

Opportunity Title: Development and Application of Advanced Laser-based Measurement Techniques to Transonic, Supersonic, and Hypersonic Flows

Opportunity Reference Code: 0003-NPP-NOV23-LRC-AeroEng

Organization National Aeronautics and Space Administration (NASA)

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Application Deadline 11/1/2023 6:00:59 PM Eastern Time Zone

Description Design of the next generation of airplanes and aerospace vehicles will rely heavily on computational fluid dynamics (CFD) simulations. However, wind tunnel experiments are required to test these CFD codes for accuracy. In addition to conventional measurements like lift and drag, vehicle designers using CFD want to compare their calculations against flowfield data such as temperature, velocity, and pressure distributions of the gas flowing around and through the vehicle. If the CFD predicts the lift or drag incorrectly, then comparison between flowfield properties and CFD help the designer determine the problem with the CFD model. Our research group is located in the Advanced Measurements and Data Systems Branch (AMDSB) of the Research Directorate (RD) at NASA Langley Research Center, in Hampton VA. We are developing advanced laser-based measurement techniques for transonic, supersonic, and hypersonic flows. Current projects include applying femtosecond laser electronic excitation and tagging (FLEET) method and particle image velocimetry (PIV) to study high Reynolds number transonic flows and applying planar laser-induced fluorescence (PLIF) to study launch and hypersonic Earth and Mars re-entry vehicles and heat shield materials. The fundamental part of our research involves studying the laser-based techniques themselves and developing new variations to extend the measurement capability of the technique. The applied part of our research involves making measurements in some of the 30 or more flow facilities located at Langley. Research opportunities exist for both fundamental and applied aspects of all of these measurement methods including using these advanced measurement techniques to study important fluid mechanics problems. For more specific information about the projects, view links

from https://amdsb.larc.nasa.gov/directory/Dr_Paul_Danehy1.html .

Location:

Langley Research Center
Hampton, Virginia

Field of Science: Aeronautics, Aeronautical or Other Engineering

Advisors:

Paul Michael Danehy
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757-864-4737

This opportunity may require the following: 1- Mandatory drug testing; 2-Random drug testing; 3- Testing prior to initiation of fellowship appointment.

- Eligibility Requirements**
- **Citizenship:** LPR or U.S. Citizen
 - **Degree:** Doctoral Degree.



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