BASIC RESEARCH CHALLENGE PROGRAM

INTRODUCTION:

This publication constitutes a Broad Agency Announcement (BAA) as contemplated in the Department of Defense Grants and Agreements Regulations (DoDGARS) 22.315(a). A formal Request for Proposals (RFP), other solicitation, or additional information regarding this announcement will not be issued.

The Office of Naval Research (ONR) will not issue paper copies of this announcement. The ONR reserves the right to fund all, some or none of the proposals received under this BAA. ONR provides no funding for direct reimbursement of 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 ONR to treat all proposals as sensitive competitive information and to disclose their contents only for the purposes of evaluation.

Potential offerors may obtain information on ONR Programs and opportunities by checking the ONR website at http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx

I. GENERAL INFORMATION

1. Agency Name - Office of Naval Research

2. Research Opportunity Title – Basic Research Challenge (BRC) Program

3. Program Name – Basic Research Challenge (BRC) Program

4. Research Opportunity Number – 10-013

5. Response Date -

A) White Paper Due Date: 03 June 2010
B) Full Proposal Due Date: 18 July 2010

6. Research Opportunity Description -

The Office of Naval Research (ONR) is interested in receiving proposals for the BRC Program, which supports basic science and or engineering research within academia and industry. The program is focused on stimulating new, high-risk basic research projects.

Work funded under a BAA may include basic research, applied research and some advanced technology development (ATD). With regard to any restrictions on the conduct or outcome of work funded under this BAA, ONR will follow the guidance on and definition of "contracted fundamental research" as provided in the Under Secretary of Defense (USD) Acquisition, Technology and Logistics (AT&L) Memorandum of 26 June 2008. As defined therein, the definition of "contracted fundamental research", in a Department of Defense (DoD) contractual context, includes [research performed under] grants and contracts that are (a) funded by Research, Development, Test, and Evaluation Budget Activity 1 (Basic Research), whether performed by universities or industry or (b) funded by Budget Activity 2 (Applied Research) and performed on campus at a university or by industry. ATD is funded through Budget Activity 3 (Advanced Development). In conformance with the USD (AT&L) guidance and National Security Decision Directive 189, ONR will place no restriction on the conduct or reporting of unclassified fundamental research, except as otherwise required by statute, regulation or Executive Order. Normally, fundamental research is awarded under grants with universities and under contracts with industry. ATD is normally awarded under contracts and may require restrictions during the conduct of the research and DoD pre-publication review of research results due to subject matter sensitivity. As regards to the present BAA, the Research and Development efforts to be funded will consist of basic research. The funds available to support awards are Budget Activity 1.

SPECIFIC BRC TOPICS

FY2010 BRC Topic #1

Biologically-Inspired Intelligent Metamaterials

Background: In order to survive in a harsh and competitive natural environment, some marine and other organisms have evolved highly sophisticated abilities to passively sense their electromagnetic (EM) environment, change their appearance in response to the sensed information, and, in some cases, communicate covertly with similar individuals. The structures responsible for adaptation (e.g., color, polarization, or texture control) are embedded within the cells that make up the animals skin and sensing and control can either be localized or distributed. Details of how animal systems are able to sense and adapt dynamically continue to emerge from on-going DoD investments, including a recently started Multidisciplinary University Research Initiative (MURI) project directed at Dynamic Biological Responses in the Marine Environment. At the same time, the field of electromagnetic metamaterials has been rapidly developing in recent years, leading to new materials with exotic properties generally unattainable in nature, including metamaterials having negative refractive index. Various realizations of metamaterials have been achieved at frequencies from microwave through visible and infrared wavelengths. However these are often limited in bandwidth, lack arbitrary shape and polarization, and subject to high losses. Other recent work has demonstrated embedding active control devices into the metamaterial to increase functionalities such as tuning and control.

Objectives: Researchers will develop theoretical and practical understanding of the electromagnetic properties of systems of adaptable materials in ways that are both predictable and controllable. This goal will be achieved through a combination of modeling the complete EM field within the ambient environment and the embedded metamaterial, materials research guided by the modeling and directed at specific EM far-field effects, and mimicry of examples found in the zoological sciences. Fundamentally important aspects of the research are to understand how knowledge of marine biological systems can be utilized to inspire improved man-made materials that can both sense and adapt in a dynamic EM environment. Researchers will address the architectural aspects of the intelligent, adaptive materials, including the fabrication of scaled models to prove critical components and concepts within a controlled laboratory setting. A multidisciplinary research effort will bring together expertise in physics, electronics, mathematics, materials science, compressed sensing, marine biology, control theory and architecture, neuromorphic engineering, and signal processing in order to develop intelligent metamaterials.

Basic Research Concentration Areas: Suggested research areas include but are not limited to: (1) Concepts of multidimensional sensing and processing and concepts of optimal combinations of sensors and control architectures; (2) Miniaturization of composites that include sensing, actuation, and embedded control of metamaterials with unique properties such as negative refractive index; (3) Incorporation of mechanical and chemical processes using organic and inorganic components; and (4) Optimal combinations of sensors, control architectures for specific outcomes and conditions for stability. Proposers can include academia, public and private research laboratories, and industry. Student participation is strongly encouraged.
Impact: This research will have the potential to: (a) open up an entirely new field of naval

research interconnecting marine biology, electronics/photonics, materials science, and adaptive control; (b) Determine a pathway to solving practical problems related to metamaterials and smart skin technologies that will function in arbitrary shapes and flexible structures, and dynamic EM environments; (c) invent new, yet un-conceived methods of electronic warfare, signature reduction and covert communications.

