



The purpose of this amendment is to change and clarify the language found on page 19, Section B. a. - White Paper Content - Curriculum Vitae, within part IV Application and Submission Information. This amendment 0001 hereby replaces all previous postings of N00014-16-S-BA10 in its entirety.

Broad Agency Announcement for the Office of Naval Research (ONR) Navy and Marine Corps FY2017 Basic Research Challenge (BRC) Program

INTRODUCTION:

This publication constitutes a Broad Agency Announcement (BAA) as contemplated in Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016, the Department of Defense Grants and Agreements regulations (DoDGARS) 22.315(a) and DoD's Other Transaction Guide for Prototypes Projects, USD(AT&L), OT Guide, Jan 2001. A formal Request for Proposals (RFP), solicitation, and/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 select for award and fund all, some, or none of the proposals in response to this announcement. 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 submitted under this BAA as sensitive competitive information and to disclose their contents only for the purposes of evaluation.

This BAA is intended for proposals related to basic research projects. Proposals that do not meet the criteria specified by this document will not be reviewed. Awards will take the form of contracts, grants, and cooperative agreements, as appropriate.

All grant proposals are to be submitted through Grants.gov; offerors should include responses to the Representations indicated in Section VII, K of this BAA and located at <http://www.onr.navy.mil/en/Contracts-Grants/submit-proposal/grants-proposal.aspx>

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I. GENERAL INFORMATION

A. Agency Name

Office of Naval Research
One Liberty Center
875 N. Randolph Street
Arlington, VA 22203-1995

B. Research Opportunity Title

Broad Agency Announcement (BAA) for the Office of Naval Research's (ONR) Navy and Marine Corps FY2017 Basic Research Challenge (BRC) Program

C. Program Name

ONR Basic Research Challenge Program

D. Research Opportunity Number

N00014-16-S-BA10

E. Response Date

White Papers: 3 June 2016 (Friday) 11:59 Eastern Daylight Time

Full Proposals: 12 August 2016 (Friday) 11:59 Eastern Daylight Time

F. Research Opportunity Description

The Office of Naval Research (ONR) is interested in receiving proposals for basic research relating to the following topic areas:

- [Topic 1](#) Establishing a Multiscale Theory for Cavitation in Complex Soft Materials
- [Topic 2](#) Understanding the Phase-Resolved Bottom-Side IONosphere (BSION)
- [Topic 3](#) Decentralized Perception in Data-Rich Dynamic Environments
- [Topic 4](#) A Scientific Basis for Enhanced Manufacturability with Electrical Currents
- [Topic 5](#) Distributed Sensing, Actuation and Control in Soft Materials for Flexible Appendages
- [Topic 6](#) Predictive and Causal Modeling - Bridging the Gap
- [Topic 7](#) New Opportunities to Transform Wall-bounded Turbulence Understanding

ONR Basic Research Challenge Topic 1

Establishing a Multiscale Theory for Cavitation in Complex Soft Materials

Background: Cavitation is a highly unsteady, nonlinear, multiscale phenomenon capable of generating high, transient, localized pressures. Traditional cavitation research has focused on bubble dynamics and subsequent damage to marine structures associated with underwater explosions and cavitation in propulsion systems. In recent years, interdisciplinary research reaching across fluid dynamics, solid mechanics and materials science has enabled the development of sophisticated engineering models for predicting cavitation erosion to metallic surfaces. However, these models do not immediately translate to cavitation in or near softer materials, such as soft biological tissues (in- and ex-vivo), polymeric coatings, biofouling, composites, 3D printed scaffolds and synthetic biological materials. The current understanding of soft matter mechanics at the rates at which cavitation occurs is limited by the complex nature of the rheology, thermodynamics and, for biological tissue, by the variety and intricacy of the physiology. The microstructure gives rise to nonlinear viscoelastic, anisotropic, rate- and temperature-dependent properties at macroscopic scales. These notions are supported by the few early studies of cavitation in soft media with elastic moduli < 1 MPa performed in the context of therapeutic ultrasound, which indicate that bubble dynamics and the potential for damage strongly depend on the material's properties, and that observed stresses and heating are increased in complex soft media. However, few systematic studies of cavitation in soft matter have been conducted, so that little is known about this phenomenon.

Objective: The purpose is to establish and validate a multiscale theory for cavitation and damage mechanisms in complex, soft materials, starting from homogeneous, isotropic gels to multilayered substrata and nonlinear, rate-dependent polymers. The theory would be used to develop a fundamentally new, in-situ materials characterization technique capable of characterizing a vast class of complex soft materials across several orders of strain rate, strain, temperature and stress. This effort is specifically intended to produce experimentally validated physics-based models rather than phenomenologically descriptive data for specific complex soft materials. Physical phenomena in soft matter occur across many scales of length (nm to m), time (nano-sec to hours), and functionality (biochemistry). Therefore, the theoretical framework must be multiscale. Preference will be given to work addressing sub-centimeter scales. This effort is not intended to address mechanisms of nucleation (i.e., how cavitation bubbles form).

Research Concentration Areas: Suggested research areas include: (1) comprehensive understanding of cavitation dynamics in complex soft materials; (2) experimentally validated multiscale theoretical framework to predict cavitation dynamics in complex soft materials; and (3) a novel experimental technique for characterizing the material properties of soft materials at extreme rates. These outcomes pave the way to select and design material systems to control, enhance or mitigate cavitation dynamics in current and future DoD-related soft material applications. A major advantage of the cavitation-based material characterization technique is its ability to simultaneously determine the material properties across various strains, strain rates, and stress amplitudes by utilizing the recorded full-field information, and exploiting the nonlinear nature of the cavitation-induced material deformation fields.

Anticipated Resources: The Cavitation BRC is a four-year \$6M (\$1.5M per year) research effort, which is intended to fund two, or possibly three, research proposals. Though individual investigators may apply, multi-disciplinary teams, combining modelers and experimentalists, are preferred. Maximum team budget may not exceed \$1M per year and total for the two or three successful proposals cannot exceed the \$1.5M per year cap.

