



## NASA SBIR 2014 Phase I Solicitation

### Z1.02 Advanced Space Battery Technology

Lead Center: GRC

Participating Center(s): JPL, JSC

NASA seeks innovative, advanced technologies for next generation battery chemistries. Breakthrough battery cell technologies that far exceed the specific energy and energy density of current state-of-the-art lithium-ion cell technologies are required to achieve NASA's far-term energy storage goals for human and robotic missions. Future NASA missions will require rechargeable battery technologies that can provide 500 Wh/kg and 700 Wh/liter and can deliver > 1000 cycles at full depth of discharge. Components and chemistries for rechargeable battery cells that can enable performance that approaches 500 Wh/kg and 700 Wh/l on a cell level when integrated into a full cell with other advanced components and that can sustain stable performance over > 500 cycles are sought. Advanced next generation chemistries and components must have the potential to meet performance goals while simultaneously delivering a high level of safety. Proposed components may include, but are not limited to:

- Methods to enable safe, stable cycling of lithium metal.
- Innovative lithium-ion conducting electrolytes that offer ionic conductivities of  $10E-3$  Siemens per centimeter at room temperature and that can enable safe, stable cycling of lithium metal. These may include, but are not limited to, solid state electrolytes and ionic liquids.
- Other innovative cell component technologies that can enable the desired cell-level performance when integrated into a cell with other advanced components.

Offerors may propose to develop a single component or full cells. Phase I proposals shall include quantitative analysis, data, and technical rationale that clearly demonstrates how the proposed component, components, or cells will meet or contribute to the stated (as proposed) cell performance goals by the end of a Phase II effort. If a single component is proposed, the Offeror shall also include in their justification of the proposed technology the performance that other advanced cell components must achieve in order to meet the claimed cell-level goals in an integrated system. During the Phase I effort, the proposed component(s) shall be incorporated into an appropriate test vehicle, such as half or full cell laboratory cells, to demonstrate feasibility. Phase I proposals shall describe the technical path that will be followed to achieve the claimed (as proposed) goals. Where possible, laboratory scale prototype hardware should be proposed as deliverables to NASA in Phase I.