

I. ADMINISTRATIVE INFORMATION

This publication constitutes a Broad Agency Announcement (BAA) as contemplated in Federal Acquisition Regulation (FAR) 6.102(d)(2)(i). A formal Request for Proposals (RFP), solicitation, and/or additional information regarding this announcement will not be issued. This announcement replaces BAA #N00167-03-BAA-01. This announcement will remain open for one year from the date of publication, unless replaced earlier by a successor BAA. Initial responses to this announcement must be in the form of White Papers, as detailed in Section V. Proposals shall be requested only from those offerors selected as a result of the scientific review of the White Papers made in accordance with the evaluation criteria detailed in Section VI. White Papers may be submitted any time during the period that this announcement remains open.

The Naval Surface Warfare Center Carderock Division (NSWCCD) will not issue paper copies of this announcement. NSWCCD reserves the right to request proposals from all, some or none of those who have submitted White Papers in response to this announcement. NSWCCD reserves the right to make awards to all, some or none of those who have been requested to submit proposals. Awards may take the form of contracts, cooperative agreements, or other transaction agreements.

NSWCCD will not provide any funding for reimbursement of White Paper or Proposal development costs. Technical and cost proposals (or any other material) submitted in response to this BAA will not be returned. It is the policy of NSWCCD to treat all White Papers and Proposals as sensitive competitive information and to disclose the contents thereof only for the purposes of evaluation.

II. GENERAL INFORMATION

Agency Name

Naval Surface Warfare Center Carderock Division
5001 S. Broad Street
Philadelphia, PA 19112-1403

Research Opportunity Title

“Cooperative Science, Technology, Research and Development Opportunities in Naval and Marine Machinery”

Research Opportunity Description

In support of the Defense Department’s transformation, the research and development community is refocusing its efforts on integrated approaches to technology development and moving new capabilities quickly to the warfighters. DOD’s energy and power technologies research and development (R&D) initiative is focused on enabling an

“electric force” in power generation, energy storage, and power management and control, at sea, on land and in the air.

The U.S. Navy’s 21st century vision (“Sea Power 21”) depicts how the Navy will organize, integrate and transform to meet the challenges and realize the opportunities that lie ahead. The three main elements of this vision are Sea Strike, Sea Shield and Sea Basing. Sea Strike is the ability to project precise and persistent offensive power from the sea. Sea Shield encompasses projecting global defensive assurance, and Sea Basing is the projection of operational independence and support for the joint force.

The vision of the Carderock Division of the Naval Surface Warfare Center is to ensure U.S. Naval supremacy through advanced ships and ship systems that provide the Warfighter with greater mobility, enhanced survivability and increased payload capacity. These ships and ship systems will be reconfigurable, highly automated, sustainable and affordable.

The NSWCCD Machinery Research and Engineering Department (Code 90) is interested in White Papers for long and short term Science and Technology (S&T) and Research and Development (R&D) projects which offer potential for advancement and improvements of naval machinery operations and the scientific knowledge necessary to create such advancements. Our scientists and engineers provide the technology development, acquisition support, and life cycle management for vital machinery systems and equipment, which enable all Navy ships to meet performance and mission requirements for mobility, crew systems support, and combat systems interfaces. This is achieved by working with industry and academia partners and employing modern laboratories and research equipment to develop and validate fundamental concepts necessary for the transition of new technologies into naval machinery applications. Our mission is central to the continued effectiveness of the Navy by ensuring that emerging technologies/systems are operationally ready, affordable, survivable, and environmentally compliant.

The S&T/R&D functional areas include: mechanical and electric propulsion systems; advanced electrical power systems; auxiliary machinery systems; hull, deck and habitability machinery/systems; machinery automation, controls, sensors and network systems; and ship logistics and maintenance systems & processes. The application and life-cycle management of these products greatly influence the effectiveness, viability of operation and the affordability of naval platforms.

Our work is focused on providing, at best value, the present and future Navy with systems that meet stated or implicit requirements for: enhanced mobility; extended depth, range and speed; better control; quicker or more responsive actions; quieter operation; longer life; higher reliability; and improved safety.

The technical areas of focus for White Papers and Full Proposals submitted in response to this BAA should include, but are not limited to, the machinery system and component areas listed below. The development and application of analytical, integration, modeling

and systems engineering design/assessment tools in support of naval machinery development are also encouraged.

