Call for Papers

The AIAA Structural Dynamics and Fluid Dynamics Technical Committees

are jointly sponsoring a Special Session on:

Advances in High-Speed Fluid-Thermo-Structural Interaction (FTSI)

AIAA SciTech 2027

January 11-15, 2027
Hyatt Regency
Orlando, FL

Intensive work on High-Speed FTSI modeling and experimentation has been underway by the structural dynamics' international community, leading to collaborative and multidisciplinary research in the area. New research provides insight into the challenges of modeling and capturing FTSI instability mechanisms in different configurations and sparks the discussion on advances in the field and practical applications. This session will highlight recent efforts on investigating the fundamental physics of FTSI in the supersonic and hypersonic flow regimes using computational modeling and experimental tests to support the design of high-speed aerospace vehicles. The committee welcomes submissions from industry, government, academia, and small businesses.

Make sure to select the "Advances in High-Speed Fluid-Thermo-Structural Interaction" topic option under "Structural Dynamics" or "Fluid Dynamics" during submission.

For more information, please contact the session organizer:

Luisa Piccolo Serafim
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Georgia Institute of Technology

Eric Blades
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ATA Engineering

Call for Papers

The AIAA Structural Dynamics and Spacecraft Structures Technical Committees

are jointly sponsoring a Special Session on:

Advances in AI/ML for Space Structures, Loads, and Structural Dynamics

AIAA SciTech 2027
January 11-15, 2027
Hyatt Regency
Orlando, FL

There has been significant effort in recent years across the aerospace community to implement artificial intelligence (AI) and machine learning (ML) in many disciplines. This special session solicits papers highlighting recent progress in applying AI/ML to address technical challenges in space systems structural dynamics and related coupled environments. Topics of interest include, but are not limited to, are loads and dynamics (coupled loads analysis, system/subsystem vibration, shock, and acoustics), structures, guidance, navigation, and control (GNC) and pointing stability (including jitter analysis), and aerosciences as they relate to structural response (aeroelasticity, buffet and unsteady aerodynamic forcing, aeroacoustics, and computational fluid dynamics / fluid–structure interaction).

Make sure to select the "Structural Dynamics" category during submission.

For more information, please contact the session organizers:

Dexter Johnson
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Call for Papers

The AIAA Structural Dynamics and Adaptive Structures Technical Committees
are jointly sponsoring a Special Session on:

Aircraft Load Alleviation and Control

AIAA SciTech 2027

January 11-15, 2027
Hyatt Regency
Orlando, FL

The AIAA Structural Dynamics Technical Committee and the AIAA Adaptive Structures Technical Committee invite submissions to the **Special Session: Aircraft Load Alleviation and Control** at the **AIAA SciTech 2027 Forum**. As modern aircraft designs, including eVTOL and hybrid-electric concepts, are tending towards lighter and more flexible designs, the need for improved gusts, maneuvers and ground loads alleviation becomes increasingly important to meet structural efficiency, performance, and certification requirements. This session focuses on innovative concepts, control strategies, experimental demonstrations, and integrated design approaches aimed at reducing structural loads and improving aeroelastic performance.

Topics of Interest
Authors are invited to submit papers in areas including, but not limited to:
Active and Passive Load Alleviation Techniques
- Gust load alleviation
- Maneuver load control
- Wing load reduction concepts
- Passive, semi-active, and hybrid load mitigation solutions

Aeroelastic Modeling and Simulation
- High-fidelity and reduced-order aeroelastic models
- Nonlinear aeroelastic behavior
- Integrated aerodynamic–structural modeling frameworks
- Verification and validation of load-alleviation simulation tools

Flight Control Approaches for Load Reduction
- Integrated flight and structural control
- Robust, adaptive, and optimal controllers
- Model-predictive control for load management
- Handling qualities with load-alleviating control laws

Morphing and Adaptive Structures
- Morphing wings and adaptive surfaces
- Distributed actuation concepts
- Smart material-based load control
- Folding wing tips
- Pop up spoilers
- Structural adaptation for performance enhancement

Aeroelastic Tailoring and Structural Optimization
- Composite tailoring for passive load alleviation
- Anisotropic stiffness distribution and fiber-orientation optimization

- Twist and bending tailoring for load and flutter control
- Integrated aerodynamic–structural optimization
- Tailored wings for high-aspect-ratio and flexible aircraft

Data-Driven and AI-Enabled Load Alleviation Methods
- Machine-learning–based gust and load prediction
- AI-assisted load estimation and sensor fusion
- Reinforcement learning for active load control
- Surrogate modeling for rapid aeroelastic analysis
- Digital twins for real-time structural loads management
- AI-accelerated design exploration for load-optimized structures

Experimental and Flight Demonstrations
- Wind-tunnel tests and subscale demonstrators
- Full-scale flight test results
- Experimental validation of active and passive load-alleviation concepts
- Sensing devices including LIDAR
- Sensing strategies and real-time estimation techniques

Applications to Next-Generation Aircraft Architectures
- High-aspect-ratio transport wings
- Hybrid-electric, hydrogen, and distributed-propulsion aircraft
- eVTOL and advanced air mobility vehicles
- Flexible, lightweight future aircraft concepts

Detailed deadline information, abstract preparation instructions, and policies can be found at:
https://www.aiaa.org/SciTech/call-for-content/call-for-papers

Make sure to select "Aircraft Load Alleviation and Control " topic option under "Adaptive Structures" or "Structural Dynamics" technical discipline when prompted during submission.

