CALL FOR PAPERS

79th Annual Forum & Technology Display
May 16–18, 2023  West Palm Beach, Florida

VFS is pleased to announce the 79th Annual Forum & Technology Display is planned for May 16–18, 2023, at the Palm Beach County Convention Center.

Forum 79 is the premier opportunity to present and discuss advances in vertical flight technology, developments and applications.

For nearly 80 years, the Forum has been the world’s largest and most important vertical flight technical meeting. It is the only event where academics, government researchers and leaders, military operators and decision makers, and industry engineers and executives come together to learn, share and work to advance vertical take-off and landing (VTOL) aircraft and technology. We invite the world’s vertical flight community to join us for Forum 79 and help shape The Future of Vertical Flight.

VTOL technology is advancing rapidly, as high-fidelity modeling and analysis tools, autonomy, advanced manufacturing, electric/hybrid-electric propulsion, and other technologies and innovations enable new capabilities. As the US military’s Future Vertical Lift (FVL) program progresses and expands, next generation civil tiltrotors and compounds take shape under the Europe Union’s Clean Sky 2, new commercial rotorcraft near certification, and more electric VTOL aircraft take to the skies, this coming year will be full of advances in VTOL technology, which will be showcased at the 79th Annual Forum.

This Call for Papers invites abstracts to be submitted for consideration in any of the Society’s 21 technical areas or History committee:

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

The Forum 79 Technical Chair is Prof. Mark D. White, University of Liverpool, mdw@liv.ac.uk

The Forum 79 Deputy Technical Chair is Dr. Hyeonsoo Yeo, US Army DEVCOM Aviation & Missile Center, hyeonsoo.yeo.civ@army.mil

Abstracts are due by Monday, October 24, 2022 and must be submitted to the Mira website at www.vtol.org/mira. It is the author’s responsibility to obtain clearances from their organizations in time to meet the abstract submission deadline date.

The Annual Forum is an international event and therefore it is VFS policy that all final written papers and Forum presentations are completely unrestricted. Potential authors should make note of this policy BEFORE submitting an abstract.

Abstract acceptance will be based upon the following:

- Work that represents new vertical flight technology advancements and/or reports significant new information.
- Technical quality, relevance, importance and timeliness.
- Submitter’s prior history in following through with previous commitments.
- Work in progress must be cited appropriately in the abstract, specifying how proposed content differs from prior publication (if any). Failure to cite prior publications may result in the abstract being ineligible for review.

Below is a summary of submission information and guidelines:

- Submittal of an abstract is a professional commitment. If an abstract is accepted, the author commits to prepare a final paper, register, and pay to attend the Forum, and make a presentation on that final paper.
- One author may present no more than two papers at the Forum.
- The abstract should present the status of the background data to be used, summarize figures and illustrations, and include a summary of important conclusions.
- Abstracts should be in PDF format, not exceed 5 pages in length and be less than 5MB in file size. Abstracts exceeding the 5-page limit will not be evaluated.
- Formatting guidelines must be followed. Templates are available on the Mira and Forum 79 sites (www.vtol.org/mira).

No Paper — No Podium Rule: this 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.

Registration: Forum speakers are eligible for reduced speaker registration fees, whether members of VFS or not. Speakers MUST register and pay for the Forum before accessing any sessions.

Important Dates:
Monday, October 24, 2022: Abstracts must be submitted to the Mira website.
Early December 2022: VFS expects to notify authors of paper selection.
Monday, April 10, 2023: Final written papers are due.

www.vtol.org/mira

Forum 79 Call for Papers information, contact Julie M. Gibbs: 1-703-684-6777 ext. 103, jmgibbs@vtol.org
Forum 79 Exhibit and Sponsorship information, contact David Renzi: 1-703-684-6777 ext. 105, drenzi@vtol.org

www.vtol.org
Best Paper Awards: Each of the authors of the best papers presented at the Annual Forum for each technical discipline — as determined by the relevant Technical Committee — will receive a Best Technical Paper Award certificate.

In addition, the overall best paper will receive the Alfred Gessow Forum Best Paper Award:

- The main winning author will be invited to present his or her paper at the European Rotorcraft Forum (ERF), to be held in September 2023, and will be honored with a plaque.
- ERF organizers provide complimentary registration and accommodations and VFS covers the winner’s travel expenses to ERF.

