

Special Notice 13-SN-0023
Special Program Announcement for 2013 Office of Naval Research
Research Opportunity:
Select Topics in Power Generation and Energy Storage

I. INTRODUCTION

This announcement describes a research thrust, entitled “Select Topics in Power Generation and Energy Storage Research,” to be launched initially under the current, FY 13 Long Range BAA, ONRBAA13-001, entitled, “Long Range Broad Agency Announcement 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>. White papers will be received under the current FY13 Long Range BAA, ONRBAA13-001; however, full proposals will be received under the upcoming FY14 Long Range BAA, ONRBAA14-001 - which is expected to be released in September 2013 - since the requested submission date for full proposals will be after the expiration of the current, FY 13 Long Range BAA, ONRBAA13-001. The requirements for proposal submission, evaluation, and award of any resulting contracts and grants will ultimately be subject to the terms described in the upcoming, FY14 Long Range BAA, ONRBAA14-001. Potential Offerors may review the current FY13 Long Range BAA, ONRBAA13-001, to get a general understanding of what the proposal requirements may be in the upcoming, FY14 Long Range BAA, ONRBAA14-001.

The research opportunity described in this announcement currently falls under the following sections of FY13 Long Range BAA, ONR BAA13-001:

Topic #1 - Safe Energy and Power Dense Battery Technology:

Section I, entitled “General Information”, sub-section 6, entitled “Research Opportunity Description”, the “Sea Warfare and Weapons Department (Code 33)” item, paragraph 2), subparagraph a, entitled “Functional Materials”.

Topic #2 - Naval Shipboard Generator Applied Research:

Section I, entitled “General Information”, sub-section 6, entitled “Research Opportunity Description”, the “Sea Warfare and Weapons Department (Code 33)” item, paragraph 1), subparagraph c, entitled “Electrical and Thermal Systems”.

Topic #3 - Generator Supporting Materials Applied Research:

Section I, entitled “General Information”, sub-section 6, entitled “Research Opportunity Description”, the “Sea Warfare and Weapons Department (Code 33)” item, paragraph 1), subparagraph c, entitled “Electrical and Thermal Systems”.

The purpose of this announcement is to (1) focus the attention of the scientific community on the areas to be studied, (2) initiate dialogue amongst those interested in these areas, and (3) discuss the planned timetable for the submission of white papers and proposals.

II. TOPIC DESCRIPTION

The selected topics in this special notice are designed to address research and technology gaps in the area of energy storage safety and novel and improved power generation technologies in ONR's current program portfolio. The program will pursue early applied research in several specific topics that complement and enhance existing programs in related areas.

Objective:

The Office of Naval Research (ONR) is interested in receiving proposals on the following research topics:

Topic #1 - **Safe Energy and Power Dense Battery Technology**

Topic #2 - **Naval Shipboard Generator Applied Research**

Topic #3 - **Generator Supporting Materials Applied Research**

The *objective* of this announcement is to encourage research and innovation in these selected topic areas and to foster technology transition that benefits future war-fighters and meets Navy needs.

The program will address technical challenges in each of the selected areas:

Topic #1 - Safe Energy and Power Dense Battery Technology:

A significant challenge to meeting current and future Navy and USMC energy storage needs are large scale power and energy dense battery technologies with reliable, long-term performance at high C-rates in high temperature environments and with graceful failure modes. The flammability and operating window of the electrolyte is often the primary consideration for de-rating to enable safe operation for existing technology. This topic seeks to develop and demonstrate cell-level battery technology that provides a demonstrated capability to expand the envelope of safe storage, transport and operating conditions beyond what is currently available. Desired cell-level attributes include matching or surpassing current state of the art energy and power densities while increasing safety (e.g. non-flammability, minimal flames, non-sparking, limited propagation, etc), long-term power and capacity retention under deep discharge (100% DOD desired at high rates), rate capability (15C or better desired), and high temperature performance (stability approaching 80°C). Approaches should be scalable to large format cells, demonstrate key performance and safety at the 5-10 Ah laboratory/proof of concept cell level, provide an analysis of the expected long-term performance and degradation, provide an analysis of how the improved cell technical and safety performance would extrapolate to the module and/or system level, and deliver 5-15 proof of concept cells to Navy for independent testing. Discussion of the anticipated safe performance envelope of the cell, to include but not limited to power/rate capability, stability, cost, flammability and toxicity, is desired.

