NASA SBIR 2009 Phase I Solicitation

S3.07   Sensor and Platform Data Processing and Control

Lead Center: GSFC

Participating Center(s): ARC, JPL

Future NASA's science missions will require high-performance onboard data processing capabilities that far exceed those of today. These capabilities will be leveraged to provide data reduction for missions where sensor bandwidths far exceed downlink bandwidth. Improved onboard data processing will also enable autonomous/collaborative systems, where science operations are autonomously controlled via features extracted from the sensor data. Advances in technologies relevant to sensor and platform data processing and control are sought to support NASA's goals and several missions and projects under development.

http://nasascience.nasa.gov/search?SearchableText=missions+under+development
http://www.nap.edu/catalog.php?record_id=10432

 The subtopic goals are to: (1) develop device technologies and architectures that can yield a 10x to 100x improvement in on-board computing power is required to enable the next generation of Earth Science, Space Science and Exploration missions; and (2) develop tool technologies that can enable rapid development of high reliability, high performance onboard data processing applications for these missions.

 Successful proposal concepts will significantly exceed the present state-of-the-art. Proposals will clearly (1) state what the product is; (2) describe how it targets the technical priorities listed below; and (3) outline the feasibility of the technical and programmatic approach. If a Phase 2 proposal is awarded, the combined Phase 1 and Phase 2 developments shall produce a prototype that is testable by NASA. The technology priorities sought are listed below.

Device Technologies and Architectures

- Highly reliable, radiation tolerant, special purpose data processing devices (FPGA, multi-core, DSP) that enable accelerated onboard data processing;

- Hybrid onboard processing architectures using multiple heterogeneous processing elements (CPU, FPGA, DSP, multi-core);

- Architectures providing software-based radiation mitigation strategies for commercial processing elements.

Development Tool Technologies

- Hybrid system design tools that (a) take full advantage of hybrid processing platforms, and (b) automate/accelerate the design and verification process.

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