ANNUAL FORUM TECHNICAL SESSIONS

ACOUSTICS

Papers are welcomed that address recent advances in the study of rotorcraft acoustics and their related fields. Research into crewed or uncrewed vehicles that focuses on external and internal noise generation, propagation, control (active and passive), and community acceptance for rotorcraft. VTOL vehicles and advanced air mobility (AAM) are appropriate. Papers addressing similar topics in wind turbine noise are also welcome. Topics of interest include but are not limited to:

- Research contributing to a basic understanding of fundamental aerodynamic noise sources
- Noise measurement, modeling, and prediction research that advances the state of science
- Acoustic aspects of issues that could transform, revolutionize or facilitate concepts for the future of vertical flight
- Development or implementation of national or international civil noise regulations

Appropriate exterior noise topics include:
- Vehicle component and full system noise prediction methodology development and validation
- Wind tunnel and flight test acoustics measurements
- New procedures for acoustic data acquisition and analysis
- Active and passive noise reduction technologies

Appropriate interior noise topics include:
- Application of numerical techniques to predict noise in vehicle cabins
- Active and passive noise control technologies to reduce cabin noise
- Noise abatement flight operations
- Interaction between various noise sources for vertical flight vehicles
- Acoustic propagation models
- Impact of vehicle noise on the community and human response

Session Chair: Prof. James Baeder, University of Maryland, baeder@umd.edu
Deputy Session Chair: Dr. James H. Stephenson, US Army, james.h.stephenson23.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. 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 and uncertainty quantification

Aerodynamics abstracts exceeding 5 pages will not be evaluated. Authors are encouraged to use the full five pages to allow for sufficient detail and increase the chance of acceptance.

Session Chair: Dr. Manuel Kessler, University of Stuttgart, kessler@iai.uni-stuttgart.de
Deputy Session Chair: Glen Whitehouse, Continuum Dynamics, glen@continuum-dynamics.com

AVIONICS & MISSION SYSTEMS

The committee invites papers that address software, mission, flight, or avionics systems for crewed or uncrewed, or optionally crewed 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), data links, or electronic warfare systems
- Complex software-intensive, partitioned, or multi-core avionics, mission, or flight systems including cognitive decision aiding, machine learning, artificial intelligence, automation/augmentation, and 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, GPS denied environments, information assurance, and aspects of DevSecOps
- Avionics test or qualification
Fly

Analytical modeling techniques

Development of rotorcraft

Improved situation

Cueing and pilot input

Development and application

Advances in dynamics

Loads prediction

Large-scale manufacturing and

Secure and night vision

Graphical user interface

Innovative flight control and/or

Workload, stress and fatigue

Tactile cueing

Development of systems that

MIL-STD-1472, MIL-L-85762,

Minimizing human impact injury

Open systems architecture

Multi-terrain impact analysis

Voice recognition and

Impact of crash-resistant fuel

Methods for minimizing

New designs facilitating hands

Infrastructure: vertiports,

Innovative technologies

Crew, troop, and passenger

Flight, wind-tunnel and model-

Prediction of loads, vibration,

Dynamics of coupled rotor/

systems, or software systems

capabilities of vertical lift aircraft

Open systems architecture

initiatives, technologies, and

applications within rotorcraft or

adjacent airborne aircraft (e.g.,

fighter) systems, including, but

not limited to MOSA, FACE,

OMS, HOST, SOSA and IMA

architectures

Electrical power generation,
distribution, and control

including eVTOL

control and back

Improved situation

awareness and information

management techniques

New and innovative visual
displays, large area displays,
touch interfaces, 3D displays

Graphical user interface

designs and information

management

Tactile cueing

Voice recognition and auditory
displays, advances in 3D audio

Secure and night vision

goggle compatible crew

station lighting

uncrewed 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

Methods for minimizing

design-related errors by the

flight crew / enable flight

crew to detect and manage

errors that do occur

CRASH SAFETY

Papers are invited on ALL aspects of crashworthiness and aviation
crashworthiness certification, or other aspects of qualification
occupant safety, analysis and design, rotorcraft, uncrewed aircraft systems
(UAS), and other V/STOL aircraft in applications such as military,
civil, offshore transport, advanced air mobility (AAM), mountainous
terrain, emergency medical services, and law enforcement. Of key
interest are system integration analyses that demonstrate enhanced
crashworthiness concepts and technologies focused on:

• Minimizing human impact injury

• Maximizing post-crash survival

• Development of crash-resistant

design criteria

• Addressing chronic injury

potential related to crash-

protective systems

• Development and application

of comprehensive human

tolerance and injury criteria

Additional crashworthiness topics of interest include but are not
limited to the following:

• 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

• Multi-terrain impact analysis

and testing including ditching

and flotation stability

• Impact of crash-resistant fuel

systems to include range

extension tanks

• Methods of mishap data

retrieval, collection and

analysis; use of mishap data to
define crash safety technology
deficiencies and support
system safety analyses

• Numerical techniques for

crashworthiness including

occupant modeling, simulation
of aircraft impacts, aircraft

crash protective systems

such as landing gear,

energy-absorbing seats,
inflatable devices; validation
methods for acceptance of these results

Session Chair: Dr. Joseph Pelletiere, Federal Aviation
Administration, joseph.pelletiere@faa.gov
Deputy Session Chair: Tyrone Minton, The Protective Group,
tyrone.minton@pbeamorus.com

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

• Cockpit environment for

extended mission times, such
as air conditioning, noise
reduction, vibration reduction,
etc.

• Flight controls that reduce

workload or simplify the

pilotage task

• Innovative flight control and/or

mission grip design

• Cognitive decision aiding and

automation

• Reducing long-term injury to

pilots due to vibration, head-

borne weight of goggles, etc.

• Cueing and pilot input

needed to transition from

autonomous flight to manual

control and back

Session Chair: Daniel Cooper, Sikorsky, a Lockheed Martin Co.,
dan.m.cooper@lmco.com
Deputy Session Chair: Grace Chrysilla, The Boeing Company,
grace.chrysilla@boeing.com

DYNAMICS

Papers are invited for all areas related to rotorcraft dynamics and
aerelasticity. Priority will be given to completed programs where
significant conclusions are substantiated and the results contribute to
advancing the state-of-the-art. Papers reporting on the following are
of particular interest:

• Development of rotorcraft
dynamic or aerelastic

analyses, experimental

validation and new

experiments

• Advances in dynamics
technology and design

methodologies

• Advances in active and passive

vibration reduction techniques

Other topics include but are not limited to:

• Rotor response and stability

• Dynamics of coupled rotor/

airframe system

• Loads prediction

Session Chair: Dr. Jonathan Rogers, Georgia Institute of
Technology, jonathan.rogers@ae.gatech.edu
Deputy Session Chair: Dr. Klausdieter G. Pahlke, German
Aerospace Center (DLR), klausdieter.pahlke@dlr.de

ELECTRIC VERTICAL TAKEOFF AND LANDING (eVTOL)

Papers are invited on all areas related to the sciences, engineering,
and technologies unique to Electric Vertical Takeoff and Landing
(eVTOL) aircraft and Urban Air Mobility (UAM) infrastructure of the
future. Particular topics of interest include, but are not limited to:

• Advanced on-board electric

power systems: batteries,

hydrogen fuel cells, hybrid-

electric engines, transmission

distribution, heat rejection

• Infrastructure: vertiports,

airspace insertion, fast-

charging, airspace navigation,

hydrogen infrastructure and

standards

• Large-scale manufacturing and

global supply chain

• Economics: missions, demand

modeling, and various costs

• Problems of safety: crash

gress, high-voltage,

fire, cyber- and physical-

vulnerability

• Flight, wind-tunnel and model-
testing of eVTOL aircraft and

sub-systems

• Standards, regulatory needs,

and certification for eVTOL/ UAM

• Pilot interface and pilot/crew

training including automation

and autonomy

• Urban aviation environment,

micro-climatology, high wind/

gust operations

• Other topics unique to eVTOL

aircraft and UAM

Session Chair: Dr. William Staruk, Joby Aviation,
william.staruk@jobyaviation.com
Deputy Session Chair: Dr. John Tritschler, US Naval Test Pilot
School, john.tritschler@navy.mil
Papers are invited that address all aspects of VTOL aircraft handling qualities from basic research through engineering design and development to implementation, verification, qualification, and certification in piloted simulation and flight tests. Handling Qualities comprises all of the aircraft characteristics that govern the ease and precision with which a pilot or uncrewed system is able to perform tasks required by various aircraft missions and under special operational or environmental conditions. This includes vehicle stability and control/response characteristics, flight guidance and control systems, and the pilot-vehicle interface. There is also particular interest to investigate and expound on the influence these systems have on piloting strategies and pilot workload as driven by task demands. 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
- Impact of handling qualities on safety considerations, and work related to handling qualities of unconventional vertical flight configurations
- Handling qualities of remotely-piloted, uncrewed, and autonomous systems of all sizes as defined by mission performance measures, or other relevant metrics

**HEALTH & USAGE MANAGEMENT SYSTEMS**

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

- Advanced monitoring technologies to support aircraft health and condition assessment, including sensors, data acquisition and processing, diagnostic and prognostic algorithms, artificial intelligence, machine learning (deep learning), onboard system architecture with HUMS integration, wireless communication and energy harvesting
- Advanced life and usage assessment techniques, including modeling, analysis, and data fusion
- HUMS enabled paradigm shifts in aircraft design (HUMS as a cyber-physical system), maintenance practices, and operations planning (logistics)
- 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
- The application areas are propulsion, drive systems, structures, rotor systems, vehicle management system/flight control, electrical and electronic systems, as well as cross system integrated solutions.
- Modeling and Simulation that utilizes rotorcraft health and usage monitoring and management, and condition-based maintenance to facilitate realistic total lifecycle value (sustainment, operational availability, etc.) of crewed and uncrewed rotorcraft platforms
- Aircraft 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 validation and verification with respect to ADS-33E-PRF, 14 CFR Part 60, CS-FSTD(H) or similar standards
- Flight modeling and simulation of sling loads, urban mobility, alpine operations, shipboard launch and recovery, degraded visual environments, and other unique operational challenges
- Application of flight modeling and simulation to VTOL aircraft; advanced lifting mechanism for rotor, wing, or body; and other 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

**MANUFACTURING TECHNOLOGY**

The US Department of Defense is now investing in the largest rotary-wing acquisition program ever, Future Vertical Lift, which consists of multiple mission sets covering requirements across the military services. At the same time, the world of eVTOL concepts also continues to grow. High rates are anticipated in both areas (2,000 to 10,000 units per year), which is far greater than historical aircraft procurement rates, though not as high as automotive rates. New and novel manufacturing approaches are vital to achieving the most cost-effective implementation of technologies to meet industry’s needs. Papers are invited on topics that are likely to be employed in the manufacture of FVL and eVTOL aircraft concepts, such as:

- High-rate automated manufacturing
- Additive manufacturing
- Augmented reality assembly
- Nano- and micro-scale machining
- Adaptive and smart manufacturing equipment and systems
- Manufacturing modeling and simulation
- Resource efficient factory design
- Data management for increased production performance
- Human-centered manufacturing (designing workplaces of the future)
- Networked factories linking supply chains to local production
- Regulatory impacts and environmental issues
- Quality assurance approaches (including non-destructive evaluation/inspection techniques), and applications of innovative process measurements
- Advanced bonding, joining and assembly techniques
- Composite repair
- Accelerating readiness levels
OPERATIONS

The Operations Technical Committee welcomes papers on the technical topics below in civil, commercial & military areas. It also welcomes any papers which encompass disciplines affecting current and future operations & operability of rotorcraft.

- Concepts of Operations (CONOPS)
- Air Traffic Management (ATM) & Unmanned Traffic Management (UTM)
- eVTOL / advanced air mobility (AAM) operations
- Lessons learned from deployed operations
- Operations in Degraded Visual Environment (DVE)
- Offshore, public safety, emergency medical service, and search and rescue operations
- Crewed-uncrewed operations
- Innovative procedure & approach to optimize & extend capability of landing platforms
- Vertical lift survivability.