FY2010 BRC Topic #2

Computing with Natural Language

Background: Natural language (NL) plays an important role in human intelligence. Much of human knowledge is expressed in terms of NL, human reasoning is thought to be done with words (symbols), and dialogue based on NL is the dominant mode of human-human communication. Intelligent agents that can interact with people in ways that are natural to humans and utilize human knowledge must be able to understand and reason with NL. Natural language, however, is rife with imprecise generalized quantifiers, such as near, often, might, many, etc. For machines, which are made to compute with crisp values and functions, the imprecise and qualitative nature of NL creates severe difficulties in representation of NL-based information and computation with qualitative variables and constraints. Humans, on the other hand, have the remarkable ability to reason and make rational decisions with qualitative, uncertain, incomplete information, and partial truth. Humans, for example, routinely reason with such qualitative information as “the relationship between x and y is strong”, while machines need a crisp value, say, 0.9 for strong.

To develop the capability for building intelligent systems that approach human level performance, especially when they are deployed in unconstrained environments, we must better understand how humans represent information and meaning, and the cognitive processes used in inference. We must also develop machine useable representations for qualitative information and effective computational tools that enhance and complement current Artificial Intelligence approaches that are based primarily on probability and bivalent logic.

Objective: The objective of this research topic is to advance two interrelated issues that are needed for building intelligent agents that can interact seamlessly with people: (a) gain understanding of how humans process natural language and reason with imprecise information; and (b) develop computational models and methods that are used in making robust, near-optimal decisions, based on imprecise, qualitative information, particularly information expressed in terms of natural language.

Research Concentration Areas: The approach to this topic will draw on expertise in multiple areas including cognitive science, artificial intelligence, mathematics, statistics, and advanced algorithmic design. The research areas include the following. (1) Formal and empirical investigation of cognitive architectures and representation of meaning and interactions of meanings of words in different contexts and in the process of discourse. (2) Develop methods and algorithms for computing with imprecise, qualitative information, which includes methods for (a) precisiation of qualitative variables, constraints and functions; (b) propagation of qualitative information through reasoning systems, and (c) methods for granulating qualitative information and computing with granules. (3) Develop the foundations of a broad theory of uncertainty that can express natural language based qualitative constraints that cannot be represented correctly or efficiently by probability theory.

Impact: This research topic is expected to advance our knowledge of how to build robust intelligent agents that can function in uncertain and unconstrained environments, utilize information expressed in natural language, and communicate seamlessly with human partners. Such intelligent systems will contribute to greater automation by reducing the cognitive workload of the Naval/DoD personnel, as well as reducing manpower required for performing certain missions.

FY2010 BRC Topic #3

The Micro-Physics of a Liquid-Solid-Gas Interaction

Background: The triple-interaction of a liquid and gas with a solid surface where the fluids are flowing over the solid, possibly at high speeds (Reynolds numbers) is an extension of the contact line problem. The liquid-gas interface meets the liquid-solid and gas-solid interfaces with their associated boundary layers (and possibly turbulence) creating complex mechanics and incompatible dynamical boundary conditions at the contact line (a "free surface" intersects the nonslip condition on the solid). Global computations have ignored this region by extrapolating to the surface, but description of processes such as spray generation and gas entrainment/bubble generation, especially when the flows are turbulent, require consideration of the detailed mechanics. Additional complications could include the presence of electrolytes and surfactants (e.g. seawater) and gravity waves on the free surface. Detailed computation of complex turbulent boundary layer flow has made great strides, and a detailed understanding of, and simulation of, free-surface flows and waves lends hope that these capabilities may be extended to this complex interaction of the two. Likewise significant advances in experimental techniques able to capture flow phenomena over a range of scales from microscopic to global should be able to be applied to this flow configuration.

Objective: The goal is a basic understanding and computational prediction capability for the dynamics of the triple-interaction of a liquid – gas – solid in turbulent flow conditions. The added complexities due to the presence of electrolytes, gas-saturation of the liquid, and surface tension variations need also to be considered. Both the micro-scale dynamics and more global descriptions must be determined, such as parameterizations of the two-phase, turbulent flow in this region and droplet ejection or bubble generation. Experimental data will be required to evaluate theoretical and computational approaches.

Research Concentration Areas: Research areas relevant to this initiative include, but are not limited to: (1) Theoretical descriptions of this complex flowfield, particularly as related to computational prediction methods; (2) development of computational approaches, both at the micro-scale and at a global-scale (including parameterizations); (3) experimental investigations, also at the micro-scale and global scale, both high-resolution time-resolved and averaged appropriate to parameterizations.

Impact: The grand challenge in ship hydrodynamics is to understand, predict, and control all fluid mechanics phenomena in the interaction of a ship with the sea. The present topic is a member of this class and one which has not been explored. The flow dynamics of the contact line generate spray and bubbles, both of which are of practical interest to ship operations. On a broader scale, the methods developed herein will have the potential also to impact other applications of computational fluid mechanics.

FY2010 BRC Topic #4

Acoustical Uncertainty due to Marine Mammals and Fish

Background: Acoustic attenuation and scattering due to aggregations of marine mammals and fish on the continental shelves have the potential to dominate all other acoustic mechanisms in the shallow water environment. The resulting substantial and yet-unaccounted-for spatial and temporal fluctuations in reverberation and attenuation can produce acoustic prediction uncertainties far exceeding those induced by poorly parameterized geology or even the largest water column fluctuations. Empirical studies have shown that acoustic attenuation due to marine biota such as aggregations of fish can easily exceed 10 dB at certain frequencies and geometries, and that backscattering from aggregations of fish produce substantial acoustic reverberation and clutter. The absence of these biologically-induced effects in acoustic models is due to (1) insufficient understanding of the physical mechanisms of acoustical-biological attenuation (scattering and absorption) and backscattering; and (2) a lack of mathematical techniques to adequately parameterize the spatial and temporal density distribution of marine biological species in terms which are appropriate for acoustic models.