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ONR Basic Research Challenge Topic 2

Understanding the Phase-Resolved Bottom-Side IONosphere (BSION)

Background: The current state of the art in operational space weather effects modeling is the Global Assimilation of Ionospheric Measurements (GAIM) system, developed by Utah State University and collaborators from a previous ONR-managed basic research effort Multidisciplinary University Research Initiatives (MURI) program starting in 1998, which transitioned to DoD operations in 2006. This model is now in widespread operational and research use and is supported by several government agencies including a common community research code version (NASA), an operational analysis version (Air Force) serving multiple Federal agencies, and other research implementations in Navy, NSF, NOAA, and the academic community. The GAIM is significantly better at capturing real-time variability than previous approaches; however, it is best at specifying the coarse resolution (5° latitudinal by 15° longitudinal), vertically integrated electron density profile (Total Electron Content or TEC) at mid-latitudes and does not address Equatorial and Polar processes critical to Naval research and operations. While it does estimate the plasma density vertical profile and advective transport along and across magnetic field lines, these processes are represented in a fairly rudimentary, although a computationally efficient method. While quite successful, the GAIM system approach has inherently limited utility for emerging research thrusts and unmet/future DoD needs.

Objective: This topic addresses the ability to understand and predict regional bottom-side ionosphere (BSI) variability, especially in the Equatorial and Polar Regions that are relatively under studied. By the end of the BRC expected outcomes include a fully coupled integrated tropospheric, stratospheric and ionospheric modeling suite that can be used for high fidelity simulations of observed plasma field conditions including phase-resolved BSI variability on scales of minutes to hours and Travelling Ionospheric Disturbances (TIDs) traversing the field of regard of ground-based imagers. In addition to this prototype modeling suite the component models will be redesigned for computational efficiency on a DoD high performance computer (HPC) and a hybrid ensemble-variational data assimilation package will be developed to better integrate field campaign observations and laboratory simulations.

Research Concentration Areas: This Basic Research Challenge seeks to integrate several enabling capabilities into a Whole Atmosphere Model from the surface to 350 km to provide a seamless full-physics pathway for realistically understanding the neutral upper atmosphere and ionosphere, with explicit coupling between the Cartesian/sigma-z coordinate lower atmosphere and the magnetic field line/z-coordinate thermosphere, that will enable a new era in geospace research.

Furthermore, new computational approaches are anticipated that will enable massively parallel high performance computing techniques while still retaining the relevant physical, dynamical, and chemical processes involved in plasma generation, structural evolution, transport, and decay in the ionosphere.

Anticipated Resources: It is anticipated that individual investigator awards under this topic will be no more than an average of \$150K per year for 2-3 years with a follow-on option of 12-18 months from a total budget of \$6M over four years.

Research Topic Chief:

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ONR Basic Research Challenge Topic 3 **Decentralized Perception in Data-Rich Dynamic Environments**

Background: Perception, or understanding the environment, is one of the most important and challenging aspects of autonomous agents. It is a complex process that involves processing mission-relevant data, reasoning with low-level data and high-level knowledge, determining what additional information is needed to reduce uncertainty, and planning how to actively obtain that information. Proliferation of affordable embedded sensors in an increasingly large number of devices, the advent of both traditional networked systems and cloud computing, and the emergence of the Internet of Things (IoT) and perhaps a future Battlefield IoT now provide agents access to large volumes of heterogeneous data in real-time, creating the opportunity for radical advances in perception. The challenge remains of how to effectively process this data and redirect actively controlled sensing resources to provide timely information in the form of models and classifications. Since single agents are unlikely to have the computing power to handle such data and are unable to provide the necessary coverage, we will have to use a team of agents, which also provide multiple points of view, thereby potentially improving the situational awareness. But, these advantages can only be realized if the data processing and planning can be coordinated across the team to obtain a more accurate and coherent understanding of the environment. This coordination is difficult in ideal settings because of the computational requirements of the sophisticated models that must be employed, and even harder in contested communication environments that limit the ability of agents to share information, models, and decisions.

Objective: The goal of this topic is to develop the underlying science and tractable computational methods that enable flexible and resilient approaches to learning, sharing, reasoning, and exploiting representations of the mission intent for situational awareness by a team of agents within a rigorous closed-loop framework. Advances in surveillance technology create large volumes of increasingly complex and unbounded data streams. The challenge for the Navy is to derive intelligence from such massive, distributed, and diverse data. This requires developing computational methods that model dependencies within and between data streams, cope with noisy and incomplete data, integrate multiple data modalities, and provide correct uncertainty measures.

Research Concentration Areas: Suggested research areas include: (1) Task-aware Perception including learning distributed and shared representations of complex structures and representations of the environment from diverse heterogeneous sources of data in a network of agents for which much of the data is typically irrelevant to the task, (2) Asynchronous Decentralized Planning for distributed stochastic planning that accounts for substantial uncertainty of the environment, constraints, and agents that don't all have the same information at the same time, and (3) Unified Frameworks for perception and planning/decision-making that address what perceptual information is most important for making effective decisions and plans in a way that is robust and efficient and acquires the most general and powerful representations. Also, is consider how resilient teams of heterogeneous agents that can exploit information from a broad range of global networks when available while being neither dependent nor vulnerable to interactions with those networks.

Anticipated Resources: It is anticipated that 2-4 awards under this topic will be no more than an average of \$500K per year for four years for a program total of \$6M.

Research Topic Chiefs:

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ONR Basic Research Challenge Topic 4

A Scientific Basis for Enhanced Manufacturability with Electrical Currents

Background: A desirable feature of metals is ductility – the ability to undergo significant plastic deformation before fracture. The genesis of that plastic flow is attributed primarily to the movement of dislocations. In the early 1960's Soviet metallurgists found that when applying short bursts of high density electrical current to a metal undergoing deformation there is a significant decrease in the flow stress and an improvement in ductility. Most of the ensuing studies by the Soviets involved experiments on the influence of current pulses of $\sim 100 \text{ A/mm}^2$ for ~ 50 microsecond duration (to minimize internal Joule heating) on mechanical properties of metals. Based on those experiments they provided an explanation that ran counter to the then-established fact that the electrons of a metal exert a viscous drag on dislocations, retarding their motion and consequently the ease with which a metal deforms under an applied stress. The Soviet explanation invoked a direct interaction of drift electrons with the dislocations providing an "electron wind" that facilitates dislocation motion by pushing them. This concept is now called the electroplastic effect, and while is championed by technologists in the DoD-relevant area of metalworking there has been limited research into the fundamental understanding of electroplasticity (EP).