Integrated Electric Power Systems

The development, implementation and demonstration of future shipboard electric power technologies emphasizing shipboard power distribution and control; power quality/continuity and system stability; electric power system/component level modeling and simulation; and electrical system survivability and fight-through capability.

- Power generation, transmission, distribution and conversion
- Power system control
- Power quality
- Pulsed power systems
- Energy storage systems
- Weapon effect analysis
- Shipboard integration
- Power continuity
- Systems engineering
- Advanced distribution architecture
- Modeling and simulation analysis
- Design tools

Electric Propulsion and Machinery Systems

The research and development of quiet electric drive technologies and systems, including electroacoustics; large-scale electric machine energy transfer via advanced brush/current collectors; integrated ship electric power technologies/systems; advanced electro-mechanical actuators and linear motors; and electric machinery energy storage technologies.

- Energy storage devices
- Electric propulsion motors
- Electric motors
- Machinery design and development
- Electroacoustics
- Current collectors
- Cryogenics
- Modeling and simulation analysis
- Electric Actuators
- Propulsion motor drives
- Ship service generators
- Machinery systems evaluation
- Design and trade-off studies
- Magnetics
- Superconductivity

Power Electronic Components and Devices

The research and development, simulation and prototyping of electrical systems power semiconductors (including application guidance/device characterization) and power conversion devices; linear and rotary motor drives; solid state/electromechanical circuit breakers; and microprocessor control for electric power systems.

- Power converters
- Semiconductors
- Motor controllers
- Device development
- Thermal management
- System protection components
- Modeling and simulation analysis
- Manufacturing

Alternate Energy Sources and Power Systems

The research and development of advanced power generation and transmission systems such as engines, fuel cells, batteries, and alternative energy and power sources; gears, shafting, bearings and associated components which provide the transmission of power for mobility, range, and endurance for ships, submarines and watercraft.

- Gas turbine engines
- Fuel cells
- Energy conservation
- Diesel engines
- Engine emissions
- Hybrid Cycles

Thermal and Auxiliary Systems

The research and development of alternative cooling technologies, advanced pumps, composite machinery, fluid systems, desalination equipment, piping structures, heat exchangers, hydraulic systems, advanced ventilation fans, and air conditioning/refrigeration equipment.

- Reverse osmosis desalination
- Advanced heat exchangers
- Advanced actuators
- Thermal analysis
- Biofouling control
- Climate control systems
- Alternative cooling systems

Machinery Automation and Control Systems

The development, demonstration, and implementation of automation and control technologies to reduce ownership costs by replacing personnel with dependable and survivable automated shipboard machinery and electrical systems. Included are the machinery architecture concepts, modeling and simulation tools, control algorithms, and advanced sensors.

- Advanced architectures
- Advanced sensor development
- Control systems simulation and modeling
- Robotics
- Distributed control networks
- Automated system reconfiguration

Machinery Acoustic Silencing Systems

The development of technologies to control machinery acoustic noise generation at the source as well as noise transmission to the ship's hull. Included are quiet pumps and compressors, electric motor acoustic & electromagnetic modeling, acoustic filter development, transient noise analysis, machinery system noise prediction, weapons delivery and launch acoustics, fluid system acoustic analysis, and main propulsion unit acoustics & electromagnetics. Instrumentation and measurement techniques for acoustic characterization of machinery, components, and structures are also developed.

- Auxiliary component source silencing
- Isolation mount development
- Fluid system acoustic analysis
- Machinery airborne noise control
- Weapons handling and launch system silencing
- Advanced sound isolation couplings
- Ventilation system silencing
- Damping treatments
- System noise modeling
- COTS equipment silencing

Ship's Logistics and Maintenance Systems & Processes

The research, development, and implementation of future ship logistics and maintenance systems and processes, emphasizing support of the future littoral positioned ships in minimally manned configurations, under heavily constrained operating budgets, in extended deployments, and under reduced maintenance and resupply availabilities. Material management and distribution, corrosion mitigation, e-business, information and knowledge management, web-based, asset management, wireless, open architecture,

documentation management, and Condition Based Maintenance (CBM) concepts and solutions are being sought.