Objectives: This program will address the challenges mentioned above by generating dramatic scientific advancements in the fields of mathematical biology and physics-based ocean acoustics; specifically, expected advancements will include (1) new mathematical theory of wave propagation and scattering in cluttered media to stochastically parameterize the dynamic spatiotemporal distributions of marine aggregations; and (2) development of physics-based models of biologically-induced acoustic scattering and attenuation by aggregations of marine animals. Ultimately, this program will advance our understanding of and capability to predict biologically-induced acoustical impacts due to aggregations of marine mammals and fish, and contribute to the future development of the fundamental building blocks of a coherent suite of tools which will constitute a fully ecological approach to operational sonar system performance prediction.

Research Concentration Areas: Research areas relevant to this initiative include, but are not limited to, the following: (1) explorations of new mathematical parameterizations of oceanic biota on multiple temporal and spatial scales; (2) theoretical development of physics-based models of acoustic wave propagation and scattering in cluttered media to predict backscattering and forward scattering by marine animals; (3) development of new techniques to understand the extent of the impact of marine biota on geo-acoustic inversions of ocean bottom properties; (4) new physics-based computational and signal processing techniques for understanding and characterizing biological-acoustical coupling in acoustic propagation and scattering. Integrated field programs which specifically evaluate theoretical and statistical models are specifically encouraged.

Impact: This initiative will seek to build a scientific framework to include biology in acoustic predictions, in order to provide fundamental scientific knowledge required for accurate and robust acoustic predictions

7. Point(s) of Contact –

The BRC Topic Chiefs are identified below for each specific BRC Topic. Questions of a technical nature should be submitted to any one of the listed BRC Topic Chiefs for your topic of interest:

BRC Topic Chiefs – Topic #1

Name: Dr. Dan Purdy
Address: Office of Naval Research
875 North Randolph Street – Suite 908
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Email: dan.purdy@navy.mil

Name: Dr. Steven Ackleson
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875 North Randolph Street – Suite 1065
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Address: Office of Naval Research
875 North Randolph Street – Suite 270
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Code: 331
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BRC Topic Chiefs – Topic #2

Name: Dr. Behzad Kamgar-Parsi
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Arlington, VA 22203
Code: 311
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Name: Dr. Paul Bello
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875 North Randolph Street – Suite 1036
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BRC Topic Chiefs – Topic #3

Name: Dr. L. Patrick Purtell
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BRC Topic Chiefs – Topic #4

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Name: Dr. Jim Eckman
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Name: Dr. Mike Weise
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875 North Randolph Street – Suite W1068
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Code: 322MB
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Name: Dr. Reza Malek-Madani
Address: Office of Naval Research
875 North Randolph Street – Suite 1104
Arlington, VA 22203
Code: 311
Email: Reza.MalekMadani@navy.mil

Name: Dr. Tristan Nguyen
Address: Office of Naval Research
875 North Randolph Street – Suite 1175
Arlington, VA 22203
Code: 311
Email: tristan.nguyen@navy.mil

Questions of a business nature should be submitted to:

Primary

Name: Lynn Christian
Address: Office of Naval Research
875 North Randolph Street – Suite W1273
Arlington, VA 22203
Code: BD0251
Email: lynn.christian@navy.mil

Secondary

Name: Vera Carroll
Address: Office of Naval Research
875 North Randolph Street – Suite 1279
Arlington, VA 22203
Code: BD0251
Email: vera.carroll@navy.mil

Questions of a security nature should be submitted to:

Diana Pacheco
Information Security Specialist
Office of Naval Research
Security Department, Code 43
One Liberty Center
875 N. Randolph Street
Arlington, VA 22203-1995
Email Address: Diana.pacheco@navy.mil

Note: All UNCLASSIFIED questions shall be submitted via e-mail to the BRC Topic Chiefs with a copy to the designated Business POC.

CLASSIFIED questions shall be handled through the ONR Security POC. Specifically, any entity wanting to ask a CLASSIFIED question shall send an email to the ONR Security POC with copy to both the BRC Topic Chief POC and the Business POC stating that the entity would like to ask a CLASSIFIED question. DO NOT EMAIL ANY CLASSIFIED QUESTIONS. The Security POC will contact the entity and arrange for the CLASSIFIED question to be asked through a secure method of communication

Questions submitted within two (2) weeks prior to a deadline may not be answered, and the due date for submission of the white paper and/or full proposal will not be extended.

Answers to questions submitted in response to this BAA will be addressed in the form of an Amendment and will be posted to one or more of the following webpages:

- Grants.gov Webpage – http://www.grants.gov
- ONR Broad Agency Announcement (BAA) Webpage – http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx

8. Instrument Type(s) –

Awards will take the form of grants.

ONR reserves the right to award a different instrument type if deemed to be in the best interest of the Government.

9. Catalog of Federal Domestic Assistance (CFDA) Number - 12.300

10. Catalog of Federal Domestic Assistance (CFDA) Title -

Basic and Applied Scientific Research

11. Other Information -

This announcement is restricted to applied research and that portion of advanced technology development not related to the development of a specific system or hardware procurement. Contracts, grants and other assistance agreements made under this BAA are for scientific study and experimentation directed towards advancing the state of the art and increasing knowledge or understanding.

THIS ANNOUNCEMENT IS NOT FOR THE ACQUISITION OF TECHNICAL ENGINEERING AND OTHER TYPES OF SUPPORT SERVICES.

II. AWARD INFORMATION

The awards will be made at funding levels commensurate with the proposed research and in response to agency missions. Each individual award will be for a four (4) year period. The award will be incrementally funded.

