

Special Notice 14-SN-0012
Special Program Announcement for 2014 Office of Naval Research
Research Opportunity:
Compact High-Density Tactical Energy Storage

I. INTRODUCTION

This announcement describes a research thrust, entitled “Multifunction, Compact, High-Density Tactical Energy Storage,” to be launched under the current, FY 14 Long Range BAA, ONRBAA14-001, entitled, “Long Range Broad Agency Announcement (BAA) for Navy and Marine Corps Science and Technology” which can be found at <http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx>.

The research opportunity described in this announcement currently falls under the following sections of FY14 Long Range BAA, ONR BAA14-001:

Section I, entitled “General Information”, sub-section F, entitled “Research Opportunity Description”, the “Expeditionary Maneuver Warfare & Combating Terrorism Department (Code 30)” item, paragraph 7, subparagraph b, entitled “Fuel Efficiency” and subparagraph c, entitled “Portable Electric Power”.

Section I, entitled “General Information”, sub-section F, entitled “Research Opportunity Description”, the “Sea Warfare and Weapons Department (Code 33)” item, paragraph 1, subparagraph c, entitled “Electrical and Thermal Systems”.

Section I, entitled “General Information”, sub-section F, entitled “Research Opportunity Description”, the “Sea Warfare and Weapons Department (Code 33)” item, paragraph 2, subparagraph a, entitled “Functional Materials”.

The purpose of this announcement is to (1) focus attention of the scientific & technology community on the areas of interest, (2) encourage dialogue amongst those interested in these areas, and (3) provide a planned timetable for the submission of white papers and proposals.

II. TOPIC DESCRIPTION

The Office of Naval Research (ONR) is interested in receiving proposals on the topic of “Compact High-Density Tactical Energy Storage.” The objective is to encourage innovation, advance technology development, and foster technology transition that benefits future war-fighters and meets US Marine Corps future needs. One example of USMC future needs for energy storage is documented in the 2012 Marine Corps Science & Technology Strategic Plan¹ that identifies Expeditionary Energy Science & Technology Objective, EE STO-04, entitled “Energy Storage Other than Liquid” as a technology needed to bridge the gap between on-site energy harvesting and demand. Another example is the 2011 Marine Corps Initial Capabilities Document (ICD) for Expeditionary Energy, Water and Waste² which identifies five gaps to be

addressed by its Mobile Electric Hybrid Power Sources (MEHPS) initiative: 1) Lack of existing capability to automatically match load to demand (3.LC.1); 2) Lack existing capability to autonomously and automatically match power production to consumption (6.LC.1); 3) Lack of existing capability to efficiently integrate multiple energy sources (6.LC.2); 4) Lack of common and/or renewable power sources (14.LC.1); and 5) No scalable expeditionary energy storage capability (22.LC.1).

The latter gap (22.LC.1) is the primary focus of this special notice. Scalable/modular expeditionary energy storage capability is desired as a means for matching power production to load demand through hybridization, and as a medium for storing harvested energy. This energy storage capability will be expected to function in support of peak shaving, cycle charging, silent watch and maintain flexibility for operations in future hybrid power generation systems such as those envisioned as a result of the MEHPS Analysis of Alternatives (AoA) study conducted by the Marine Corps³.

The S&T effort herein seeks development and demonstration of system-level energy storage technology that provides a capability to expand the envelope of safe storage, transport and operating conditions beyond that which is currently available. Analyses and trade studies shall be conducted as necessary to determine the optimal system kW-hr rating and scaling approach to satisfy per each future expeditionary power need. The S&T effort shall address the following operational needs and desired attributes at a minimum:

- 1) Storage and transport environments include vehicle, ship, and aircraft platforms. Applicable guidelines are contained in NAVSEAINST 9310.1c, the Technical Manual for Batteries, Navy Lithium Safety Program and Procedures, Rev 2 S9310-AQ-SAF-010, and UNECE Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria.
- 2) Operating environment is primarily terrestrial and the mobility platform is the Light Tactical Trailer-Marine Corps Chassis (LTT-MCC).
- 3) Portability of the systems is required (2 person lift objective, 4 person lift threshold).
- 4) Operation in 0 to 55°C (threshold) / -20 to 55°C (objective) environments.
- 5) Typical charge and discharge rates of C/2 (threshold) and 2C (objective) are envisioned.
- 6) DC round-trip efficiency target without power electronics is 90% (threshold) / 95% (objective) at C/2 rate.
- 7) Long-term power and capacity retention are required; threshold life of 4,500 charge/discharge cycles, and an objective of 20,000 cycles.
- 8) Long-term shelf life in -40°C to +40°C environments with self-discharge rates less than 5%/month (threshold), 2%/month (objective).
- 9) All parasitic losses shall be identified and minimized to limit impact on operational use of the systems.
- 10) System energy density shall be compared to existing fielded energy storage density of 72 W-hr/kg. Greater system energy density concepts will receive favorable consideration.
- 11) The energy storage systems (in a stand-alone or modular/scalable configuration) shall support 3 hours (threshold) / 8 hours (objective) of silent watch operation under the loading scenarios detailed in the AoA study³.
- 12) Life-cycle cost estimate shall be provided for the proposed energy storage solution.

