NASA SBIR Select 2014 Phase I Solicitation

H20.01 Human-Robotic Systems - Manipulation Subsystem and Human-System Interaction

Lead Center: JSC

Participating Center(s): ARC, JPL, KSC

The objective of this topic is to create human-robotic technologies (hardware and software) to improve the exploration of space.

Robots can perform tasks to assist and off-load work from astronauts. Robots may perform this work before, in support of, or after humans.

Ground controllers and astronauts will remotely operate robots using a range of control modes (tele-operation to supervised autonomy), over multiple spatial ranges (shared-space, line-of-sight, in orbit, and interplanetary), and with a range of time-delay and communications bandwidth.

Manipulation Subsystem - Proposals are sought that address subsystems that improve handling and maintenance of payloads and assets. Proposals that would directly benefit future ISS robotics (EVA dexterous mobile manipulation and IVA free-flying robot) are highly encouraged. Key technologies of interest include but are not limited to: tactile sensors, human-safe actuation, active structures, dexterous grasping, modular â€œplug and playâ€ mechanisms for deployment and setup, small/lightweight excavation/drilling devices to enable subsurface access, and novel manipulation methods; as well as, sample handling by both humans and tele-operated robots for storage and in-situ utilization/evaluation.

Human-System Interaction - Proposals are sought that address subsystems that enable crew and ground controllers to better operate, monitor and supervise robots. Proposals that would directly benefit future ISS robotics (EVA dexterous mobile manipulation and IVA free-flying robot) are highly encouraged. Key technologies of interest include but are not limited to: robot user interfaces, automated performance monitoring, tactical planning software, ground data system tools, command planning and sequencing, real-time visualization/notification, and software for situational awareness.

Offerors are encouraged to consider all Technology Readiness Level efforts TRL 1-8 when considering proposals for the Phase I and Phase II Deliverables.

Phase I Deliverables may include - Feasibility studies, or they may support an entirely new and innovative potential solution to the Human, Robotics discipline. Demonstrations, taking adapted or targeted innovative solutions from concept through demonstrations in relevant environments and/or use case.

Phase II Deliverables may include but are not limited to - Prototype or Engineering Release products that have evolved from initial concept phases into designs of enough maturity to demonstrate confidence that the product remains viable and feasible for the intended use. The ability to mature concepts along the TRL lifecycle is highly desired and should be emphasized by the offeror.

Reference NASA Office of Chief Technologist Technology Roadmap OCT TA (4.3, 4.4 and 4.7)

(http://www.nasa.gov/offices/oct/home/roadmaps/index.html)