Total amount of funding for four years for grants resulting from this BAA is estimated to be about $18M, subject to the availability of out-year appropriations. It is anticipated that the maximum award will be $1.5M per year. It is recommended that potential proposers communicate with the BRC Topic Chiefs regarding these issues before the submission of formal proposals.

There is no guarantee that any of the proposals submitted in response to a particular topic will be recommended for funding. On the other hand, more than one proposal may be recommended for funding for a particular topic.

For the past three years Congress has placed limits on the percentage of facilities and administrative (F&A) costs that can be paid by the government using basic research (6.1) funds. Currently F&A costs paid under contracts and grants for the performance of basic research may not exceed 35 percent. It is unknown at present whether a similar indirect cost restriction will apply to 6.1 funds in FY 2011 or thereafter.

III. ELIGIBILITY INFORMATION

All responsible sources from academia and industry may submit proposals under this BAA. Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals. However, no portion of this BAA will be set aside for HBCU and MI participation.

Federally Funded Research & Development Centers (FFRDCs), including Department of Energy National Laboratories, are not eligible to receive awards under this BAA. However, teaming arrangements between FFRDCs and eligible principal bidders are allowed so long as they are permitted under the sponsoring agreement between the Government and the specific FFRDC.

Navy laboratories and warfare centers as well as other Department of Defense and civilian agency laboratories are also not eligible to receive awards under this BAA and should not directly submit either white papers or full proposals in response to this BAA. If any such organization is interested in one or more of the programs described herein, the organization should contact the appropriate ONR BRC Topic Chief to discuss its area of interest. As with FFRDCs, these types of federal organizations may team with other responsible sources from academia and industry that are submitting proposals under this BAA.

Teams are encouraged to submit proposals in any and all areas. However, Offerors must be willing to cooperate and exchange software, data and other information in an integrated program with other contractors, as well as with system integrators, selected by ONR.

IV. APPLICATION AND SUBMISSION INFORMATION

1. Application and Submission Process

The proposal submission process is in two phases:

Phase I: White Papers
Phase II: Full Proposals

Phase I: WHITE PAPERS

Prospective awardees are encouraged to submit white papers to minimize the labor and cost associated with the production of detailed full proposals that have very little chance of being selected for funding. Each white paper should state that it is submitted in response to this BAA announcement. White papers shall be submitted directly to the BRC Topic Chief identified in Paragraph Number 7 above. 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. The submitters of White Papers judged to be of "particular value" to the Navy will be so identified in the initial responses provided by ONR and encouraged to submit Full Proposals. The submitter of any White Paper not judged by the ONR reviewers as being of "particular value" to the Navy may still submit a full proposal by the date and time specified in the BAA, but the initial Navy response provided is a useful indicator of likely future project funding under this BAA. Based on an assessment of the white papers, the responsible Research Topic Chief will provide informal feedback notification to the prospective awardees to encourage or discourage them to submit full proposals.

White papers arriving after the deadline may not receive feedback prior to full proposal submission. However, all full proposals submitted under the terms and conditions cited in the BAA will be reviewed.

Due Date: The due date for white papers is no later than 4:00 P.M. (Eastern Time) on Thursday 03 June 2010.

Evaluation/Notification: Initial evaluations of the white papers will be issued on or about 17 June 2010.

2. Content and Format of White Papers –

White Papers submitted under the BAA are expected to be unclassified, and shall be submitted directly to the BRC Topic Chiefs. Proposal submissions will be protected from unauthorized disclosure in accordance with FAR Subpart 15.207, entitled, "Handling Proposals and Information", applicable law, and DOD/DON regulations. Offerors are expected to appropriately mark each page of their submission that contains proprietary information. Grants awarded under this announcement will be unclassified.

IMPORTANT NOTE: Titles given to the White Papers should be descriptive of the work they cover and not be merely a copy of the title of this solicitation.

a. 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
- No more than four (4) single-sided pages (excluding cover page).
- Copies – White papers in either Microsoft® Word or Excel compatible or .PDF format must be submitted on or before the due date and time via e-mail, via the United States Postal Service (USPS), via a commercial carrier or may be hand delivered to the attention of the responsible BRC Topic Chief specified in Section I paragraph number 7.. **NOTE: Do not send White Papers via facsimile, and do not send zip files or password protected files.**

White Paper Content

- **Cover Page:** The Cover Page shall be labeled "WHITE PAPER" and shall include the BAA number, proposed title, technical points of contact, telephone number, facsimile number, and e-mail address.

- **Technical Concept:** A description of the technology innovation and technical risk areas.

- **Future Naval Relevance:** A description of potential naval relevance and contributions of the effort to the agency's specific mission.

- **Cost Estimate:** Cost information is needed, although not at the level of detail as required with the full proposal. White paper submissions shall include a cost summary showing requested funding per year. The cost summary (not to exceed one (1) page shall be segregated by both task and year (over the period of performance (i.e., 1, 2 or 3 years).

b. Phase II: FULL PROPOSALS

Submission of Full Proposals:

The due date for receipt of Full Proposals is 2:00PM (Eastern Time) on 18 July 2010. It is anticipated that final selections for awards will be on or about 04 August 2010. As soon as the final proposal evaluation process is completed, each offeror will be notified vie email or letter of its selection or non-selection for an award.

IMPORTANT NOTE: Titles given to Full Proposals should be descriptive of the work they cover and not be merely a copy of the title of this solicitation.

2. Content and Format of Full Proposals –

Full Proposals submitted under the BAA are expected to be unclassified. Proposal submissions will be protected from unauthorized disclosure in accordance with FAR Subpart 15.207, entitled, "Handling Proposals and Information", applicable law, and DOD/DON regulations. Offerors are expected to appropriately mark each page of their submission that contains proprietary information. Grants awarded under this announcement will be unclassified.

