



NASA SBIR 2009 Phase I Solicitation

X7.01 Advanced Space Rated Batteries

Lead Center: GRC

Participating Center(s): JPL, JSC

Advanced battery systems are sought for use in Exploration mission applications including power for landers, rovers, and extravehicular activities. Areas of emphasis include advanced cell chemistries with the aggressive mass and volume performance improvements and safety advancements in human-rated systems over state-of-the-art lithium-based systems. Rechargeable cell chemistries with advanced non-toxic anode and cathode materials and nonflammable electrolytes are of particular interest.

The focus of this solicitation is on advanced cell components and materials to provide mass and volume improvements and safety advancements that contribute to the following goals:

- Specific energy (cell level) >300 Wh/kg at C/2 and 0°C;
- Energy density (cell level) >600 Wh/l at C/2 and 0°C;
- Operating Temperature Range from 0°C to 30°C;
- Tolerance to abuse such as overcharge and over temperature conditions;
- Calendar life >5 years; cycle life 250 cycles at 100% depth of discharge.

Systems that combine all of the above characteristics and demonstrate a high degree of safety are desired. Cell safety devices such as shutdown separators, current limiting devices that inhibit or prevent thermal runaway, cell venting, and flame or fire; autonomous safety features that result in safe, non-flammable, non-hazardous operation especially for human-rated applications are of particular interest. Safety features that enhance the performance of high-power/high-rate cells that operate at >30°C discharge rates are also of interest.

Research should be conducted to demonstrate technical feasibility during Phase 1 and show a path toward a Phase 2 hardware demonstration, and when possible, deliver a demonstration unit for functional and environmental testing at the completion of the Phase 2 contract.

