SOCOM232-003: Higher Density Handheld Radio Batteries

ADDITIONAL INFORMATION
N/A

TECHNOLOGY AREAS:
Electronics | Ground Sea | Human Systems | Information Systems

MODERNIZATION PRIORITIES:
Advanced Materials | Renewable Energy Generation and Storage

KEYWORDS:
Battery; density; radio; handheld; amp hour

OBJECTIVE:
The objective of this topic is to develop applied research towards higher density handheld radio batteries. To meet evolving radio systems that require additional power to provide new capabilities, the demand for increased battery capacity has exponentially grown. Operators also require batteries that meet capacity to reduce the number of times that they switch batteries during missions and reducing the weight of carried items during missions.
IMPORTANT: For SOCOM instructions: please visit: https://www.defensesbirsttr.mil/SBIR-STTR/Opportunities/. Go to the bottom of the page and click the “DoD SBIR 23.2” tab. Once there, go to the SOCOM SBIR 23.2 document.

DESCRIPTION:
As a part of this feasibility study, the proposers shall address all viable overall system design options with respective specifications on the key system attributes below:

- Battery Capacity equal to or greater than 16 Ah (Amp Hours in a .84-pound battery). This is equivalent to approximately 500 Wh/kg (watt-hour per kilogram) (500 Wh/Kg / 12volts / 2.2lbs/kg x .84BatteryWeightInPounds = 15.909Ah)
- Battery shall have >70% of its nominal capacity after 300 full discharge / discharge cycles
- Battery shall provide 12VDC (volts direct current) for handheld radio operations
- Battery shall not exceed .84 pounds in weight
- Battery shall not exceed 15.232 cubic inches (3.4 x 2.8 x 1.6) – current battery volume
- Battery shall support Peak Current => 8A (Amps)

PHASE I:
Conduct a feasibility study to assess what is in the art of the possible that satisfies the requirements specified in the above paragraphs entitled “Objective” and “Description.”
The objective of this USSOCOM Phase I SBIR effort is to conduct and document the results of a thorough feasibility study (“Technology Readiness Level 3”) to investigate what is in the art of the possible within the given trade space that will satisfy a needed technology. The feasibility study should investigate all options that meet or exceed the minimum performance parameters specified in this write up. It should also address the risks and potential payoffs of the innovative technology options that are investigated and recommend the option that best achieves the objective of this technology pursuit. The funds obligated on the resulting Phase I SBIR contracts are to be used for the sole purpose of conducting a thorough feasibility study using scientific experiments and laboratory studies as necessary. Operational prototypes will not be developed with USSOCOM SBIR funds during Phase I feasibility studies. Operational prototypes developed with other than SBIR funds that are provided at the end of Phase I feasibility studies will not be considered in deciding what firm(s) will be selected for Phase II.

PHASE II:

Develop, install, and demonstrate prototype batteries determined to be the most feasible solution during the Phase I feasibility study on a Higher Density Handheld Radio Battery.

PHASE III DUAL USE APPLICATIONS:

These batteries can be used by multiple organizations that use handheld radios (standard connection) and the technology should transition to other battery systems with limited development.

REFERENCES:

1. Illinois Institute of Technology. (2023, February 2). The novel chemistry behind ultra-high power density batteries. https://techxplore.com/news/2023-02-chemistry-ultra-high-power-density-batteries.html; Designing better batteries for electric vehicles. (2021, August 16). MIT News | Massachusetts Institute of Technology. https://news.mit.edu/2021/designing-better-batteries-electric-vehicles-0816; A Guide to Understanding Battery Specifications (2008, December). MIT Electric Vehicle Team. http://web.mit.edu/evt/summary_battery_specifications.pdf

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