robotics aspect of VTOL and rotary-wing UAVs in the following general areas: autonomy, collaboration and architectures; reliability and robustness; payloads and sensors, including applications such as Intelligence, Surveillance and Reconnaissance (ISR), weaponization, cargo, etc.; agility and performance; survivability; and operability. Topics of interest include, but are not limited to:

- Guidance, navigation and control
- Alternate navigation methods
- Design concepts, including small unmanned aircraft systems (sUAS) and micro air vehicles (MAVs)
- Mechatronics integration
- Reasoning, decision-making, autonomy and multivehicle collaboration architectures
- Embedded perception and data/information fusion
- Autonomous operation, tasking and control (C4)
- Manned-unmanned (MUM) teaming
- Flight testing, modeling and simulation
- Data links and communications
- Airworthiness, safety and certification, operation in civil airspace
- International cooperation and compatibility

Session Chair: Dr. Srikanth Saripalli, Texas A&M University, 1-979-458-0352, sssaripalli@tamu.edu

Deputy Session Chair: Dr. Vikram Hrishikeshavan, University of Maryland, 1-240-383-8379, vikramh@umd.edu

KEY DATES:

Abstracts must be submitted to the Mira website via www.vtol.org/mira by Monday, October 16, 2017.

AHS expects to notify authors of paper selection by Monday, November 20, 2017.

Final papers must be submitted to the Mira website via www.vtol.org/mira by Monday, April 2, 2018.



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