- Advanced Logistics Analysis
- Open Systems Architectures
- Modeling and simulation analysis
- Process design and business case analyses
- Automated Mission Readiness Assessment Technologies
- Data mining technologies
- Self-healing systems
- Corrosion detection, monitoring and mitigation
- Advance Integrated Maintenance and Logistics Information Systems
- Logistics and Maintenance Knowledge Projection and Retrieval
- Paperless Shipboard Logistics Delivery Systems
- Advanced Data Reuse/Repurposing Content Management Systems
- Advanced Real Time Shipboard Data Delivery Systems
- Wireless sensors and networking
- Virtual training systems
- Tele-maintenance and remote repair technologies
- Advanced diagnostics and prognostics
- Automated maintenance prescription and execution
- Semantic and Case-based reasoning systems
- Decision Support Systems
- Situational Awareness
- Material Movement modeling and studies
- Virtual Warehousing and material distribution technologies
- High-Capacity Alongside Sea Base Sustainment (HiCASS) Technologies including:
 - Ship Separation Technology
 - Relative motion compensation
 - Cargo/target transfer tracking
 - Autonomous Rigging
 - Ramp materials and torsion technologies
 - Ship to ship securing technologies

Point(s) of Contact

Questions of a technical nature should be submitted to Mr. Charles Zimmerman, Machinery R&D Program Manager, Code 911, on 215-897-7736 or email at zimmermanch@nswccd.navy.mil or Mr. Michael Gawitt, BAA Project Coordinator, Code 911, on 215-897-1174 or email at gawittma@nswccd.navy.mil. Questions related to procurement issues should be addressed to Ms. Beth Youse, Code 3351, on 215-897-7768 or email at youseej@nswccd.navy.mil.

III. AWARD INFORMATION

It is anticipated that awards may take the form of contracts, cooperative agreements, and other transaction agreements, as appropriate.

The amount and period of performance of each selected proposal will vary depending on the research area and the technical approach to be pursued by the selected offeror.

IV. ELIGIBILITY INFORMATION

All responsible sources from academia and industry may submit White Papers under this BAA. Academic institutions, including Historically Black College and Universities (HBCUs) and Minority Institutions (MIs), are encouraged to submit White Papers or join others in submitting White Papers under this BAA.

V. APPLICATION AND SUBMISSION INFORMATION

Application and Submission Process

White Papers are desired by NSWCCD in response to this announcement. Offerors submitting White Papers considered to have merit will be requested to prepare full proposals for the planned effort.

General Information for Content and Format of White Papers/Full Proposals

White Papers and proposals submitted under this BAA are expected to be unclassified. However, confidential/classified proposals are permitted. The proposal submissions will be protected from unauthorized disclosure in accordance with FAR 15.207, applicable law, and DoD/DoN regulations. Offerors are expected to appropriately mark pages of their submission that contain proprietary information.

White Papers

White Paper Format

- Paper Size - 8.5 x 11 inch paper
- Margins - 1 inch

- Spacing - single or double-spaced
- Font - Times New Roman, 12 point
- Page Limit - shall not exceed 3 pages
- Copies - one (1) original hard copy and one (1) electronic copy on a 3.5" Diskette or CD-ROM, (in Microsoft® Word or Excel compatible or .PDF format).

White Paper Content

- Cover Page - The Cover Page shall be labeled "BAA WHITE PAPER" and shall include the BAA number, proposed title, technical point(s) of contact, with telephone number, facsimile number, and e-mail address.
- Technical Concept - The Technical Concept shall include a description of the technology innovation and technical risk areas. This section also includes a description of the potential Naval relevance and contributions of the proposed effort to the specific mission of the NSWCCD Machinery Research and Engineering Department. This section may include a plan for demonstrating and evaluating the operational effectiveness of the Offeror's proposed products or processes in field experiments and/or tests in a simulated environment.

Full Proposals

FULL PROPOSALS SHOULD ONLY BE SUBMITTED BY OFFERORS UPON REQUEST OF NSWCCD AFTER REVIEW OF PREVIOUSLY SUBMITTED WHITE PAPER

Full Proposal Format (Volume 1 - Technical Proposal/Volume 2 - Cost Proposal)

- Paper Size - 8.5 x 11 inch paper
- Margins - 1 inch
- Spacing - single or double-spaced
- Font - Times New Roman, 12 point
- Page Limit - Volume 1 shall not exceed 50 pages (excluding resumes). There are no page limitations to Volume 2.
- Copies - one (1) original hard copy and one (1) electronic copy on a 3.5" Diskette or CD-ROM, (in Microsoft® Word or Excel compatible or .PDF format).

Full Proposal Content

Volume 1: Technical Proposal-- Each section of the Technical Proposal must start on a new page.