The high energy cost of traditional ceramics processing, including hot isostatic pressing and sintering, has driven the development of new energy-efficient methods. This includes field assisted sintering technology (FAST) where an applied field enhances the sintering process. These fields can be of different types: electromagnetic radiation as in microwaves and electrical fields applied in various waveforms through electrodes in contact with a green body. Flash sintering (FS) is new and distinguishes itself from other FAST techniques in its unusually short time scale of few seconds and significantly lower sintering temperature (40 – 50% less than the typical

temperature of 1500 °C). Despite the successful demonstration of FS, it remains poorly understood. Because of some similarities (application of fields and currents) to other FAST techniques, like spark plasma sintering, the unique phenomena involved in FS have either not been recognized or have been misinterpreted by the scientific community. For instance, the highly non-linear I-V behavior at the on-set of the flash process has been attributed to thermal run-off following the Joule heating of the green body, while *in-situ* synchrotron measurements performed during the flash process have recently excluded Joule heating and potential grain boundary melting as possible mechanisms for FS. Associated with the non-linear I-V characteristics of FS there is also anomalous lattice expansion, beyond the scale induced by any thermal effects, which has been observed for both oxide (yttria-stabilized zirconia, BaTiO₃) and non-oxide (B₄C) ceramics. Macroscopic descriptions of the above FS-related phenomena exist, but micro- or nano-scale quantitative descriptions do not exist. So far the attempts to develop a comprehensive theory for flash sintering have been limited to mere suggestions and brief outlines of plausible mechanisms, including field-driven thermodynamics and sintering kinetics and field-induced defect generation and migration to grain boundaries.

Objective: The goal of this BRC is to provide a scientific foundation for the use of electric currents in materials manufacturing. To achieve that goal we will pursue the following three objectives: (1) Understanding field (current)/matter interactions under processing conditions. Intense electric and magnetic fields are known to influence greatly many classes of materials; in this BRC we are assessing the interaction of charge carriers moving in an electric field (drift electrons in metals and electrons and/or holes in ceramics) and how those carriers interact with a metal under applied stress or a ceramic being sintered. (2) Providing theories and software for science and engineering. Plasticity theories and continuum models will be used where needed but the major advance to be made in this BRC involves the use of first principle techniques, e.g., atomistic studies of dislocation dynamics (EP) and unit cell transformations in FS. Typical quantum-based dynamics studies with density functional theory are based on the Born-Oppenheimer approximation, in which there is a separation of electron and nuclear motions. This is less rigorous than coupled electron dynamics methods, sometimes called Ehrenfest dynamics or more commonly non-adiabatic quantum dynamics where the required algorithms are only now being developed. (3) Develop rules/guidelines for materials engineers to use in manufacturing settings. Additionally, data being generated could be mined and used to generate predictive models using machine learning methods. From this a set of rules and guidelines concerning what EP-assisted dislocation motions on as-yet un-synthesized alloys can be used by engineers and technologists to guide their selection of materials for a given task.

Research Concentration Areas: This program will provide a comprehensive scientific basis along with predictive modelling tools and a set of rules/guidelines related to electrically assisted materials manufacturing of alloys and ceramics. The materials to be examined for the EP component of this BRC will begin with simple metals and alloys but move progressively towards aluminum alloys used extensively in current shipbuilding and titanium alloys needed for future ships; both alloys are relevant to newly funded ONR programs on the topic of light weight metals. The materials to be examined by the sintering component of this BRC constitute an important group of materials with ultra-high melting point and hardness and low density (e.g., B₄C), desirable for many Navy applications. Major examples include forming ceramic-based VIS-IR transparent windows needed for DDG-1000 and Virginia-Class submarines. Scientific advances in

these two areas are expected to enable new techniques and materials in traditional and additive manufacturing for critical naval technologies.

Anticipated Resources: This BRC will fund two research teams; one will focus on electroplasticity and the other on flash sintering. It is anticipated that the awards under this topic will be no more than \$750K per team per year for four years with a total of \$3M for each team. White papers and proposals should have a well-defined focus on either electroplasticity or flash sintering, and any area where the physics of the two phenomena may overlap should be clearly indicated. A single team can submit two white papers covering both topics.

Research Topic Chiefs:

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ONR Basic Research Challenge Topic 5

Distributed Sensing, Actuation and Control in Soft Materials for Flexible Appendages

Background: New soft materials have been developed which could impact robotics and there have been early attempts to embed sensors and flexible electronics into these materials. Advances in additive manufacturing enable new research and realization of innovative bio-inspired designs using multifunctional materials. Current research has focused on narrow aspects of this problem and has not attempted a synthesis of biology, materials, control and sensing research. For example, several investigators have developed fluidic stretch and force sensors in small channels within hyper-elastic materials. Other investigators have explored a variety of muscle-like actuation materials, or focused on fabrication of novel soft materials such as pre-strained elastomers that relieve contractile stresses upon pressurization by pneumatic or hydraulic means to produce the desired movements. Indeed, several laboratory prototype robotic crawlers or grippers have been built using homogeneous foam materials pneumatically actuated by off-board air pumps. However, self-contained actuation systems (embedded within the soft material) would be much more desirable for autonomous systems and allow a greater degree of local adaptation. Biological soft tissues involve arrays of fibers embedded in a supporting matrix, and elastic skins which have a critical role in generating, transmitting and redistributing the forces. Flexible, controlled structures are ubiquitous in the natural world, such as the arms and tentacles of octopus, squid, jellyfish, and the mantles of cephalopods in the marine environment and elephant trunks in the terrestrial domain. These appendages have remarkable motor and manipulation capabilities, and they exhibit distributed sensing and control. Although researchers have done some limited demonstrations of the control of soft structures, this has typically been done either through ad hoc scripting or by doing kinematic rather than dynamic control. The fundamental principles and theory for the control of soft robotics and even the modeling of such systems dynamic interactions with the geometry of their environments are still not well understood.

Objective: The objective is to obtain a fundamental understanding of the role played by distributed sensing, dynamics and control in soft biological structures and appendages to enable a principled approach to the modeling and design of bio-inspired flexible structures and appendages. This

research could help provide a fundamental understanding of the role of dynamics and control in hyperelastic continua. The research would provide bio-inspired design principles for soft multifunctional materials and revolutionary new robotic capabilities. The technology which might emerge from this basic research could impact a number of DoD relevant problems including advances in propulsion and control for underwater and aerial vehicles that are efficient, stealthy and highly maneuverable, bio-inspired wings, bodies and control surfaces for vehicles, vehicles that can reversibly adhere to hulls, vehicles and arms that can change shape to enter narrow passages, manipulation for explosive ordinance disposal, compliant robots and arms for less hazardous operation close to humans, ability to survive contact with obstacles or falls, improved compliant sensing surfaces for dexterous manipulation and prosthetic hands, soft wearable exoskeletons for diver augmentation and advances in additive manufacturing.