- 13) Favorable consideration will be given to open systems architecture approaches. Guidelines are provided in OSD's Open Systems Architecture Initiative.⁷

Nominally, Budget Activity 2 (BA 2) applied research funds will be used for the base phase, and BA 3 Advanced Technology Development funds will be used in the option phase. The overall S&T effort is envisioned to be conducted at the TRL 4-6 stage. Achievement of TRL 5 is anticipated at the end of 18 months, and TRL 6 is expected by end of 36 months.

Applicable reference documents include:

1. 2012 Marine Corps Science & Technology Strategic Plan (<http://www.onr.navy.mil/~media/Files/About-ONR/USMC-ST-Strat-Plan-2012-Final-31Jan.ashx>)
2. Initial Capabilities Document (ICD) for Expeditionary Energy, Water and Waste. Available: <http://www.hqmc.marines.mil/Portals/160/Docs/USMC%20E2W2%20ICD.pdf>
3. Brief to Industry, Mobile Electric Hybrid Power Sources (MEHPS). Available: http://www.hqmc.marines.mil/Portals/160/FINAL%20MEHPS%20Brief%20to%20Industry_0201.pdf
4. 2011 Expeditionary Energy Strategy and Implementation Plan. Available: (<http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=0CCkQFjAA&url=http%3A%2F%2Fwww.hqmc.marines.mil%2FPortals%2F160%2FDocs%2FUSMC%2520Expeditionary%2520Energy%2520Strategy%2520%2520Implementation%2520Planning%2520Guidance.pdf&ei=ssXvUpkirMmxBKDugvAC&usg=AFQjCNEsN1980Fuzh5TT3AT217yr30w6gA&sig2=xINwG-mhiX7j37EGjnKttw&bvm=bv.60444564,d.cWc>)
5. Marine Corps Vision and Strategy 2025 (http://www.onr.navy.mil/~media/Files/About-ONR/usmc_vision_strategy_2025_0809.ashx)
6. 2011 Naval Science & Technology Strategic Plan (<http://www.onr.navy.mil/About-ONR/science-technology-strategic-plan.aspx>)
7. OSD Open Systems Architecture Initiative (http://www.acq.osd.mil/se/initiatives/init_osa.html)

III. No events are planned

IV. WHITE PAPER SUBMISSION

Although not required, white papers are strongly encouraged for all offerors seeking funding. Each white paper will be evaluated by the Government to determine whether the technology advancement proposed appears to be of particular value to the Department of the Navy. Initial Government evaluations and feedback will be issued via e-mail notification from the Technical Point of Contact. The initial white paper appraisal is intended to give entities a sense of whether their concepts are likely to be funded.

Detailed full proposals (technical and cost volumes) will be subsequently encouraged from those offerors whose proposed technologies have been identified through the above referenced e-mail as being of "particular value" to the Government. However, any such encouragement does not

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assure a subsequent award. Full proposals may also be submitted by any offeror whose white paper was not identified as being of particular value to the Government or any offeror who did not submit a white paper.

For white papers proposing efforts that are considered of particular value to the Navy, but either exceed available budgets or contain certain tasks or applications that are not desired by the Navy, ONR may suggest a full proposal with reduced effort to fit within expected available budgets or an effort that refocuses the tasks or application of the technology to maximize the benefit to the Navy.

White papers should not exceed 4 single-sided pages, exclusive of cover page, references, and resume(s) of principal investigator(s), and should be in 12-point Times New Roman font with margins not less than one inch. White papers shall be in Adobe PDF format (preferred) or in Microsoft Word format compatible with MS Office 2010.

The cover page should be labeled “White Paper for ONR 2013 Research Opportunity: Compact High-Density Tactical Energy Storage.” The cover page should also include the following information: title of the proposed effort, technical point of contact, telephone number, and e-mail address.