Full Proposal Format – Volume 1 - Technical and Volume 2 - Cost Proposal

• Paper Size – 8.5 x 11 inch paper
• Margins – 1 inch
• Spacing – single-spaced
• Font – Times New Roman, 12 point
• Number of Pages – Volume 1 is limited to no more than twenty-five (25) pages. Limitations within sections of the proposal, if any, are indicated in the individual descriptions shown below. The cover page, proposal checklist, table of contents, resumes and current and pending project and proposal submissions information are excluded from the page limitations. Full Proposals exceeding the page limit may not be evaluated. There are no page limitations to Volume 2.
• Copies – the full proposal should be submitted electronically at http://www.grants.gov/ as delineated in paragraph 5 below.

Volume 1: Technical Proposal

• **Cover Page:** This should include the words "Technical Proposal" and the following:

1) BAA number *XX-XXX*;
2) Title of Proposal;
3) Identity of prime Offeror and complete list of subawards, if applicable;
4) Technical contact (name, address, phone/fax, electronic mail address)
5) Administrative/business contact (name, address, phone/fax, electronic mail address) and;
6) Proposed period of performance (identify both the base period and any options, if included).

• **Table of Contents:** An alphabetical/numerical listing of the sections within the proposal, including corresponding page numbers.

• **Proposal Checklist:** To assist Offerors in the development and submission of their proposals in response to this BAA, a Proposal Checklist for Contracts, Grants, Cooperative Agreements and Other Transactions has been uploaded as an attachment. Offerors should print and complete the checklist to ensure that all required actions have been taken and information included prior to proposal submission. Inclusion of the completed checklist as the first page of your Volume I, Technical Proposal, will assist in proposal evaluation and may shorten the time it takes to make an award.

Technical Approach and Justification: The major portion of the proposal should consist of a clear description of the technical approach being proposed. This discussion should provide the technical foundation/justification for pursuing this particular approach/direction and why one could expect it to enable the objectives of the proposal to be met. Offerors should limit the number of pages for this section to 15 pages.

• **Future Naval Relevance (where applicable):** A description of potential Naval relevance and contributions of the effort to the agency's specific mission.

• **Project Schedule and Milestones:** A summary of the schedule of events and milestones:

• **Reports:**

The following are sample data deliverables that are typically required under a research effort:

Technical and Financial Progress Reports
Final Report

Grants and other agreements do not include the delivery of software, prototypes, and other hardware deliverables.

• **Management Approach:** Identify which personnel and subcontractors/subrecipients (if any) will be involved. Include a description of the facilities that are required for the proposed effort, along with a description of any Government Furnished Equipment/Hardware/ Software/Information required, by version and/or configuration.

• **Current and Pending Project and Proposal Submissions:** Offerors are required to provide information on all current and pending support for ongoing projects and proposals, including subsequent funding in the case of continuing contracts, grants, and other assistance agreements. Offerors shall provide the following information of any related or complementary proposal submissions from whatever sources (e.g., ONR, Federal, State, local or foreign government agencies, public or private foundations, industrial or other commercial organizations).

The information must be provided for all proposals already submitted or submitted concurrently to other possible sponsors, including ONR. Concurrent submission of a proposal to other organizations will not prejudice its review by ONR:

1) Title of Proposal and Summary;
2) Source and amount of funding (annual direct costs; provide contract and/or grant numbers for current contracts/grants);
3) Percentage effort devoted to each project;
4) Identity of prime Offeror and complete list of subcontractors, if applicable;
5) Technical contact (name, address, phone/fax, electronic mail address)
6) Administrative/business contact (name, address, phone/fax, electronic mail address);
7) Period of performance (differentiate basic effort);
8) The proposed project and all other projects or activities requiring a portion of time of the Principal Investigator and other senior personnel must be included, even if they receive no salary support from the project(s);
9) The total award amount for the entire award period covered (including indirect costs) must be shown as well as the number of person-months or labor hours per year to be devoted to the project, regardless of source of support; and
10) State how projects are related to the proposed effort and indicate degree of overlap.

• **Qualifications:** A discussion of the qualifications of the proposed Principal Investigator and any other key personnel. Include resumes for the Principal Investigator and other key personnel and full curricula vitae for Principal Investigators and consultants. The resumes and curricula vitae shall be attached to the proposal and will not count toward the page limitations.

Volume 2: Cost Proposal

The offeror must use the Grants.gov forms from the application package template associated with the BAA on the Grants.gov web site located at http://www.grants.gov/. If options are proposed, the cost proposal must provide the pricing information for the option periods; failure to include the proposed costs for the option periods will result in the options not being included in the award. Assume that performance will start no earlier than 01 September 2010. The cost should be broken down to reflect funding increment periods of:

(1) One month (01 Sep to 30 Sep 10),
(2) Twelve months (01 Oct 10 to 30 Sep 11),
(3) Twelve months (01 Oct 11 to 30 Sep 12),
(4) Twelve months (01 Oct 12 to 30 Sep 13), and
(5) Eleven months (01 Oct 13 to 31 Aug 14).

Note that the budget for each of the budget periods (e.g. 01 September 2010 to 30 September 2010) should include only those costs to be expended during that budget period.

Part 1: The itemized budget must include the following

- Direct Labor – Individual labor categories or persons, with associated labor hours and unburdened direct labor rates. Provide escalation rates for out years.

  Administrative and clerical labor – Salaries of administrative and clerical staff are normally indirect costs (and included in an indirect cost rate). Direct charging of these costs may be appropriate when a major project requires an extensive amount of administrative or clerical support significantly greater than normal and routine levels of support. Budgets proposing direct charging of administrative or clerical salaries must be supported with a budget justification which adequately describes the major project and the administrative and/or clerical work to be performed.