Research Concentration Areas: The new research areas that will achieve this objective consist of multidisciplinary research that addresses (1) Distributed architectures that exploit biological strategies, including local sensing, feedback control, and muscle-like actuators, in order to achieve motion primitives. (2) Comparative analysis of how biological design principles of soft multifunctional materials respond to the challenges of different habitats, niches and mobility and predation strategies. (3) Novel fabrication of appendages using multifunctional materials based on soft biological designs like muscular hydrostats in aquatic, terrestrial, and/or aerial environments. (4) A control theoretic abstraction of the neuromechanics that leverages the intrinsic dynamics of an infinite dimensional system and can take into account the complex physical interactions of the system with the geometry and dynamics of its environment. (5) Extending the performance capabilities of materials using novel designs in order to distribute the sensing and controls between morphology and sensor processing. Small interdisciplinary teams that include biologists, material scientists and sensing and control scientists are encouraged to focus on a particular appendage for functional bio-inspiration.

Anticipated Resources: It is anticipated that 2-4 awards under this topic will be no more than an average of \$500K per year for four years for a program total of \$6M.

Research Topic Chiefs:

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ONR Basic Research Challenge Topic 6 **Predictive and Causal Modeling – Bridging the Gap**

Background: Recently, significant progress has been made in developing accurate predictive models. Unfortunately, most of those models, such as deep learning (DL) networks, are black-box approaches. For example, when a DL network makes a wrong prediction, it is almost impossible to decipher why it happened and to modify elements (e.g. parameters) that are responsible for the wrong prediction. Most importantly, DL and machine learning (ML) models in general have little explanatory power. On the other hand, substantial progress has also been made in the area of causal modeling. One of the main challenges in that domain is how to distinguish between correlational and causal dependences. The standard approach is to use various forms of

randomized experiments, which has been very successful in many fields such as medicine (e.g., for determining effects of various drugs). However, it turns out that causal methods have little predictive power. For example, it took decades to finally determine that smoking causes cancer but none of the causal methods can predict whether a specific person who smoked for x years will develop cancer. Despite the fact that prediction and causation can be viewed as two sides of the same coin, research communities that studied the two did not and still do not interact much. While predictive modeling has been mostly studied by computer scientists, the causal modeling has been mostly studied by statisticians. As a consequence, the two groups have been historically using different “languages” and different modeling tools.

Objective: The main objective of this topic is to develop a theory that is both predictive and explanatory. In contrast to existing ML algorithms, which are mostly based on heuristics and ad-hoc solutions, the objective is to build a principled theory. In contrast to existing causal models, which often use very simplistic and unrealistic assumptions, the new theory should be able to capture complex dependences. The success will be evaluated by running the models on ground-truth data. Therefore, one of the goals of this topic is to design experiments for model evaluation, and identify or generate new ground-truth datasets.

Research Concentration Areas: This topic will require close collaboration among different fields such as computer science, statistics, engineering, applied math, economics, social, and cognitive sciences. Suggested research areas include but are not restricted to: (1) *Bridging the methodology gap*. The first challenge of this topic is to evaluate specific techniques from each field and to determine their usefulness for the other field. Can successful ML tools be extended to causal analysis? Under what conditions can parameters or features in ML models be interpretable? (2) *Combining learning and intervention*. ML has developed numerous learning algorithms while causal research has focused mostly on estimating causal dependences. Is it possible to learn causal dependences as opposed to estimating them? Recent results from cognitive sciences suggest that this is possible and humans are a good existence proof. Humans learn and draw causal inferences through actions, which can be related to “interventions” in standard causal theory. Can ML move from “observational” to “interventional” learning? Note that the concept of interventional learning is different than the concept of active learning. (3) *Big data and computational power*. While DL clearly benefited from more (training) data and more computational power, causal modeling was not as much affected by these new developments. Indeed, finding causal relations in big networks is much more difficult compared to small networks. How can we bring big data to causal modeling? Given the large amounts of data available, it is appealing to explore the benefits of natural experiments. Although they resemble random experiments, they are quite different since we don’t have control over data generation. Can ML be used to make a bridge between natural and random experiments?

Anticipated Resources: It is anticipated that awards under this topic will be no more than an average of \$1.5M per year for four years for a total of \$6M.

Research Topic Chief:

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ONR Basic Research Challenge Topic 7

New Opportunities to Transform Wall-bounded Turbulence Understanding

Background: More than a century has elapsed since Prandtl first described the boundary layer around a body immersed in a flowing fluid, and the intervening century has revealed that this flow is important to a remarkably wide range of disciplines and applications. Under most practical conditions, boundary layer flow is turbulent possessing structure that informs existing physical and computational models of turbulence. Over the years, the research focus has been, perhaps disproportionately, on low Reynolds numbers and idealized conditions. These conditions are poor proxies for real naval platforms where the Reynolds number is very large and the boundary layer grows on rough, curved surfaces with regions of increasing and/or decreasing pressure. The consequence is that existing descriptions and models of wall-bounded turbulence have limited ranges of applicability and poor predictive ability which renders them of limited utility to engineering design practice.

Objective: This topic seeks to build a consistent description for the structure of wall-bounded turbulence across a wide range of realistic and dynamically complicated flow fields. The bulk of boundary layer research has focused on flows along smooth flat plates with uniform freestream conditions, an extraordinarily rare state to find in practice. Knowing the structure of turbulence in this case is useful as a baseline, but relevant boundary layer flows experience departures from equilibrium such as surface roughness or curvature, freestream pressure gradients, wind gusts, and near-surface wave-induced forcing on undersea vehicles. This topic will address questions related to the change in the structure of boundary layer turbulence when the flow experiences departures from its basic equilibrium condition. Specifically, it will address how these influences change, for example, the existing structure of the boundary layer turbulence; how the production mechanisms for turbulence change; how interactions in the structure are modified; and how traditional scaling arguments change.