Session Chair: Scott Swinsick, The Boeing Company,
scott.swinsick@boeing.com
Deputy Session Chair: Shaun Melhorn, Sikorsky, a Lockheed Martin Co., shawn.p1.melhorn@lmco.com

PRODUCT SUPPORT SYSTEMS TECHNOLOGY

The Product Support Systems Technical Committee is calling for technical papers that highlight the development or application of technology, processes and innovations that support vertical lift operators and maintainers, including eVTOL systems.

Note that many of the technologies that have been presented in previous Forum sessions and have now been successfully fielded are excellent candidates to present in the Product Support sessions going forward. All fielded technology, processes and innovations end up supporting the operator or maintainer. Key product support subjects include:

- Design for Reliability and Maintainability
- Platform Maintenance Applications (PMA)
- UID / IUID Integration
- Predictive Maintenance Systems
- HUMS-Derived Maintenance Management
- Condition Based Maintenance (CBM)
- Maintenance Free Operating Period (MFOP)
- MSG-3 and Reliability Centered Maintenance (RCM)
- Fleet Data Management & Data Analytics
- Development of New Repair Technologies
- Damage-Tolerant Systems Support
- Sustainment and sustainable technologies
- eVTOL logistics development and support
- 3-D and Augmented Reality Technical Publications
- Performance Based Logistics (PBL)
- Lessons Learned from Deployed Operations
- Fleet Information Management (FIM)
- Flight Operations Quality Assurance (FOQA)
- Site Activation
- Austere-Fielded Support Programs
- Pre-Operational Support Planning
- Service Center Support
- Training & Training Facilities
- Increasing the Life of Legacy Systems
- Rapid Prototyping for Legacy, Out-of-Production Spares
- Safety Risk Management efforts which proactively identify and address potential accident causes risks to aircraft safety
- Safety Risk Assessment

Session Chair: Shaun Stubbs, Boeing Global Services, shawn.d.stubbs@boeing.com
Deputy Session Chair: Thomas Cieslewski, Kamatics Corporation, thomas.cieslewski@kaman.com

SAFETY

Papers are invited addressing technologies and processes for the prevention of vertical flight accidents in the design, testing and operational stages. Topics of particular interest are:

- Transformative designs/technologies which enhance safety, such as autonomous crewing and distributed propulsion
- Technology solutions addressing accident causal factors
- Technology solutions to critical commercial, private, and military aircraft hazards
- System Safety Engineering processes that identify and mitigate hazards
- Safety Risk Management efforts which proactively identify and address potential accident causes risks to aircraft safety
- Safety Risk Assessment

Session Chair: Anastasia Kozup, US Army DEVCOM Aviation & Missile Center, anastasia.j.kozup.civ@mail.mil
Deputy Session Chair: Patrick Darmstadt, The Boeing Company, patrick.r.darmstadt@boeing.com

PROPULSION

The 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 UAS, FVL and V/STOL aircraft configurations with variable/multi-speed propulsion concepts. Please limit Propulsion abstract submissions to no more than 2 pages. Recommended topics for these configurations include:

- Rotorcraft engines
- Rotorcraft drive systems
- Platform energy requirements
- eVTOL propulsion units

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 including novel propulsion systems or energy sources (electric propulsion, hydrogen fuel, etc.)

Other recommended topics include:

- System integration considerations environmental impacts and requirements
- Integrated/advanced electronic control systems (to include sensors)
- Advanced materials, gear and bearing technology
- Shafting advancements
- Alternative fuels and lubricants
- Demonstrate the use of simulation to enhance propulsion systems and subsystems
- Detail design tools that support the above technologies
- Propulsion system integration
- Related airframe/engine technologies
- Integrating alternative fuels and lubricants including sustainable aviation fuel (SAF) into existing or novel propulsion units.
- Use of hydrogen or alternate lubricants for electric machines.
- Provide a reduction in operations and sustainment costs
- Present weight/noise reduction technologies
- Novel methods for providing propulsion power for eVTOL or advanced air mobility applications
- Provide creative validation/testing methods aimed at reductions in development/qualification costs
- Alternatives to conventional rotorcraft propulsion/drive systems, including hybrid/electric drives, batteries, hydrogen fuel cells and electric motors, and their integration
- Reduce propulsion contribution to fuel/energy cost and environmental footprint including novel propulsion systems or energy sources (electric propulsion, hydrogen fuel, etc.)