- Fringe Benefits and Indirect Costs (i.e., F&A, Overhead, G&A, etc) – The proposal should show the rates and calculation of the costs for each rate category. If the rates have been approved/negotiated by a Government agency, provide a copy of the memorandum/agreement. If the rates have not been approved/negotiated, provide sufficient detail to enable a determination of allowability, allocability and reasonableness of the allocation bases, and how the rates are calculated. Additional information may be requested, if needed. If composite rates are used, provide the calculations used in deriving the composite rates.
- Travel – The proposed travel cost should include the following for each trip: the purpose of the trip, origin and destination if known, approximate duration, the number of travelers, and the estimated cost per trip must be justified based on the organizations historical average cost per trip or other reasonable basis for

estimation. Such estimates and the resultant costs claimed must conform to the applicable Federal cost principals.

- Subawards – Provide a description of the work to be performed by the subrecipients. For each subaward, a detailed cost proposal is required to be submitted by the subrecipient(s). Fee/profit is unallowable.
- Consultants – Provide a breakdown of the consultant's hours, the hourly rate proposed, any other proposed consultant costs, a copy of the signed Consulting Agreement or other documentation supporting the proposed consultant rate/cost, and a copy of the consultant's proposed statement of work if it is not already separately identified in the prime contractor's proposal.
- Materials & Supplies – Provide an itemized list of all proposed materials and supplies including quantities, unit prices, proposed vendors (if known), and the basis for the estimate (e.g., quotes, prior purchases, catalog price lists).
- Recipient Acquired Equipment or Facilities – Equipment and/or facilities are normally furnished by the Recipient. If acquisition of equipment and/or facilities is proposed, a justification for the purchase of the items must be provided. Provide an itemized list of all equipment and/or facilities costs and the basis for the estimate (e.g., quotes, prior purchases, catalog price lists). Allowable items normally would be limited to research equipment not already available for the project. General purpose equipment (i.e., equipment not used exclusively for research, scientific or other technical activities, such as personal computers, office equipment and furnishings, etc.) should not be requested unless they will be used primarily or exclusively for the project. For computer/laptop purchases and other general purpose equipment, if proposed, include a statement indicating how each item of equipment will be integrated into the program or used as an integral part of the research effort.
- Other Direct Costs – Provide an itemized list of all other proposed other direct costs such as Graduate Assistant tuition, laboratory fees, report and publication costs, and the basis for the estimate (e.g., quotes, prior purchases, catalog price lists).
- Fee/Profit – Fee/profit is unallowable.

Part 2: Cost breakdown by Government fiscal year and task/sub-task corresponding to the same task breakdown in the proposed Statement of Work. When options are contemplated, options must be separately identified and priced by task/subtask.

3. Significant Dates and Times –

Anticipated Schedule of Events		
Event	Date	Time (EASTERN TIME)
FY10 White Papers Due Date	03 June 2010	4:00 PM
Notification of Initial Navy Evaluations of FY10 White Papers	17 June 2010*	
Full FY10 Proposal Due Date	18 July 2010	2:00 PM
Notification of Selection for FY10 Award	04 August 2010*	
Issued FY10 Awards	01 Sep, 2010*	

*These dates are estimates as of the date of this announcement.

NOTE: Due to changes in security procedures since September 11, 2001, the time required for hard-copy written materials to be received at the Office of Naval Research has increased. Materials submitted through the U.S. Postal Service, for example, may take seven days or more to be received, even when sent by Express Mail. Thus any hard-copy proposal should be submitted long enough before the deadline established in the solicitation so that it will not be received late and thus be ineligible for award consideration.

4. Submission of Late Proposals (Applicable to White Papers and Full Proposals)

Any proposal, modification, or revision, that is received at the designated Government office after the exact time specified for receipt of proposals is "late" and will not be considered unless it is received before award is made, the contracting officer determines that accepting the late proposal would not unduly delay the acquisition and

(a) If it was transmitted through an electronic commerce method authorized by the announcement, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals; or

(b) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of proposals and was under the Government's control prior to the time set for receipt of proposals; or

(c) It was the only proposal received.

However, a late modification of an otherwise timely and successful proposal, that makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

Acceptable evidence to establish the time or receipt at the Government installation includes the time/date stamp of that installation on the proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at the Government office designated for receipt of proposals by the exact time specified in the announcement, and urgent Government requirements preclude amendment of the announcement closing date, the time specified for receipt of proposals will be deemed to be extend to the same time of day specified in the announcement on the first work day on which normal Government processes resume.

The contracting officer must promptly notify any offeror if its proposal, modifications, or revision was received late and must inform the offeror whether its proposal will be considered.

5. Submission of Grant Proposals through Grants.gov

The offeror must use the Grants.gov forms from the application package template associated with the BAA on the Grants.gov web site located at http://www.grants.gov/. To be considered for award, Applicants must fill out Block 4 of the SF 424 R&R as follows: Block 4a, Federal Identifier, for new awards enter N00014, Block 4b, Agency Routing Number, enter the three (3) digit Program Office Code (i.e., 331) and, if known, the Program Officer's name, last name first, in brackets (i.e., [Shifler, David]). Applicants who fail to provide a Department code identifier may receive a notice that their proposal will be rejected.

Detailed instructions entitled “Grants.gov Electronic Application and Submission Information” on how to submit a grant proposal through Grants.gov may be found at the ONR website listed under the ‘Acquisition Deparment – Contracts & Grants Submitting a Proposal” link at: http://www.onr.navy.mil/Contracts-Grants/submit-proposal/contracts-proposal/cost-proposal.aspx.