Topic #2 – Naval Shipboard Generator Applied Research:

Multi-megawatt shipboard generators are an increasingly important subsystem in the transition toward more integrated power and propulsion solutions for Navy surface combatant ships. Of particular interest are novel generator concepts that offer significant value to the Navy in terms of lower capital and life-cycle costs, improved efficiencies across a wide range of operation, improved gravimetric and volumetric power density, and lower signatures. Concept exploration studies, sub-scale laboratory characterization, modeling, & experimentation are envisioned to establish initial feasibility and practicality of proposed solutions to technological challenges. This topic covers only the generator component, not the prime mover. Recently, the Navy has pursued multiple technology development options for shipboard generators including superconducting systems, and high-speed permanent magnet approaches. These are examples of the types of efforts that are sought herein, and are considered critical for achieving significant progress toward generator cost, performance, and power density improvements.

Topic #3 – Navy Shipboard Generator Supporting Materials Applied Research:

There is interest in pursuing the most promising applied materials research in support of generator performance improvement, cost reduction, and power density enhancements. Applied research in magnetic materials, electrical conductors, electrical & thermal insulating materials, and cooling media are all of interest at a minimum. Modeling, material synthesis and processing, and characterization are anticipated activities under this topic. Applied research topics should be chosen based on the potential for significant impact, and should be clearly defined from the standpoint of performance and/or cost metrics. Recently, the Navy and other organizations have pursued multiple basic and applied research efforts in rare-earth free permanent magnet materials, conductor materials exhibiting low losses and high current carrying capacity, low AC loss superconductors, etc. These are examples of the types of efforts that are sought herein, and are considered critical for achieving significant progress toward generator cost, performance, and power density improvements.

For all topics, technology development activities are envisioned to be conducted at the TRL 2-4 stage. Applicable reference documents include:

- 2011 Naval Science & Technology Strategic Plan (<http://www.onr.navy.mil/en/About-ONR/~media/Files/About%20ONR/Naval-Strategic-Plan.ashx>)
- 2012 Surface Warfare Enterprise Science & Technology Strategic Plan (attached)
- 2013 Naval Systems Technology Development Roadmap (<http://www.navsea.navy.mil/Media/Naval%20Power%20Systems%20Technology%20Development%20Roadmap%20-%20Distribution%20A%20-%202014%20May%202013%20-%20Final.pdf>)

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 Proposal (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 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 that propose 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 2007.

The cover page should be labeled “White Paper for ONR 2013 Research Opportunity: Select Topics in Power Generation and Energy Storage, Topic #1 - Safe Energy and Power Dense Battery Technology”, “White Paper for ONR 2013 Research Opportunity: Select Topics in Power Generation and Energy Storage, Topic #2 - Naval Shipboard Generator Applied Research” or “White Paper for ONR 2013 Research Opportunity: Select Topics in Power Generation and Energy Storage, Topic #3 – Generator Supporting Materials Applied Research”. The title page should include the following information: title of the proposed effort, technical point of contact, telephone number, fax numbers, 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 should be submitted to the ONR 332 secure upload site:

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<https://onroutside.onr.navy.mil/aspprocessor/332Materials/> and using the naming convention specified below.

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

- Format: 13-SN-0023_Topic #_Topic ONR POC_Brief Description_Your Name_DateSubmitted
- Example: 13-SN-0023_Topic 1_Anderson_White Paper_JSmith_23DEC2012

To ensure full, timely consideration for funding, white papers should be submitted **no later than 12 SEP 2013**. White papers received after that date will be considered as time and availability of funding permit.

