



NASA SBIR 2011 Phase I Solicitation

03.03 ISS Demonstration & Development of Improved Exploration Technologies

Lead Center: JSC

Participating Center(s): ARC

The focus of this subtopic is on technologies and techniques that may advance the state of the art of spacecraft systems by utilizing the International Space Station as a technology test bed.

Successful proposals will address using the long duration, microgravity and extreme vacuum environment available on the ISS to demonstrate component or system characteristics that extend beyond the current state of the art 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.

While selection for award does not guarantee flight opportunities, the proposed demonstrations should focus on increasing the TRL in the following technology areas of interest:

- Propulsion (in-space and novel, electromagnetic and/or very high specific impulse systems).
- Power and energy storage.

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- Robotics tele-robotics and autonomous (RTA) Systems.
 - Human health, life support and habitation systems.
 - Science instruments, observatories and sensor systems.
 - Nanotechnology.
 - Materials, structures, mechanical systems and manufacturing.
 - Thermal management systems including novel heat radiation techniques.
 - Spacecraft (including ISS) plasma and contamination in-situ diagnostics.
 - Environmental control systems, including improved carbon dioxide removal.

For all above technologies, research should be conducted to demonstrate technical feasibility during Phase I and show a path toward Phase II hardware and software demonstration and delivering a demonstration unit or software package for NASA testing at the completion of the Phase II contract.

Phase I Deliverables: Research to identify and evaluate candidate telecommunications technology applications to demonstrate the technical feasibility and show a path towards a hardware/software demonstration. Bench or lab-level demonstrations are desirable.

Phase II Deliverables: Emphasis should be placed on developing and demonstrating the technology 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 a demonstration unit for functional and environmental testing at the completion of the Phase II contract.