AIAA SciTech 2020 Call for Papers Supplemental Information

Special Sessions Sponsored by the Applied Aerodynamics Technical Committee (APATC)

Commercial Supersonic Activities

There is continuing and renewed interested in addressing the technical barriers to commercial supersonic vehicles. These topics include sonic boom, airport noise, high-altitude emissions, airframe performance, propulsion performance, flexible structures, and operations. Research in computational prediction, experimental measurement, design, certification, and uncertainty quantification of these disciplines related to supersonic vehicles is requested.

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Aerodynamic Design Optimization

The AIAA Applied Aerodynamics Technical Committee's Aerodynamic Design Optimization Discussion Group will hold a series of special sessions on Aerodynamic Design Optimization. The objective is to establish a series of increasingly complex set of aerodynamic benchmark problems suitable for exercising aerodynamic optimization methods in a constrained design space. The benchmark problems are diverse enough to exercise methods in searches for both global and local optima for both single and multipoint optimization, while being realistic enough to exercise the types of constraints that the practitioner is likely to encounter. Participants will demonstrate their Aerodynamic Design Optimization Frameworks on one or more of the following four benchmark cases: Case 1: Drag Minimization of NACA 0012 in Transonic Inviscid Flow; Case 2: Drag Minimization of RAE 2822 in Transonic Viscous Flow; Case 3: Twist Optimization of NACA 0012 Wing in Subsonic Inviscid Flow; and Case 4: Single and Multipoint Drag Minimization of ADODG CRM Wing-Body in Transonic Viscous Flow.

Contact: *Siva Nadarajah (siva.nadarajah@mcgill.ca) and Steve LeDoux (stephen.t.ledoux@boeing.com)*

Stall-Spin Aerodynamics, Mitigation and Recovery

Stall-spin continues to be a technical challenge for aerodynamicists, aircraft designers and pilots. Predicting the stall-spin characteristics of an airplane is particularly difficult because it occurs at high angles of attack where there is significant flow separation and CFD methods typically fail. This is compounded by this flow regimes strong dependence on Reynolds number, making wind tunnel test results unreliable. This session solicits papers on topics that include recent advances in the prediction of stall-spin aerodynamics, design features that improve stall-spin characteristics and pilot recovery techniques that hasten stall-spin recovery.

Contact: *Tom Chyczewski (thomas.chyczewski@ngc.com)*

Advances in High-Resolution Numerical Schemes for Aerospace Engineering Applications

Development of advanced high-resolution numerical schemes help matured computational fluid dynamics (CFD) as a revolutionary tool to explore several complex fluid dynamics and aerodynamics problems such as shock waves, turbulence, etc. In the past few decades, several modifications and improvements in the classical high-resolution numerical schemes have been introduced and successfully implemented by many researchers. This session welcomes research articles that address the application of modified and improved high-resolution numerical techniques for simulating practical aerospace engineering applications. Comparison of results with the classical high-resolution and with the low-order numerical schemes are encouraged.

Contact: *Ovais Khan (ovsukhan@gmail.com)*

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)*

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)*

Rotor-in-Hover Simulation Sessions

The AIAA Applied Aerodynamics Rotorcraft Simulation Discussion Group will be organizing multiple special sessions at SciTech 2018. Papers in these sessions will focus on the calculation of hover performance and physics using S-76, PSP, and potentially the HVAB rotor which is slated for extensive hover tests in the 2019 timeframe. Studies involving other hover-related phenomena such as rotor-downloads simulation for other rotors are also encouraged. These sessions are a follow up to the special hover sessions at SciTech 2017 in which facility effects, physics phenomena such as wake breakdown, transition modeling etc. were simulated for the S-76 and PSP rotors.

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