For more information, contact one of the following organizers:
- **Dr. Jonathan Cooper**, Structural Dynamics TC   j.e.cooper@bristol.ac.uk
- **Dr. Roeland De Breuker**, Adaptive Structures TC   r.debreuker@tudelft.nl

Call for Papers

The AIAA Structures Technical Committee and Structural Dynamics Technical Committee
are sponsoring a Joint Session on:

Fatigue Loads, Spectrum Generation, and Testing

AIAA SciTech 2027

January 11-15, 2027
Hyatt Regency
Orlando, FL

The AIAA Structures and Structural Dynamics Technical Committees solicit papers with recent research, technological advancements, and systems-level perspectives on **Fatigue Loads and Spectrum Generation** for the AIAA SciTech conference. Applications to all aero-structures, aircraft, rotorcraft, and spacecraft (such as launch vehicles), are welcome. Potential topics could include but are not limited to:

- **Advanced Methods for Fatigue Load Generation**: Exploring new techniques and algorithms (e.g. AI/ML, Risk based) for generating fatigue loads across different mission profiles (commercial, military, etc.).
- **Challenges in Testing for Novel Aerospace Structures**: Developing fatigue spectra and test methods for the qualification of new materials and structural designs; such as for composite bonded structures, additive manufactured structures, and/or advanced ceramic matrix composites.
- **Fatigue in Extreme Environments**: Studying the effects of extreme conditions (e.g., temperature, pressure, acoustics) on fatigue loads and testing; such as for high speed vehicles (inlets, nozzles, control surfaces, leading edges, and engine exhaust washed structure under combined loads and extreme environments).
- **Impact of Aerodynamic Buffet on Fatigue Loads**: Understanding how buffet contributes to fatigue in aircraft structures; spectrum generation, combined loads fatigue methods, and methods to simulate buffet during Full Sale Fatigue Testing; flight test data reduction.
- **Next-Generation Air-Vehicles:** Addressing the unique fatigue load, spectrum, and testing challenges in such vehicles as **Electric Vertical Takeoff and Landing (eVTOL) vehicles**, **Unmanned Aerial Vehicles (UAVs)**, Collaborative Combat Aircraft (CCA), and Hypersonic Cruise Vehicles (HCVs).
- **Application of Smarter Testing for Fatigue Certification:** Leading edge work in the area of combined test and simulation for fatigue life certification of future aerospace vehicles.

The committee welcomes submissions from government, industry, academic, and small businesses.

Detailed deadline information, abstract preparation instructions, and policies
can be found at: https://www.aiaa.org/SciTech/call-for-content/call-for-papers

Make sure to select the "Fatigue Loads and Spectrum Generation" topic option under "Structures" or "Structural Dynamics" technical discipline when prompted during submission.

For more information, contact one of the following organizers:

Rich Manwell	Textron Aviation	rmanwell@txtav.com
Sal Liguore	The Boeing Company	salvatore.l.liguore@boeing.com

Call for Papers

The AIAA Structural Dynamics and Fluid Dynamics Technical Committees

are jointly sponsoring a Special Session on:

Fluid-Metamaterial Interactions

AIAA SciTech 2027

January 11-15, 2027
Hyatt Regency
Orlando, FL

Metamaterials are engineered structures designed to exhibit bulk properties not found in natural materials. These exotic features offer exciting new avenues for flow control. This session will highlight recent experimental and computational research into the fundamental interactions between fluids and metamaterials, showcase innovative engineered surface/subsurface designs, and provide an overview of this emerging field.

Make sure to select the "Fluid-Metamaterial Interactions" topic option under "Structural Dynamics" or "Fluid Dynamics" during submission.

For more information, please contact the session organizers:

Caleb Barnes
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Air Force Research Laboratory
(Structural Dynamics Technical Committee)

Jane Bae
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California Institute of Technology
(Fluid Dynamics Technical Committee)

Call for Papers

The AIAA Structural Dynamics Technical Committee

is sponsoring a Special Session on:

High-Speed Fluid-Structure Interaction: US and International Advances

AIAA SciTech 2027
January 11-15, 2027
Hyatt Regency
Orlando, FL

Rapid advances are being made in Supersonic and Hypersonic (high-speed) fluid-structure interface simulations. Two sessions will bring the state of the art to AIAA audience from leaders in the field. We envision the following two sessions.

- AFRL SSC High-Speed FSI Computational and Experimental Test Campaigns
- International Computational and Experimental Test Campaigns

For more information, please contact the session organizer:

Eric Blades
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ATA Engineering

Call for Papers

The AIAA Structural Dynamics and Guidance, Navigation, and Control Technical Committees

are jointly sponsoring a Special Session on:

Space Jitter

AIAA SciTech 2027

January 11-15, 2027
Hyatt Regency
Orlando, FL

Predicting, managing, controlling, and testing spacecraft line-of-sight (LoS) jitter caused by micro-vibrations due to on-board internal and external environmental disturbance sources is a difficult multidisciplinary engineering task. It is becoming increasing challenging for missions with high-performance pointing requirements (e.g., nano-radian/milli-arcsecond class) and the incorporation of vibration-sensitive optical sensor payloads. This session invites papers that address challenges in predicting spacecraft jitter performance during early phases of the system design through the life cycle, including operations in the space environment.

Potential topics could include, but are not limited to:

- Concept of Operations including Jitter Error Budget Development and Allocation
- Uncertainty Quantification
- Internal and External Disturbance Sources (ground and in-space)
- Line of Sight Equation Development
- Deterministic Model Verification Checks
- Analysis and Test Best Practices

The committee welcomes submissions from government, industry, academic, and small businesses.

Note that submission to this joint track requires adherence to the Guidance, Navigation, and Control Technical Committee requirement of a <u>full draft manuscript</u>, which must include sufficient detail to allow informed evaluation by the assigned reviewers. Extended abstracts will be returned without review. Full draft manuscripts must not exceed a total length of 25 pages, formatted in accordance with the AIAA SciTech manuscript template.

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