The planned date for completing the review of white papers is 15 OCT 2013.

V. FULL PROPOSAL SUBMISSION AND AWARD INFORMATION

Full proposals should be submitted under ONRBAA14-001 by 20 NOV 2013. Full Proposals received after that date will be considered as time and availability of funding permit.

Topic #1 - **Safe Energy and Power Dense Battery Technology**: ONR anticipates that contracts will be issued for this effort.

Topic #2 - **Naval Shipboard Generator Applied Research**: ONR anticipates that contracts will be issued for this effort.

Topic #3 - **Generator Supporting Materials Applied Research**: ONR anticipates that both grants and 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 should be submitted to the ONR 332 secure upload site: <https://onroutside.onr.navy.mil/aspprocessor/332Materials/> and using the naming convention specified below. Each document should be uploaded individually to the site.

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

- Format: 13-SN-0020_Topic #_Topic ONR POC_Brief Description_Your Name_DateSubmitted
- Example: 13-SN-0020_Topic 1_Anderson_Technical Proposal Content_JSmith_23DEC2012

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Full proposals for grants should be submitted in accordance with the requirements of the upcoming 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 shown below:

Topic #1: “332 (Anderson, Michele or Hoffman, Don)”

Topic #2: “331 (Hoffman, Don or Coombe, Harold)”

Topic #3: “331 (Coombe, Harold or Hoffman, Don)”

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

Topic #1:

ONR plans to fund up to two (2) awards with an approximate value of up to \$2,000,000 per award for a total period of performance not to exceed 36 months. Each proposed program must address the full topic with team members with significant capabilities in safe battery materials and cell development, cell fabrication and testing, and battery module and system design consistent with the topic description. Teaming between industry, academic, and other eligible performers as described in the BAA is encouraged.

Topic #2:

ONR plans to fund up to two (2) awards with an approximate value of up to \$900k per award for a total period of performance of 24 months. Each proposed project must address the full topic area; must concentrate on a concept having potential military interest; and must include a diverse group of team members with experience in electrical generator science and technology, along with significant capabilities in modeling, development, and characterization consistent with the topic description.

Topic #3:

ONR plans to fund up to three (3) awards with an approximate value of up to \$600k per award for a total period of performance of 24 months. Each proposed program must address the full topic with team members having significant experience in material science, material synthesis and processing, modeling, and characterization consistent with the topic description.

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

Funding decisions should be made by **17 DEC 2013**. Selected projects will have an estimated award date of **20 MAY 2014**.

VI. SIGNIFICANT DATES AND TIMES

Event	Date	Time
Recommended White Paper Submission Date*	12 SEP 2013	1400 Eastern Time
Notification of White Paper Valuation*	15 OCT 2013	
Recommended Full Proposal Submission	20 NOV 2013	1400 Eastern Time
Notification of Selection: Full Proposals *	17 DEC 2013	
Awards *	20 MAY 2014	

Note: * These are approximate dates.

VII. POINTS OF CONTACT

In addition to the points of contact listed in ONRBAA13-001, **and those that will be listed in ONRBAA14-001**, the specific points of contact for this announcement are listed below:

Technical Points of Contact:

Topic #1: Michele Anderson, Program Officer, Code 332, michele.anderson1@navy.mil
 Alternate Technical Point of Contact for Topic #1: Don Hoffman, Program Officer, Code 331, donald.hoffman@navy.mil

Topic #2: Don Hoffman, Program Officer, Code 331, donald.hoffman@navy.mil
 Alternate Technical Point of Contact for Topic #1: H. Scott Coombe, Program Officer, Code 332, harold.coombe@navy.mil

Topic #3: H. Scott Coombe, Program Officer, Code 331, harold.coombe@navy.mil
 Alternate Technical Point of Contact for Topic #2: Donald Hoffman, Program Officer, Code 332, donald.hoffman@navy.mil

Business Point of Contact:

All Topics: Ms. Heather Land, Contract Specialist, Code 253, heather.land@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>

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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.