



NASA SBIR Select 2014 Phase I Solicitation

H20.02 International Space Station (ISS) Demonstration and Development of Improved Exploration Technologies

Lead Center: JSC

Participating Center(s): GRC, JPL, KSC, MSFC

NASA is investing in technologies and techniques geared towards advancing the state of the art of spacecraft systems through the utilization of the ISS as a technology test bed. Desired demonstrations designed to utilize the ISS as a test bed should focus on increasing the Technology Readiness Level (TRL) in the following fields:

- Power Generation and Energy Storage (e.g., regenerative fuel cells).
- Robotics Tele-robotics and Autonomous (RTA) Systems.
- Communication and Navigation (e.g., autonomous rendezvous and docking advancements).
- Human Health, Life Support and Habitation Systems (e.g., closed loop aspects of environmental control and life support systems).
- Environmental Control Systems.
- Radiation Protection and Mitigation.
- Science Instruments, Observatories and Sensor Systems.
- Materials, Structures, Mechanical Systems and Manufacturing.
- Thermal Management Systems.

Successful proposals in these fields are expected to advance the state of the art of spacecraft systems by:

- Increasing capability/operating time including overall operational availability.
- Reducing logistics and maintenance efforts.
- Reducing operational efforts, minimizing crew interaction with both systems and the ground.
- Reducing known spacecraft/spaceflight technical risks and needs.
- Providing information on the long term space environment needed in the development of future spacecraft technologies through model development, simulations or ground testing verified by on-orbit operational data.

For all above technologies, research should be conducted to demonstrate technical feasibility and prototype hardware development during Phase I and show a path toward Phase II hardware and software demonstration and delivering an engineering development unit or software package for NASA testing at the completion of the Phase II contract that could be turned into a proof-of-concept system which can be demonstrated in flight.

Phase I Deliverables - Research to identify and evaluate candidate technologies applications to demonstrate the technical feasibility and show a path towards a hardware/software demonstration. Bench or lab-level demonstrations are desirable. The technology concept at the end of Phase I should be at a TRL of 3-6.

Phase II Deliverables - Emphasis should be placed on developing and demonstrating hardware and/or software prototype that can be demonstrated on orbit (TRL 8), or in some cases under simulated flight conditions. The proposal shall outline a path showing how the technology could be developed into space-worthy systems. The contract should deliver an engineering development unit for functional and environmental testing at the completion of the Phase II contract. The technology at the end of Phase II should be at a TRL of 6-7.

Potential NASA Customers include:

- International Space Station Program (http://www.nasa.gov/mission_pages/station/main/index.html).
- Orion Multipurpose Crew Vehicle (<http://www.nasa.gov/exploration/systems/mpcv/index.html>).