By completing Block 17, the Grant Applicant is providing the certification on lobbying required by 32 CFR Part 28. Refer to Section VI, “Award Administration Information” entitled “Certifications” for further information.

For electronic submission of grant full proposals, several one-time actions must be completed in order to submit an application through Grants.gov. These include obtaining a Dun and Bradstreet Data Universal Numbering System (DUNS) number, registering with the Central Contract Registration (CCR), registering with the credential provider, and registering with Grants.gov. See http://www.grants.gov, specifically http://www.grants.gov/GetStarted.

Use the Grants.gov organization Registration Checklist at http://www.grants.gov/applicants/register_your_organziation.jsp which will provide guidance through the process. Designating an E-Business Point of Contact (EBiz POC) and obtaining a special password called “MPIN” are important steps in the CCR registration process. Applicants who are not registered with CCR and Grant.gov should allow at least 21 days to complete these requirements. The process should be started as soon as possible. Any questions relating to the registration process, system requirement, how an application form works, or the submittal process **must** be directed to Grants.gov at 1-800-518-4726 or support@grants.gov.

Special Notices Relative to Grant Applications to be Submitted Through Grants.gov

All attachments to grant applications submitted through Grants.gov must be in Adobe Portable Document Format (i.e., .pdf files). Proposals with attachments submitted in word processing, spreadsheet, or any format other than Adobe Portable Document Format will not be considered for award.

After a full proposal is submitted through Grants.gov, the Authorized Organization Representative (AOR) will receive a series of three e-mails. It is extremely important that the AOR watch for and save each of the e-mails. You will know that your proposal has reached ONR when the AOR receives e-mail Number 3. You will need the Submission Receipt Number (e-mail Number 1) to track a submission. The three emails are:

Number 1 – The applicant will receive a confirmation page upon completing the submission to Grants.gov.

Number 2 - After proposals are uploaded to Grants.gov, the applicant receives an e-mail indicating the proposal has been submitted and that Grants.gov will take up to two days to validate the proposal. Grants.gov may reject the proposal during the validation process. Therefore, applicants who have registered with Grants.gov are urged to submit their proposals electronically **at least three days before the date and time proposals are due** so that it will not be received late and be ineligible for award consideration. Such early submission will allow a proposer time to submit its proposal to ONR through an alternative electronic method in the event the proposal is not validated (i.e., accepted) by Grants.gov after two days. See the special notice on alternate submission below.

Number 3 – The third notice is an acknowledgment of receipt in e-mail form from ONR within ten days from the proposal due date. The e-mail is sent to the authorized representative for the

institution. The email for proposals notes that the proposal has been received and provides the assigned tracking number.

Special Notice for Waiver:

Process to Obtain a Waiver from the Use of Grant.gov for Submission of Full Grant Proposals: If a prospective grantee is unable to comply with the requirement to use Grants.gov "APPLY" for submission of a grant application under this BAA or finds it would be an excessive burden to comply with this requirement, a waiver request may be submitted not less than 30 calendar days prior to the closing date for receipt of Full Proposals. Such request should be submitted by the Electronic Business Point of Contact listed in the CCR for the organization and should contain the Organization/Individual's name, address, telephone number, and email address. The request should state the reason for the request in sufficient detail so a decision can be made. The Waiver Request should be submitted to the ONR Acquisition Department point of contact or Grants Officer listed in the BAA. Such request can be sent by registered mail or email. The "postmark" stamp on the envelope of the time annotated on the email will be used to determine timeliness of the request. A decision and response will be issued within 14 calendar days of receipt of the request by ONR. Foreign Grantees who are not registered in CCR may request a waiver on that basis since CCR registration is integral to the Grants.gov application process.

Special Notice on Alternate Submission

The following alternative to submitting proposals to the Grants.gov website is provided for use under this BAA. Proposals using the alternative submission process will be accepted only if Grants.gov is not accepting the proposal and the offeror has called the Grants.gov helpline and received a case ticket number. If Grants.gov has not within two days by return e-mail validated your proposal submission, call Grants.gov (1-800-518-4726) to obtain a case ticket number. An e-mail from Grants.gov indicating rejection of the grant proposal will not be accepted in place of a Grants.gov case ticket number.

a. Upload the proposal using the form on the following website:
http://onroutside.onr.navy.mil/aspprocessor/BAAPE/.

b. Use this form to upload your grant proposal directly to the Office of Naval Research. All fields in the form are required to be completed, including the assigned Grants.gov case ticket number. Your completed package should also include a signed, scanned proposal cover sheet with the signature of your authorized organizational representative as part of the 'Attachments Form'. Submit one file per proposal in PDF format. **DO NOT submit any parts of the proposal separately. Technical proposals, endorsements, etc. should be on the Grant.gov ATTACHMENTS form.**

c. Use the naming convention below for all uploaded proposals.
*Convention: (ONRBAA09-XXX_Topic_LeadPI-University.pdf)
*Example: ONRBAA09-012_NOPP-MSMITH-UNIVRESEARCH.PDF

d. Once a document has been submitted, a "Thank You" page will appear and an e-mail will be sent to the address provided. If you do not receive an e-mail confirmation, your file has not been properly received. You should immediately contact the business point of contact listed in the BAA or the ONR Grants BAA Administrator.

V. EVALUATION INFORMATION

1. Evaluation Criteria –

Award decisions will be based on a competitive selection of proposals resulting from a scientific and cost review. Evaluations will be conducted 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, 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 (PI), team leader and key personnel who are critical in achieving the proposal objectives; and
5) The realism of the proposed costs and availability of funds.

Overall, the Technical Factors (Factors 1 – 4 above) are more important than the Cost Factor (Factor 5), with the Technical Factors all being of equal value.