- Cover Page - The Cover Page shall be labeled "Technical Proposal" and shall include the following:
 - BAA number: N65540-04-BAA-05

- Title of Proposal
 - Identification of prime offeror (and complete list of subcontractors, if applicable)
 - Technical contact (name, address, phone/fax, electronic mail address)
 - Administrative/business contact (name, address, phone/fax, e-mail address)
 - Duration of effort (differentiate basic effort and options)
- Table of Contents
 - Statement of Work - The offeror shall provide a Statement of Work (SOW) clearly detailing the scope and objectives of the effort and the technical approach. It is anticipated that the proposed SOW will be incorporated as an attachment to the resultant award instrument. To this end, such proposals must include a severable self-standing SOW without any proprietary restrictions that can be attached to the contract or agreement award. When options are contemplated, the SOW must clearly identify separate optional task statements.
 - Technical Concept - The Technical Concept shall include a description of the technology innovation and technical risk areas. This section should also describe the potential Naval relevance and contributions of the proposed effort to the specific mission of the NSWCCD Machinery Research and Engineering Department. This section may include a plan for demonstrating and evaluating the operational effectiveness of the Offeror's proposed products or processes in field experiments and/or tests in a simulated environment.
 - Project Schedule and Milestones - A tabular summary of the schedule of project events and milestones shall be provided.
 - Assertion of Data Rights - Provide a summary of any proprietary rights to pre-existing results, prototypes, or systems supporting and/or necessary for the use of the research, results, and/or prototype. Any rights claimed in other parts of the proposal that would impact the rights in this section must be cross-referenced. If there are proprietary rights, the Offeror must explain how these affect its ability to deliver subsystems and toolkits for integration. Additionally, Offerors must explain how the program goals are achievable in light of these proprietary and/or restrictive limitations. If there are no claims of proprietary rights in pre-existing data, this section shall consist of a statement to that effect.
 - Deliverables - The offeror shall provide a detailed description of the results and products to be delivered. The SOW should include a summary listing of these deliverables. The deliverables list shall minimally include Technical and Financial Progress Reports, Presentation Material, Meeting Minutes, Technical Documents or Reports, and a Final Report.
 - Management Approach - A discussion of the overall approach to the management of this effort, including brief discussions of the total organization; use of

personnel; project/function/subcontractor relationships; government research interfaces; and planning, scheduling and control practices. Identify which personnel and subcontractors (if any) will be involved. Submit resumes/curriculum vitae for the key personnel identified. Include a description of the facilities that are required for the proposed effort with a description of any Government Furnished Equipment/Hardware/Software/Information required, by version and/or configuration.

- Past Performance - Offerors shall provide all relevant past performance for similar or related work under contracts currently being performed or completed during the last three (3) years. The Offeror may include Federal, State and Local Government and private sector contracts. Offerors that represent newly formed entities, without prior contract experience, should identify previous contract and subcontract experience for all key personnel identified in the proposal. The contractor shall provide the following information for each such contract:

- Contract Number
- Customer/Agency
- Contracting Officer (name and phone number)
- Technical Point of Contact (name and phone number)
- Brief Description of Scope of Work
- Contract Type
- Award Price
- Total Labor-Hours of Effort
- Period of Performance
- Contract Deliverables

Volume 2: Cost Proposal-- The Cost Proposal shall consist of a cover page and two parts. Part 1 will provide a detailed cost breakdown of all costs by cost category by calendar/fiscal year and Part 2 will provide a cost breakdown by task/sub-task using the same task numbers in the Statement of Work. Options must be separately priced.

- Cover Page - The submission of cost or pricing data in accordance with FAR 15.403.4 is mandatory if the offeror's proposed cost exceeds \$550,000.00. The words "Cost Proposal" should appear on the cover page in addition to the following information:

- BAA number: N65540-04-BAA-05
- Title of Proposal
- Identification of prime offeror (and complete list of subcontractors/sub-recipients, if applicable)
- Technical contact (name, address, phone/fax, electronic mail address)
- Administrative/business contact (name, address, phone/fax, and e-mail address)
- Duration of effort (differentiate base effort and options)

