Opportunity Title: Deployable Automation for Planetary Science
Opportunity Reference Code: 0040-NPP-NOV23-ARC-PlanetSci

Organization National Aeronautics and Space Administration (NASA)

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

Description Looking for volatiles, extant life and accessing subsurface ices on Mars will require the ability to explore below the desiccated and irradiated surface. Missions that sample Near-Earth Objects or sample Jovian satellites, or missions with drills or corers, such as Icebreaker, MAX-C ExoMars, and Mars Sample Return missions in 2018 and onward, benefit from being able to target their precious drilling resources at sites with the best potential astrobiological value.

This opportunity proposes to study and develop a method for real-time localized vibration analysis of drills and excavators for planetary surfaces. We have past experience in detecting and characterizing structural defects and motions using commercially-available Laser Doppler Vibrometers (LDVs) for the automated control of exploratory drilling and for the detection of hidden damage in aerospace structures (fuselage and wing panels). Automation technologies employed will demonstrate hands-off measurement of ground and drill responses, using vibrational dynamical analysis methods.

Field deployments and laboratory tests will provide a rigorous test of fault characterization and ground truth from lightweight permafrost drilling to 2m depth. A goal is to demonstrate realistic systems-level sampling instrument operations in a terrestrial analog environment in order to develop and test the system in a relevant environment and will characterize local strata near/below the drill to a depth of 4-5m.

Location:
Ames Research Center
Moffet Field, California

Field of Science: Planetary Science

Advisors:
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Applications with citizens from Designated Countries will not be accepted at this time, unless they are Legal Permanent Residents of the United States. A complete list of Designated Countries can be found at: https://www.nasa.gov/oiir/export-control.

Eligibility is currently open to:

- U.S. Citizens;
- U.S. Lawful Permanent Residents (LPR);

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- Foreign Nationals eligible for an Exchange Visitor J-1 visa status; and,
- Applicants for LPR, asylees, or refugees in the U.S. at the time of application with 1) a valid EAD card and 2) I-485 or I-589 forms in pending status

Eligibility Requirements

- **Degree:** Doctoral Degree.