Research Concentration Areas: Ever improving fluid dynamics modeling and simulation tools are in constant demand in the naval sea and aviation communities. The topic will support research efforts exploring the underlying structure of boundary layer turbulence in non-equilibrium boundary layers. It will accomplish these efforts by supporting novel analytical approaches drawn from dynamical systems theory, high fidelity simulations, and sophisticated experiments deploying new sensing capabilities. The topic supports research efforts that develop a robust model of wall turbulence structure that captures changes in the structure as flow boundary conditions change, analytically establishes a link between coherent turbulence in the flow field and the mean quantities of interest to the engineering design community, allows for an *a priori* evaluation of turbulence control strategies, and provides predictive turbulence modeling strategies for Reynolds-averaged computational fluid dynamics.

Anticipated Resources: : It is anticipated that 2-4 awards under this topic will be no more than an average of \$500K per year for four years for a program total of \$6M.

Research Topic Chiefs:

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G. Point(s) of Contact (POC)

Questions of a Technical nature should be submitted to:

The ONR Research Topic Chief whose program / topic area best matches the offeror's field of interest.

Questions of a Business nature, and suggestions for improvement should be submitted to:

Mr. David Broadwell
Grant Management Specialist
Code 255
Office of Naval Research
875 North Randolph Street
Arlington VA 22203-1995
david.broadwell@navy.mil

Comments or questions shall be submitted via email and should not be classified.

Amendments to this BAA will be posted to one or more of the following web pages:

Grants.gov Webpage: <http://www.grants.gov/>

ONR Broad Agency Announcement (BAA) Webpage:

<http://www.onr.navy.mil/en/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx>

H. Instrument Type

Awards may take the form of contracts, grants, and cooperative agreements, as appropriate.

For information on the substantial involvement ONR expects to have in cooperative agreements, prospective offerors should contact the Technical Point of Contact identified in Part I, Section G, of this BAA.

Any contract award resulting from this BAA will incorporate the most current FAR, DFARS, NMCARS and ONR clauses.

Any assistance instrument awarded under this announcement will be governed by the award terms and conditions that conform to DoD's implementation of OMB circulars applicable to financial assistance. Terms and conditions of new awards made after December 26, 2014, may include revisions to reflect DoD implementation of new OMB guidance in 2 CFR Part 200, "Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards."

Examples of model contracts and grants can be found on the ONR website at the following link: <http://www.onr.navy.mil/Contracts-Grants/submit-proposal/grants-proposal.aspx>

I. Catalog of Federal Domestic Assistance (CFDA) Numbers

12.300 Office of Naval Research (ONR)

J. Catalog of Federal Domestic Assistance (CFDA) Titles

Basic and Applied Scientific Research (ONR)

K. Other Information

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 (Acquisition, Technology and Logistics) Memorandum of 24 May 2010.

As defined therein, the definition of “contracted fundamental research,” in a DoD grant or contractual context, includes research performed under grants and contracts that are funded by Research, Development, Test and Evaluation Budget Activity 1 (Basic Research), whether performed by universities or industry. The research shall not be considered fundamental in those rare and exceptional circumstances where the applied research effort presents a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense, and where agreement on restrictions have been recorded in the contract or grant.

Normally, fundamental research is awarded under grants with universities and under contracts with industry. Non-fundamental research is normally awarded under contracts and may require restrictions during the conduct of the research and DoD pre-publication review of such research results due to subject matter sensitivity. Potential offerors should consult with Technical POC to determine whether the proposed effort would constitute basic research, applied research or advanced research.

FAR Part 35 restricts the use of Broad Agency Announcements (BAAs), such as this, to the acquisition of basic and applied research and that portion of advanced technology development not related to the development of a specific system or hardware procurement. Contracts and grants and other assistance agreements made under BAAs 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

A. Funding Amount and Period of Performance

ONR intends to award approximately \$42 million under this BAA competition over the life of this Basic Research Challenge. The funded amount and period of performance of each proposal selected for award may vary depending on the research topic area and the technical approach to be pursued by the offeror selected.

B. Peer Reviews

In the case of proposals funded as basic research, ONR may utilize peer reviewers from academia, industry, and Government agencies to assist in the periodic appraisal of performance under the awards, as outlined in ONR Instruction 3966.1A. Such periodic program reviews monitor the cost, schedule and technical performance of funded basic research efforts. The reviews are used in part to determine which basic research projects will receive continued ONR funding. Peer reviewers who are not U.S. Government employees must sign nondisclosure agreements before receiving full or partial copies of proposals and reports submitted by the basic research performers. Offerors may include travel costs for the Principal Investigator (PI) to attend the peer review.

III. ELIGIBILITY INFORMATION

- A.** 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, due to the impracticality of reserving discrete or severable items of this research for exclusive competition among such entities.
- B.** 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 Offerors are allowed so long as such arrangements are permitted under the sponsoring agreement between the Government and the specific FFRDC.
- C.** 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 an appropriate ONR Technical POC to discuss its area of interest. The various scientific divisions of ONR are identified at <http://www.onr.navy.mil/>. 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.

- D. University Affiliated Research Centers (UARCs) are eligible to submit proposals under this BAA unless precluded from doing so by their Department of Defense UARC contract.
- E. Teams are also encouraged and may 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.
- F. Offerors should be aware of recent changes in export control laws. Offerors are responsible for ensuring compliance with all International Traffic in Arms Regulation (ITAR)(22 CFR §120 et. seq.) requirements, as applicable. In some cases, developmental items funded by the Department of Defense are now included on the United States Munition List (USML) and are therefore subject to ITAR jurisdiction. Offerors should address in their proposals whether ITAR restrictions apply or do not apply, such as in the case when research products would have both civil and military application, to the work they are proposing to perform for ONR. The USML is available online at <http://www.ecfr.gov/cgi-bin/text-idx?node=pt22.1.121> Additional information regarding the President's Export Control Reform Initiative can be found at <http://export.gov/ecr/index.asp>
- G. Cost sharing is not expected and will not be used as a factor during the merit review of any proposal hereunder. However, the Government may consider voluntary cost sharing if proposed.

IV. APPLICATION AND SUBMISSION INFORMATION

A. Application and Submission Process

White Papers: The due date for white papers is no later than 11:59 PM (EDT) on Friday, 3 June 2016. White papers are mandatory and should be submitted by email to the attention of the Technical POC relating to the topic area of interest. If an Offeror does not submit a white paper before the specified due date and time, it is not eligible to participate in the remaining full proposal submission process and is not eligible for funding. Each white paper should state that it is submitted in response to this BAA and cite the particular sub-section of the Research Opportunity Description that the white paper is primarily addressing.