The degree of importance of cost will increase with the degree of equality of the proposals in relation to the other factors on which selection is to be based, or when the cost is so significantly high as to diminish the value of the proposal's technical superiority to the Government.

2. Evaluation –

Technical and cost proposals submitted under this BAA will be protected from unauthorized disclosure in accordance with FAR 3.104-4 and 15.207. The cognizant Program Officer and other Government scientific experts will perform the evaluation of technical 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, proposal selection and award decisions are solely the responsibility of Government personnel. Each support contractor's employee 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 proposal submissions.

VI. AWARD ADMINISTRATION INFORMATION

1. Administrative Requirements –

- The North American Industry Classification System (NAICS) code – The North American Industry Classification System (NAICS) code for this announcement is "541712" with a small business size standard of "500 employees".

- Central Contractor Registry (CCR) - Successful Offerors not already registered in the CCR will be required to register in CCR prior to award of any grant. Information on CCR registration is available at http://www.bpn.gov/ccr.default.aspx.

Certifications - Grants:

Grant awards greater than $100,000 require a certification of compliance with a national policy mandate concerning lobbying. Grant applicants shall provide this certification by electronic submission of SF424 (R&R) as a part of the electronic proposal submitted via Grants.gov (complete Block 17). The following certification applies to each applicant seeking federal assistance funds exceeding $100,000:

CERTIFICATION REGARDING LOBBYING ACTIVITIES

(1) No Federal appropriated funds have been paid or will be paid by or on behalf of the applicant, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the Federal contract, grant, loan, or cooperative agreement, the applicant shall complete and submit Standard Form-LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.

(3) The applicant shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, title 31, U.S.C. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Grants not through Grants.gov:

Proposers seeking grants who have received Grants.gov waiver approval for awards greater than $100,000 shall complete and submit electronic representations and certifications at the Contracts and Grants Section of the ONR Home Page at http://www.onr.navy.mil/en/Contracts-Grants/submit-proposal/grants-proposal.aspx.

VII. OTHER INFORMATION

1. Government Property/Government Furnished Equipment (GFE) and Facilities

Government research facilities and operational military units are available and should be considered as potential government-furnished equipment/facilities. These facilities and

resources are of high value and some are in constant demand by multiple programs. It is unlikely that all facilities would be used for any one specific program. The use of these facilities and resources will be negotiated as the program unfolds. Offerors should explain as part of their proposals which of these facilities are critical for the project's success.

2. Security Classification

Reserved

3. Use of Animals and Human Subjects in Research

If animals are to be utilized in the research effort proposed, the Offeror must complete a DOD Animal Use Protocol with supporting documentation (copies of AALAC accreditation and/or NIH assurance, IACUC approval, research literature database searches, and the two most recent USDA inspection reports) prior to award. For assistance with submission of animal research related documentation, contact the ONR Animal/Human Use Administrator at (703) 696-4046.

Similarly, for any proposal for research involving human subjects the Offeror must submit prior to award: documentation of approval from an Institutional Review Board (IRB); IRB-approved research protocol; IRB-approved informed consent form; proof of completed human research training (e.g., training certificate or institutional verification of training); an application for a DoD Navy Addendum to the Offeror's DHHS-issued Federalwide Assurance (FWA) or the Offeror's DoD Navy Addendum number. In the event that an exemption criterion under 32 CFR.219.101 (b) is claimed, provide documentation of the determination by the Institutional Review Board (IRB) Chair, IRB vice Chair, designated IRB administrator or official of the human research protection program. Information about assurance applications and forms can be obtained by contacting ONR_343_contact@navy.mil. If the research is determined by the IRB to be greater than minimal risk, the Offeror also must provide the name and contact information for the independent medical monitor. [Note: for research involving human subjects that is greater than minimal risk, administrative procedures to protect human subjects from medical expenses (not otherwise provided or reimbursed) that are the direct result of participation in a research project must be addressed. Additional supporting documentation may be requested. For additional information on this topic, email ONR_343_contact@navy.mil.] For assistance with submission of human subject research related documentation, contact the ONR Animal/Human Use Administrator at (703) 696-4046.

For contracts and orders, the award and execution of the contract, order or modification to an existing contract or order serves as notification from the Contracting Officer to the Contractor that the HRPO has approved the assurance as appropriate for the research under the Statement of Work and also that the HRPO has reviewed the protocol and accepted the IRB approval or exemption determination for compliance with the DoD Component policies. See, DFARs 252.235-7004.

4. Recombinant DNA

Proposals which call for experiments using recombinant DNA must include documentation of compliance with Department of Human and Health Services (DHHS) recombinant DNA regulations, approval of the Institutional Biosafety Committee (IBC) and copies of the DHHS Approval of the IBC letter.

5. Department of Defense High Performance Computing Program

The DoD High Performance Computing Program (HPCMP) furnishes the DoD S & T and RDT & E communities with use-access to very powerful high performance computing systems. Awardees of ONR contracts, grants, and other assistance instruments may be eligible to use HPCMP assets in support of their funded activities if ONR Program Officer approval is obtained and if security/screening requirements are favorably completed. Additional information and an application may be found at http://www.hpcmo.hpc.mil/.

6. Organizational Conflict of Interest

Reserved

7. Project Meetings and Reviews

Individual program reviews between the ONR sponsor and the performer may be held as necessary. Program status reviews may also be held to provide a forum for reviews of the latest results from experiments and any other incremental progress towards the major demonstrations. These meetings will be held at various sites throughout the country. For costing purposes, offerors should assume that 40% of these meetings will be at or near ONR, Arlington VA and 60% at other contractor or government facilities. Interim meetings are likely, but these will be accomplished via video telephone conferences, telephone conferences, or via web-based collaboration tools.

8. Other Guidance, Instructions, and Information

Reserved.