



NASA SBIR 2009 Phase I Solicitation

S3.01 Command, Data Handling, and Electronics

Lead Center: GSFC

Participating Center(s): ARC, JPL, JSC, LaRC

NASA's space based observatories, fly by spacecraft, orbiters, landers, and robotic and sample return missions, require robust command and control capabilities. Advances in technologies relevant to guidance, navigation, command and data handling 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 high-performance processors and memory architectures and reliable electronic systems, and (2) develop an avionics architecture that is flexible, scalable, extensible, adaptable, and reusable. The subtopic objective is to elicit novel architectural concepts and component technologies that are realistic and operate effectively and credibly in environments consistent with the future NASA Science missions.

Successful proposal concepts should significantly advance the state-of-the-art. Proposals should 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 should produce a prototype that can be characterized by NASA. The technology priorities sought are listed below.

Command and Data Handling

- Processors - General purpose (processor chips and radiation-hardened by design synthesizable IP cores) and special purpose single-chip components (DSPs) with sustainable processing performance and power efficiency (>500 MIPS at >100 MIPS/W for general purpose processing platforms, >5 GMACs at >5 GMACS/W for computationally-intensive processing platforms), and tolerance to total dose and single-event radiation effects. Concepts must include tools required to support an integrated hardware/software

development flow.

- Radiation-hardened non-volatile low power memories.
- Radiation-hardened physical layer components for onboard data busses (e.g. Ethernet).
- Tunable, scalable, reconfigurable, adaptive fault-tolerant avionics.

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.

The Small Spacecraft Build effort highlighted in Topic S4 (Low-cost Small Spacecraft and Technologies) of the solicitation participates in this subtopic. Offerors are encouraged to take this in consideration as a possible flight opportunity when proposing work to this subtopic.