White Paper Evaluation/Notification: Navy evaluations of the white papers will be issued via email notification on or about Friday, 8 July 2016. An expanded oral presentation will be subsequently requested, if needed, from those Offerors whose proposed technologies have been identified as being of “particular value” to the Navy. However, any such request does not assure a subsequent award. Any Offeror whose white paper technology was not identified as being of “particular value” to the Navy is ineligible to make an oral presentation or to submit a full proposal under this BAA.

Full Proposals: The due date for receipt of Full Proposals is 11:59 PM (EDT) on Friday, 12 August 2016. It is anticipated that final selections will be made within four weeks after full

proposal submission. As soon as the final full proposal evaluation process is completed, PI's will be notified via email of their project's selection or non-selection. Full proposals received after the published due date and time will not be considered.

B. Content and Format of White Papers/Full Proposals

White papers and full proposals submitted under this BAA shall be unclassified basic research. White papers and full proposal submissions will be protected from unauthorized disclosure in accordance with applicable laws and DoD regulations. **No classified proposals shall be submitted.**

Do not put proprietary data or markings in or on the Statement of Work. For proposals containing data that the offeror does not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, the contractor shall mark the title page with the following legend:

“This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed--in whole or in part--for any purpose other than to evaluate the proposal. If, however, a contract is awarded to this offeror as a result of--or in connection with-- the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in (insert numbers or other identification of sheets).”

Also, mark each sheet of data that the offeror wishes to restrict with the following legend:

“Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal.”

IMPORTANT NOTE: Titles given to the White Papers/Full Proposals should be descriptive of the work they cover and should 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 spaced
- Font – Times New Roman, 12 point
- Page limit – 5 pages single-sided including the Cover Page but not including the curriculum vitae. Consult Technical POC with any questions.

White Paper Submission

The subject line of the email shall read “N00014-16-S-BA10 White Paper Submission”. The white paper must be a Microsoft Word 2007 compatible, or PDF format attachment to the email. There is an email size limit of 5MB per email.

NOTE: Do not send:

- 1) Hardcopies of White Papers (including Facsimiles);**
- 2) ZIP files; and**
- 3) Password protected files.**

White Paper Content

- Cover Page: The Cover Page shall be labeled “WHITE PAPER” and shall include the BAA Number N00014-16-S-BA10, proposed title, technical points of contact, telephone number, facsimile number, and e-mail address.
- Summary: A one paragraph Summary of the proposed effort.
- Technical Concept (2 Page Maximum): A description of the technology innovation and technical risk areas. The project idea, technical rationale, and approach should identify a problem(s), make arguments to substantiate the claims made, and describe the proposed approach to address the issue. The Offeror’s capacities should be discussed as they relate to the achieving success in the project. The project should address the research announcement criteria stated in Section I.F.
- Future Naval Relevance (One-half Page Maximum): A description of potential Naval relevance and contributions of the effort to the agency’s specific mission.
- Rough Order of Magnitude (ROM) (One-half Page Maximum): White Paper submissions shall include a rough order of magnitude cost showing requested funding per year, total cost, and suggests spending priorities to satisfy Section I.F. Break requested cost down into categories of salaries and benefits, equipment, materials and supplies, travel, cost associated with student participation (tuition and fees) and indirect costs.
- Curriculum Vitae: One (2 page) curriculum vitae of the Principal Investigator and a brief description (not to exceed 1/2 page each) of the qualifications of each co-investigator.

b. Full Proposals

NOTE: If page limits are not specified, then consult with your cognizant technical POC.

i. INSTRUCTIONS FOR CONTRACT, COOPERATIVE AGREEMENTS AND OTHER TRANSACTION AGREEMENTS (Does not include Grants)

Proposal Package:

The following five documents with attachments comprise a complete proposal package:

- (1) Proposal Checklist (pdf)
- (2) Technical Proposal Template (Word)
- (3) Cost Proposal Spreadsheet (Excel)
- (4) Adequacy Checklist for Pre Award Audit (SF 1408) (as applicable)
- (5) Stand-alone non-proprietary Statement of Work (SOW) in Word Format

NOTE: The electronic file name for all documents submitted under this BAA must not exceed 68 characters in length, including the file name extension.

Items 1- 5 above are located at: <http://www.onr.navy.mil/Contracts-Grants/submit-proposal/contracts-proposal/>. All have instructions imbedded into them that will assist in completing the documents. Also, both the Proposal Checklist and the Cost Proposal Spreadsheet require completion of cost-related information. Please note that attachments can be incorporated into the Proposal Checklist.

Offerors responding to this BAA must submit a separate list of all technical data or computer software that will be furnished to the Government with other than unlimited rights. The Government will assume unlimited rights if offerors fail to identify any intellectual property restrictions in their proposals. Include in this section all proprietary claims to results, prototypes, and/or deliverables. If no restrictions are intended, then the offeror should state "NONE."

For proposals below the simplified acquisition threshold (less than or equal to \$150K), the Technical Proposal Template and Proposal Checklist documents, and the Cost Proposal Spreadsheet are required. In addition, if a purchase order will be awarded, the effort will be fixed price. Purchase orders can also contain options, as long as the total amount of the base and all options does not exceed \$150K.

The format requirements for attachments are as follows:

- Paper Size - 8.5 x 11 inch paper
- Margins - 1 inch
- Spacing - single or double spaced
- Font - Times New Roman, 12 point

For proposed subcontracts or interorganizational transfers over \$150,000, Offerors must provide a separate fully completed Cost Proposal Spreadsheet in support of the proposed

costs. This spreadsheet, along with supporting documentation, must be provided either in a sealed envelope with the prime's proposal or via e-mail directly to both the Program Officer and the Business Point of Contact at the same time the prime proposal is submitted. The e-mail should identify the proposal title, the prime Offeror and that the attached proposal is a subcontract, and should include a description of the effort to be performed by the subcontractor.

Offerors should submit an appropriate number of hard copies as discussed with the cognizant Program Officer of their proposal package. The electronic copy should be submitted in a secure, pdf-compatible format, except for the electronic file of the Cost Proposal Spreadsheet which must be submitted in a Microsoft Excel 2007 compatible format and the Statement of Work Template which must be submitted in Microsoft Word format. All attachments should be submitted in a secure, pdf-compatible format.

