Statement of Work

Robotic Positioning Manipulator & Support Structure for 3D Additive Construction with Planetary Regolith Simulant

NASA Kennedy Space Center (KSC), Center Innovation Fund (CIF)

NASA KSC is developing a new method of 3 Dimensional (3D) Additive Construction using regolith simulant and robotics. In order to position the regolith print head that the KSC Surface Systems Office (NE-S) is developing, a robotic positioning manipulator is required that can be programmed to follow specific tool paths required for repetitive 2D layers of additive regolith material resulting in discrete 3 dimensional objects with salient characteristics for in situ resource utilization.

Period of Performance: 6 Months from Award of Contract

1. Study the robotic tool path required by a regolith binding print head, in order to construct a 1 meter radius hollow half sphere, resulting in an inverted dome that simulates a useful structure for space habitation, radiation shielding, thermal shading, micro-meteorite protection and dust mitigation on a target body surface.
2. Identify a suitable robotic mechanism which is able to provide a motion space envelope that is capable of constructing the 1 meter radius inverted dome described in item 1.
3. Provide the identified robotic mechanism for a period of one year for the purposes of completing the KSC task: "3D Additive Construction with In-Situ Resources for Surface Systems".
4. Provide a support structure for the robotic platform identified in item 2. This support structure shall be compatible with and capable of being installed inside the KSC Granular Mechanics & Regolith Operations (GMRO) lab, which is a 40 foot tall high bay with a concrete floor.
5. Install the support structure and robot at the KSC GMRO lab within 3 months of the award of the contract. The support structure shall be a permanent deliverable to remain at KSC.
6. Provide tool path programming support for operating the robot arm during regolith 3D additive construction development and demonstrations.

There will be no funding provided for travel.

Services the Vendor shall provide:

Project Management for Equipment and Services Proposed Herein
Project Engineering
System Application Software

System Assembly
Installation Supervision at NASA KSC
Facility in Florida
Start Up Supervision and Debug.
Cell Control Hardware and Software.

Services NASA shall provide at Swamp Works (Engineering Development Lab Annex):

On-Site Project Management
Equipment transportation from PaR Systems to the installation facility
Relocation of existing equipment at customer facility / site preparation.
Electrical power and air drops.
Foundation preparation
Unloading of the truck and placing the equipment at the installation site
Systems electrical and mechanical installation