Session Chair: Anastasia Kozup, US Army DEVCOM Aviation & Missile Center, anastasia.j.kozup.civ@mail.mil
Deputy Session Chair: Patrick Darmstadt, The Boeing Company, patrick.r.darmstadt@boeing.com

Session Chair: Mr. Jan Goericke, Advanced Rotorcraft Technology, Inc., jan@flightlab.com
Deputy Session Chair: Dr. Hong Xin, Bell, hxin@bellflight.com

scott.swinsick@boeing.com, The Boeing Company,
Key technology areas of interest to enhance safety, including but not limited to:
- Enhanced vision systems
- Advanced terrain and traffic avoidance systems
- Automated and real-time risk assessment systems
- Real-time aircraft analytics
- Weather hazards, such as inadvertent flight into IMC prevention
- Crew and passenger safety — other than crash safety

Session Chair: Dr. Alexia Payan, Georgia Institute of Technology, alexia.payan@gatech.edu
Deputy Session Chair: Paul Inguanti, Sikorsky, a Lockheed Martin Co., paul.c.inguanti@lmco.com

STRUCTURES & MATERIALS

The Structures and Materials Technical Committee invites papers, which address the development, design, analysis, testing, service experiences, or novel application of structures and materials to crewed and uncrewed rotorcraft, powered lift and fixed-wing V/STOL aircraft. Topics of interest include, but are not limited to the following:
- Structural issues of eVTOL implementations
- 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

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: Arild Barrett, Sikorsky, a Lockheed Martin Co., arild.barrett@lmco.com
Deputy Session Chair: Dr. Suresh Moon, Technical Data Analysis, Inc., smoon@tda-i.com

SYSTEMS ENGINEERING

The 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. Topics of interest include but are not limited to the following:
- Certification of artificial intelligence
- Cybersecurity — system level security
- Model-based system engineering
- Program/project management for system-of-systems
- Risk management
- System architecture measurements and refinements
- Systems engineering education and training
- Systems engineering quality management
- Systems engineering tools, processes and best practice
- System modeling and simulation
- System qualification and certification
- Systems reliability
- “System thinking” benefit
- System verification and validation

Session Chair: Louis Fabre, Airbus Helicopters, louis.fabre@airbus.com
Deputy Session Chair: James Garman, Sikorsky Aircraft, a Lockheed Martin Co., jim.garman@lmco.com

TEST AND EVALUATION

Abstracts for the Test & Evaluation Technical Committee require a minimum of 3 to a maximum of 5 pages and must be less than 5MB. Papers addressing all aspects of legacy and future VTOL aircraft test and evaluation are invited. This includes testing of advanced technologies (components and subsystems) and vehicles (manned and unmanned), both full- and model- scale, in laboratory, wind tunnel, ground, and flight-test scenarios. Insightful papers providing scientific and quantifiable data, illustrating applied methodologies and evaluation of advanced technologies and vehicles are highly desirable. 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, availability of (preliminary) results and completion status. The Committee strongly encourages papers covering:
- 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).
- Testing techniques involving vehicle safety in aspects of technological design, scientific evaluation, event investigation, and airworthiness compliance.

Session Chair: Carl Ockier, Airbus Helicopters, carl.ockier@airbus.com
Deputy Session Chair: Ali Sultan, Carson Helicopters, asultan@carsonhelicopters.com

UNMANNED VTOL AIRCRAFT & ROTORCRAFT

Papers are invited on the concepts, design, development, operation, and robotics aspect of VTOL and rotary-wing (UAS) 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
- Operability
- Shipboard Environment (deck motion and gust)

Other topics of interest include, but are not limited to the following:
- Guidance, navigation and control (with and without GPS)
- Alternate navigation methods
- Reinforced Learning Machine Learning for Autonomy
- Design concepts, including small uncrewed 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. Sandipan Mishra, Rensselaer Polytechnic Institute, mishr2@rpi.edu
Deputy Session Chair: Dr. Jean Paul Reddingier, US Army Research Lab, jean-paul.f.reddinger.civ@army.mil

Important Dates:
Monday, October 24, 2022: Abstracts must be submitted to the Mira website.
Early December 2022: VFS expects to notify authors of paper selection.
Monday, April 10, 2023: Final written papers are due.