The secure pdf-compatible format is intended to prevent unauthorized editing of the proposal prior to any award. A password should not be required for opening the proposal document, but the Government must have the ability to print and copy text, images, and other content. Should an Offeror amend its proposal, the amended proposal should be submitted following the same hard and electronic copy guidance applicable to the original proposal.

Any proposed options that are identified in the Technical Proposal Template or Proposal Checklist documents, but are not fully priced out in the Cost Proposal Spreadsheet, will not be included in any resulting contract, cooperative agreement, or other transaction. If proposing options, they must be separately priced and separate spreadsheets should be provided for the base period and each option. In addition to providing summary by period of performance (base and any options), the Contractor is also responsible for providing a breakdown of cost for each task identified in the Statement of Work. The sum of all costs by task worksheets MUST equal the total cost summary.

The electronic submission of the Excel spreadsheet should be in a "useable condition" to aid the Government with its evaluation. The term "useable condition" indicates that the spreadsheet should visibly include and separately identify within each appropriate cell any and all inputs, formulas, calculations, etc. The Offeror should not provide "value only spreadsheets" similar to a hard copy.

Fixed Fees on ONR Contracts: The Government Objective is set in accordance with the DFARS 215.404-71. See the below table for range and normal values:

Contract Risk Factor	Contract Type	Assigned Value (Normal range)	Normal Value
Technical (1)		3% - 7% (2)	5%
Management/Cost Control (1)		3% - 7% (2)	5%
Contract Type Risk	Firm Fixed Price	2% - 6% (3)	3% - 5% (4)
Contract Type Risk	Cost Plus Fixed Fee	0% - 1% (2)	0.5%

(1) Assign a weight (percentage) to each element according to its input to the total performance risk. The total of the two weights equal 100%

(2) Assign a weighting score relative to the Risk Factor.

(3) Depends on the specific Contract Type (With/without financing, performance-based payments, and/or progress payments).

(4) Depends on the specific Contract Type.

Technology Incentive (TI) is rarely utilized at ONR, because the contracts issued by ONR typically are not eligible for TI (See DFARS 215.404-71-2(c) (2)). Any consideration of TI requires strong and convincing justification in the proposal, which are then subject to negotiation and determination of a fair and reasonable fee, within the context of the specific award.

Typically the range of fee is 5% to 7.5% on an ONR awarded contract.

For submission instructions, see Part IV, Section F. [Submission of White Papers and Full Proposals for Contracts, Cooperative Agreements, and Other Transaction Agreements.](#)

ii. INSTRUCTIONS FOR GRANTS (Does not include contracts, cooperative agreements and other transaction agreements)

The following information must be completed as follows in the SF 424 located on <http://www.grants.gov> 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, last name first, in brackets (e.g., 332 [Smith, John]).

Block 4c, Previous Grants.gov Tracking ID: Enter the Grants.gov tracking number of the previous proposal submission if this submission is for a Changed/Corrected Application; otherwise, leave blank.

Applicants who fail to provide a Program Officer Code identifier may receive a notice that their proposal is rejected.

Attach the technical proposal in Grants.gov: download the application package.

> click on "Research and Related Other Project information"

> click on "Move form to Submission List"

> click on "Open Form"

You will see a new PDF document titled "Research & Related Other Project Information"

Block 7, Project Summary/Abstract: > click on "Add attachment" and attach the project summary/abstract. (You will not be able to type in the box, therefore, save the file you want to attach as Project Summary or Abstract that should be marked Approved for Public Release). Abstracts of all funded research projects will be posted on a TBD website that will be open to the public. **Do not** include proprietary or confidential information. Use only characters available on a standard QWERTY keyboard. Spell out all Greek letters, other non-English letters and symbols. Graphics are not allowed and there is a 500 character limit.

Block 8, Project Narrative: > click on attachment and attach the technical proposal. (Save the file as Volume I- Technical Proposal since you will not be able to type in the box).

Full Proposal Format - Volume 1: Technical Proposal, 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
- Page limit – There are no page limitations

The full proposal should be submitted electronically at <http://www.grants.gov/> as delineated in paragraph 5 below.

NOTE: The electronic file name for all documents submitted under this BAA must not exceed 68 characters in length, including the file name extension.

Volume 1: Technical Proposal

Cover Page: This should include the words “Technical Proposal” and the following:

- 1) BAA Number: N00014-16-S-BA10
- 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.

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 would expect it to enable the objectives of the proposal to be met.

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

Operational Naval Concept (where applicable): A description of the project objectives, the concept of operation for the new capabilities to be delivered, and the expected operational performance improvements.

Operational Utility Assessment Plan (where applicable): 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 summary of the schedule of events and milestones:

Reports: The following are sample reports that are typically required under a research effort:

- Technical and Financial Progress Reports
- Annual Program Review
- Final Report

Grants 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 subwards, 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 or curricula vitae for the Principal Investigator, other key personnel and consultants. The resumes/curricula vitae shall be attached to the proposal.

Volume 2: Cost Proposal

The offeror must use the Grants.gov forms (including the Standard Form (SF) Research and Related (R&R) Budget Form) 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 three (3) months after the date the cost proposal is submitted.

A separate Adobe .pdf document should be included in the application that provides appropriate justification and/or supporting documentation for each element of cost proposed.

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 (F&A, Overhead, G&A, etc.): The proposal must 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 must 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. Offerors may include travel costs for the Principal Investigator to attend the peer reviews described in Section II of this BAA.

Subawards/Subcontracts: Provide a description of the work to be performed by the subrecipient/subcontractor. For each subaward, a detailed cost proposal is required to be submitted by the subrecipient(s). A proposal and supporting documentation must be received and reviewed before the Government can complete its cost analysis of the proposal and enter negotiations. ONR's preferred method of receiving subcontract information is for this information to be included with the Prime's proposal. However, a subcontractor's cost proposal can be provided in a sealed envelope with the recipient's cost proposal or via e-mail directly to the Program Officer at the same time the prime proposal is submitted. The e-mail should identify the proposal title, the prime Offeror and that the attached proposal is a subcontract. Fee/profit guidance for subawards/subcontracts: Fee/Profit is unallowable under assistance agreements at either the prime or subaward level but may be permitted on any subcontracts issued by the prime awardee.

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, 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 are 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, laptops, office equipment) 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 under assistance agreements at either the prime or subaward level but may be permitted on subcontracts issued by the prime awardee.