- Summary statement of proposed costs
- Cognizant DCAA and DCMA point of contact (name, address, phone/fax, and electronic mail address -- if readily available)
- Part 1 - Detailed Cost Breakdown - A detailed breakdown of all costs by cost category by calendar/fiscal year (when options are contemplated, options must be separately identified and priced by calendar/fiscal year). Cost categories include:
 - Direct Labor - Individual labor category or person, with associated labor hours and unburdened direct labor rates
 - Indirect Costs - Fringe Benefits, Overhead, G&A, COM, etc. (Must show base amount and rate)
 - Contractor Equipment Purchases - Proposed contractor-acquired equipment such as computer hardware for proposed research projects should be specifically itemized with costs or estimated costs. An explanation of any estimating factors, including their derivation and application, shall be provided. Where possible, indicate purchasing method (competition, price comparison, market review, etc.)
 - Travel - Number of trips/travelers, destinations, duration, etc.
 - Subcontracts - A cost proposal as detailed as the Offeror's cost proposal will be required to be submitted by the subcontractor. The subcontractor's cost proposal can be provided in a sealed envelope with the Offeror's cost proposal or will be requested from the subcontractor at a later date
 - Consultant - Provide consultant agreement or other document which verifies the proposed loaded daily/hourly rate
 - Materials - Specifically itemized by cost element. An explanation of any estimating factors, including their derivation and application, shall be provided. Where possible, indicate purchasing method (competition, price comparison, market review, etc.)
 - Other Direct Costs
 - Fee/Profit, including fee expressed as a percentage of cost
- Part 2 - Cost Breakdown by Task/Sub-task - A cost breakdown by task/sub-task corresponding to the same task numbers (or work breakdown structure) in the Statement of Work (SOW) shall be provided. When options are contemplated, options must be separately identified and priced by task/sub-task corresponding to the same task numbers in the Statement of Work.

Address for the Submission of White Papers and Full Proposals

Naval Surface Warfare Center, Carderock Division
Attention: Mr. M. Gawitt, Code 911
Philadelphia Naval Business Park
5001 South Broad Street
Philadelphia, PA 19112

Email address: gawittma@nswccd.navy.mil
Proposals shall be marked: N65540-04-BAA-05

VI. EVALUATION INFORMATION

White Papers Evaluation Criteria

White Papers will be evaluated using the following evaluation criteria: (1) overall scientific and technical merits of the concept; and (2) potential naval relevance and contributions of the effort to the agency's specific mission. Decisions to request Full Proposals will be competitively made based upon the Government's assessment of Items (1) and (2) above.

Full Proposals Evaluation Criteria

Proposals will be evaluated using the following evaluation criteria: (1) overall scientific and technical merits of the proposal; (2) potential naval relevance and contributions of the effort to the agency's specific mission; (3) the offeror's capabilities, related experience/past performance, facilities, techniques or unique combinations of these which are integral factors for achieving the proposal objectives; (4) the qualifications, capabilities and experience of the proposed Principal Investigator, team leader and key personnel who are critical in achieving the proposal objectives; and (5) the realism of the proposed cost and availability of funds. Award decisions will be based on the amount of funds available for the proposed technology area and overall technical merit. Proposals submitted by large businesses will also be competitively evaluated based on the extent of the Offeror's commitment to providing meaningful subcontracting opportunities for small businesses, HUBZone small businesses, small disadvantaged businesses, woman-owned small businesses, veteran-owned small businesses, service disabled veteran-owned small businesses, historically black colleges and universities, and minority institutions.

Evaluation Panels

White Papers and Full Proposals submitted under this BAA will be protected from unauthorized disclosure in accordance with FAR 3.104-5 and 15.207. Government scientific experts will perform the technical evaluation of White Papers and Proposals. Cost proposals will be evaluated by Government business professionals. Restrictive notices notwithstanding, one or more support contractors may be utilized as subject-

matter-expert technical consultants. Similarly, support contractors may be utilized to evaluate cost proposals. However, Government personnel will retain sole responsibility for proposal selection and award decisions. Each employee, including those of support contractors, having access to technical and cost proposals submitted in response to this BAA will be required to sign a non-disclosure statement prior to receipt of any submissions.

VII. OTHER INFORMATION

Security Classification

In order to facilitate intra-program collaboration and technology transfer, the Government will attempt to enable technology developers to work at the unclassified level to the maximum extent possible. If access to classified material will be required at any point during performance, the offeror must clearly identify such need prominently in its proposal.

If developers use unclassified data in their deliveries and demonstrations regarding a potential classified project, they should use methods and conventions consistent with those used in classified environments. Such conventions will permit the various subsystems and the final system to be more adaptable in accommodating classified data in the transition system.