NASA SBIR 2009 Phase I Solicitation

S1.09 In Situ Sensors and Sensor Systems for Planetary Science

Lead Center: JPL

Participating Center(s): ARC, GSFC, JSC, LaRC, MSFC

This subtopic solicits development of advanced instruments and instrument components that are tailored to the demands of planetary instrument deployment on a variety of space platforms (orbiters, flyby spacecraft, landers, rovers, balloon or other aerial vehicles, subsurface penetrators or impactors, etc.) accessing the wide variety of bodies in our solar system (inner and outer planets and their moons, comets, asteroids, etc.). These instruments must be capable of withstanding operation in space and planetary environmental extremes, which include temperature, pressure, radiation, and impact stresses. For example missions see:

http://science.hq.nasa.gov/missions/solar_system.html

Specifically, this subtopic solicits instrument development that provides significant advances in the following areas:

- Improved science return and/or reduced mass, power, volume, data rates for instruments or instrument components (e.g., lasers and other light sources from UV to microwave, X-ray and ion sources, detectors, mixers, seismometers, etc.) or electronics (e.g., FPGA and ASIC implementations, advanced array readouts);
- Instrument technologies for detecting inorganic and organic biomarkers on future Mars missions;
- Improved robustness and g-force survivability for rough landings on planetary bodies;
- Radiation mitigation strategies, radiation tolerant detectors, and readout electronics components for candidate instruments for the Europa-Jupiter System Mission;
- Advanced sample acquisition and processing technologies, including fluid and gas storage, pumping, and manipulation, to support analytical instrumentation, sample return, or planetary protection.
- Sensors, mechanisms, and environmental chamber technologies for operation in Venus's high temperature, high pressure environment with its unique atmospheric composition. Venus test chambers that can support evaluation of 50 to 100 cm sensors, instruments, and related structures are particularly requested.

Proposers are strongly encouraged to relate their proposed development to (a) future planetary exploration goals of NASA; and (b) existing flight instrument capability to provide a comparison metric for assessing proposed improvements. Proposed instrument architectures should be as simple, robust, and reliable as possible while enabling compelling science.

Proposals should show an understanding of one or more relevant space science needs, and present a feasible plan to fully develop a technology and infuse it into a NASA program.