The 4-page body of the white paper should include the following information:

- (1) Principal Investigator(s);
- (2) Relevance of the proposed effort to the research areas described in Section II;
- (3) Technical objective of the proposed effort;
- (4) Technical approach that will be pursued to meet the objective;
- (5) A summary of recent relevant technical breakthroughs; and
- (6) A funding plan showing requested funding per fiscal year.

Resume(s) of the principal investigator(s), not to exceed 1 page per principal investigator, should also be included after the 4-page body of the white paper.

White papers shall be submitted to the ONR 331 secure upload site: <https://onroutside.onr.navy.mil/aspprocessor/331ShipSystems/> and using the naming convention specified below.

Please use the following naming convention to ensure routing to the appropriate topic author(s):

- Format: 14-SN-0012_ONR POC_Brief Description_Your Name_DateSubmitted
- Example: 14-SN-0012_Coombe_White Paper_JSmith_24Feb2014

To ensure full, timely consideration for funding, white papers should be submitted in accordance with the schedule in Section VI. White papers received after the recommended submittal date will be considered as time and availability of funding permit.

V. FULL PROPOSAL SUBMISSION AND AWARD INFORMATION

Full proposals should be submitted under ONRBAA14-001 in accordance with the schedule in Section VI. Full proposals received after the recommended submittal date will be considered as time and availability of funding permit.

ONR anticipates that grants and/or contracts will be issued for this effort.

Full proposals for contracts should be submitted in accordance with the requirements of the FY14 Long Range BAA, ONRBAA14-001. The Technical Content shall be single spaced and not exceed 20 pages. The cover page, resumes, bibliographies, project schedule, and table of contents are excluded in the page count.

Full proposals for contracts shall be submitted to the ONR 331 secure upload site: <https://onroutside.onr.navy.mil/aspprocessor/331ShipSystems/>. Each document should be uploaded individually to the site.

Full proposals for grants should be submitted in accordance with the requirements of the FY14 Long Range BAA, ONRBAA14-001. All full proposals for grants must be submitted through www.grants.gov. The following information must be completed as follows in the SF 424 to ensure that the application is directed to the correct individual for review:

Block 4a, Federal Identifier: Enter “N00014”

Block 4b, Agency Routing Number, Enter the three (3) digit Program Office Code and the Program Officer’s name as follows: 331 Coombe, Harold

All attachments to the application should also include this identifier to ensure the proposal and its attachments are received by the appropriate Program Office.

ONR plans to fund up to three (3) awards with an approximate value of up to \$750,000 per award for an 18 month base period, and a \$750,000 option for another 18 month period. Total performance not to exceed 36 months. Each proposed program must address the full topic and include team members with significant capabilities in safe energy storage system development, fabrication and testing consistent with the topic description. Teaming between industry, academia, and other eligible performers as described in the BAA is encouraged.

Although ONR expects the above described program plan to be executed, ONR reserves the right to make changes.

VI. SIGNIFICANT DATES AND TIMES

Event	Date	Time
Recommended White Paper Submission Date*	1 June 2014	1400

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Notification of White Paper Valuation*	15 Jul 2014	
Recommended Full Proposal Submission*	20 Aug 2014	1400
Notification of Selection: Full Proposals *	20 Sep 2014	
Awards *	15 Mar 2015	

Note: * These are approximate dates.

VII. POINTS OF CONTACT

In addition to the points of contact listed in ONRBAA14-001, and those that will be listed in ONRBAA14-001, the specific points of contact for this announcement are listed below:

Technical Point of Contact:

H. Scott Coombe, Program Officer, Code 331, harold.coombe@navy.mil

Alternate Technical Point of Contact: Donald Hoffman, Program Officer,
Code 331, donald.hoffman@navy.mil

Business Point of Contact:

Sarah Lewellen, Contracting Officer, Code 252, Sarah.Lewellen@navy.mil

VIII. SUBMISSION OF QUESTIONS

Any questions regarding this announcement must be provided to the Technical Points of Contact and/or the Business Point of Contact listed in Section VII above. All questions shall be submitted in writing by electronic mail.

Answers to questions submitted in response to this Special Notice will be addressed in the form of an Amendment and will be posted to the following web pages:

- Federal Business Opportunities (FEDBIZOPPS) Webpage – <https://www.fbo.gov/>
- Grants.gov Webpage – <http://www.grants.gov/>
- ONR Special Notice Webpage - <http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Special-Notices.aspx>

Questions regarding White Papers or Full Proposals should be submitted NLT two weeks before the dates recommended for receipt of White Papers and/or Full Proposals. Questions after these dates may not be answered.