AIAA SciTech 2021 Call for Papers Supplemental Information

Special Sessions Sponsored by the Applied Aerodynamics Technical Committee

Special Session: CH-53K Exhaust Gas Re-ingestion: CFD Modeling/Flight Test Combined Redesign
The CH-53K rotorcraft development encountered challenging issues stemming from exhaust gas re-ingestion (EGR). The issue was solved with a minimal impact to performance and improvements in other key areas, partly due to the CFD-capabilities enabling a large parameter space to be examined. This session solicits papers from combined flight test/CFD modeling practitioners whose efforts enabled the redesign and solved the problem.
Contact: James Forsythe (James.r.forsythe@navy.mil)

Special Session: Collaborative Experimental-Computational Efforts in High-Speed FTSI
This special session will highlight recent collaborative computational-experimental efforts in high-speed fluid-thermal-structural interactions. This session is jointly sponsored by the Aerodynamic Measurement Technology, Applied Aerodynamics, Fluid Dynamics and Structural Dynamics Technical Committees (AMT-APA-FD-SD).
Contact for APA: Katya Casper (kmcaspe@sandia.gov)

Special Session: HPC Multi-Physics CREATE Sessions
CREATE is part of the Defense Department's High Performance Computing Modernization Program. This set of special sessions focuses on large-scale multi-physics simulations of full-up air vehicles using high performance computing strategies. Simulations include fixed-wing and rotary-wing capability demonstration, verification/validations and applications to deployment scenarios.
Contact: Nathan Hariharan (nathan.hariharan.ctr@hpc.mil)

Special Session: Integration Environments for Large-Scale Multidisciplinary Modeling & Simulation

The development, testing and production of new air vehicles is associated with considerable risks due to product complexity. In order to accelerate the introduction of innovative technologies and to better control the technological risks there is a need to virtualize the design and development processes, including the definition of an appropriate validation strategy. This requires being able to perform highly parallel, highly accurate multidisciplinary simulations for full aircraft configurations and a framework for integration and coupling of the different disciplinary models and tools. Such integration environments provide development and analysis capabilities based on high-fidelity methods that enable digital flight testing, multidisciplinary optimization and certification by analysis.

Two related sessions are envisioned. The first session solicits papers on software frameworks based on high-fidelity methods from industry, government & research labs that facilitate setting up and solving large-scale multidisciplinary simulation problems targeting air vehicles. This session will help sharing and discussing requirements and ideas of concepts for multidisciplinary frameworks leveraging HPC resources and provide an overview of activities worldwide. While the focus of the first session will be on integrating methods and tools into software and software products for enabling digital aircraft design and virtual flight testing and targets framework developers, the focus of the second session will be on how these frameworks are being used for challenging applications, in particular in industry, both civil and military. The second session will be concluded with a panel discussion on experience, past and present, and limitations from the view of industry, to create stimulus for researchers and developers. The panel will also include HPC, meshing and visualization experts to represent different aspects.
Contact: David R. McDaniel (david.r.mcdaniel2.ctr@mail.mil), Stefan Goertz (Stefan.goertz@dlr.de)

Special Session: Rotor-in-Hover Simulation Sessions
The AIAA Applied Aerodynamics Rotorcraft Simulation Discussion Group will be organizing multiple special sessions at SciTech 2021. Papers in these sessions will focus on hover simulations and most particularly blind predictions of the upcoming NASA HVAB rotor test in the NFAC test facility. Guidance on final test-article geometry, aero-elastic effects and test conditions will be provided in the HPW website (https://aiaahover.wixsite.com/website-6) by early summer. Participants are encouraged to show predictions of rotor performance, blade loads, tip vortex trajectories, elastic deformations, and boundary layer transition locations using their best practices. Papers should detail the analysis approach including grid and solution convergence. Studies of elastic effects, facility impact, wake capturing, boundary layer and wake turbulence modeling are also encouraged. These sessions are a follow up to the special hover sessions from SciTech 2014 - SciTech 2020.
Contact: Nathan Hariharan (nathan.hariharan.ctr@hpc.mil)

Special Session: Slotted, Natural-Laminar-Flow Airfoil Development
A NASA-funded University Leadership Initiative program targeted at ultra-efficient commercial aircraft has identified the slotted, natural-laminar-flow airfoil as an enabling technology to meet N+3 fuel/energy consumption goals. Developing and integrating this airfoil technology into an aircraft platform is a highly multidisciplinary undertaking, and papers in this session will describe progress on this effort.
Contact: Jim Coder (jcoder@utk.edu)

Special Session (Invited): Low-Boom Flight Demonstration and X-59 QueSST Aircraft
This LBFD related special session will provide overviews of the NASA Low Boom Flight Demonstration Mission and additional details about the various phases of the LBFD Mission. Presentations will cover the current manufacturing status, current acoustic signature predictions, acoustic signature validation plans, and community test planning. A presentation is also planned to provide a status on the process and progress on the development of certification standards for quiet supersonic flight overland. This session will provide a high-level introduction to the additional planned technical special sessions.
Contact: David Richwine (david.m.richwine@nasa.gov) & Lori Ozoroski (lori.p.ozoroski@nasa.gov)

Special Session (Invited): 3rd AIAA Sonic Boom Workshop Report-out
The 3rd AIAA Sonic Boom Prediction Workshop (SBPW3) was held at SciTech 2020 in January. Invited papers and presentations will report on three topic areas: (i) Propagation Cases, (ii) Near-Field Bi-Convex Case, and (iii) Near-Field C608 Case.
Contact: Melissa Carter (melissa.b.carter@gmail.com) & Michael Park (Mike.Park@NASA.gov)

Special Session: Engineered Surfaces, Materials, and Coatings for Viscous Drag Reduction
Engineered Surfaces Materials and Coatings (ESMC) has the objective to develop a practical approach to implement passive viscous drag reduction (riblets) on aerospace vehicles. This session will provide an update on the technical and programmatic developments of projects aimed at ESMC's objectives. Detailed technical results are described in a series of companion papers presented concurrently describing the iterative design, manufacture, and test cycle implemented in the creation of optimized riblet geometry to reduce viscous drag. Our purpose here is to put the detailed results into context, review the significant contributions made by this research to date, and to provide an analysis of the technical and programmatic challenges remaining. The nature and rationale for the implementation of a carefully managed gated testing program leading to full scale wind tunnel and flight testing is also described.
Contact Dylan Hope (dylan.hope.1@us.af.mil) & Aaron Altman (aaron.althman.1@us.af.mil)