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.

For submission instructions, see Part IV, Section E. [Submission of Grant Proposals through Grants.gov](http://www.Grants.gov)

C. Significant Dates and Times

Schedule of Events		
Event	Date	Time
White Papers Due	3 June 2016 (Friday)	11:59 PM Eastern Daylight Time
Evaluation of White Papers and Notification to Submit Full Proposals	8 July 2016 (Friday)	
Questions Regarding Full Proposals*	25 July 2016 (Monday)	11:59 PM Eastern Daylight Time
Full Proposals Due	12 August 2016 (Friday)	11:59 PM Eastern Daylight Time
Notification of Selection for Award	16 September 2016 (Friday)**	
Start Date of Grant	2 January 2017 (Monday)**	
Start Date of Contract	2 May 2017 (Monday)**	

* Questions submitted after the Q&A deadline may not be answered. The due date for submission of the white paper and/or full proposal will not be extended.

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

D. Submission of Late Proposals

The Government reserves the right to not review proposals submitted after 12 August 2016 (Friday) 11:59 Eastern Daylight Time.

E. Submission of Grant Proposals through Grants.gov

Detailed instructions entitled “Grants.Gov Electronic Application and Submission Information” on how to submit a Grant proposal through Grants.gov are under the Contracts and Grants — Submitting Proposals section of the ONR website at <http://www.onr.navy.mil/Contracts-Grants/submit-proposal/grants-proposal/grants-gov.aspx>.

White Papers must NOT be submitted through the Grants.gov application process. White paper submissions should be e-mailed directly to the appropriate ONR Program Officer/Program Manager. White paper format requirements are found in Part IV, Section B.(a) above.

For electronic submission of full proposals for grants, there are several one-time actions that 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 System for Award Management (SAM), registering with the credential provider, and registering with Grants.gov. See www.grants.gov, specifically <http://www.grants.gov/web/grants/support.html>. Click on Grants.gov Online User Guide.

Use the Grants.gov Organization Registration Checklist which can be found at:

<http://www.grants.gov/web/grants/applicants/organization-registration.html>

This document will provide guidance through the process. Designating an E-Business Point of Contact (E-Biz POC) and obtaining a special password called ‘MPIN’ are important steps in the SAM registration process. Applicants who are not registered with SAM.gov and Grants.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 requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 (1-606-545-5035 for foreign applicants) 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. Proposals with attachments submitted in word processing, spreadsheet, or any format other than Adobe Portable Document Format will not be considered for award.

Proposal Receipt Notices: 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 e-mails are:

Number 1 – The applicant will receive a confirmation page upon completing the submission to Grants.gov. This confirmation page is a record of the time and date stamp that is used to determine whether the proposal was submitted.

Number 2 – The applicant will receive an e-mail indicating that the proposal has been validated by Grants.gov within two days of submission (This means that all of the required fields have been completed). After an institution submits an application, Grants.gov generates a submission receipt via email and also sets the application status to “Received.” This receipt verifies the Application has been successfully delivered to the Grants.gov system. Next, Grants.gov verifies the submission is valid by ensuring it does not contain viruses, the opportunity is still open, and the applicant login and applicant DUNS number match. If the submission is valid, Grants.gov generates a submission validation receipt via email and sets the application status to “Validated.” If the application is not validated, the application status is set to "Rejected." The system sends a rejection email notification to the institution, and the institution must resubmit the application package. Applicants can track the status of their application by logging in to Grants.gov.

Number 3 – The third notice is an acknowledgment of receipt in e-mail form from ONR within ten days from the proposal due date, if applicable. The e-mail is sent to the authorized representative for the institution. The e-mail for proposals notes that the proposal has been received and provides the assigned tracking number.

F. Submission of Full Proposals for Contracts, Cooperative Agreements, and Other Transaction Agreements.

Full Proposals for Contracts, Cooperative Agreements, and Other Transaction Agreements shall be sent to the Office of Naval Research at the following address:

Office of Naval Research
Attn*: _____
ONR Department Code**: _____
875 North Randolph Street
Arlington, VA 22203-1995

**Cognizant ONR Program Officer/Point of Contact (POC)*

***Cognizant ONR POC's Code*

V. EVALUATION INFORMATION

A. Evaluation Criteria

Awards under this BAA will be made to Offerors on the basis of the evaluation criteria listed below, and program balance to provide overall value to the Government. The Government reserves the right to request any additional, necessary documentation after the

decision to award is made. The Government reserves the right to remove Offerors from award consideration should the parties fail to reach agreement on award terms, conditions, and cost/price within a reasonable time, or the Offeror fails to timely provide requested additional information.

The primary basis for selecting proposals for acceptance will be technical importance to agency programs, and fund availability. Cost realism and reasonableness will also be considered. The following criteria, all being of equal value, will be used for the technical evaluation:

- 1) Overall scientific and technical merits of the proposal and responsiveness to the topic.
- 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.

The ultimate recommendation for award of proposals is made by ONR's scientific/technical community. Recommended proposals will be forwarded to the ONR Contracts and Grant Awards Management office. Any notification received from ONR that indicates that the Offeror's full proposal has been recommended does not ultimately guarantee an award will be made. This notice indicates that the proposal has been selected in accordance with the evaluation criteria above and has been sent to the contracting department to conduct cost analysis, determine the offeror's responsibility, and to take other relevant steps necessary prior to commencing negotiations with the offeror.

Industry-Government Partnering – ONR encourages partnering among industry and Government with a view toward speeding the incorporation of new science and technology into fielded systems.

B. Commitment to Small Business

The Office of Naval Research is strongly committed to providing meaningful subcontracting opportunities for small businesses, small disadvantaged businesses (SDBs), woman-owned small businesses (WOSBs), historically underutilized business zone (HUBZone) small businesses, veteran-owned small business (VOSBs), service disabled veteran-owned small businesses (SDVOSBs), historically black colleges and universities, and minority institutions, and other concerns subject to socioeconomic considerations through its awards.

Businesses unfamiliar with doing business with the government and that require assistance may contact the state-specific Department of Defense (DoD) Procurement Technical Assistance Center (PTAC). DoD PTACs serve as a resource for businesses pursuing and performing under contracts with DoD, other federal agencies, state and local governments and

with government prime contractors. Assistance provided by the PTACs is usually free of charge. PTAC support includes registration in systems such as SAM, identification of contract opportunities, understanding requirements and preparing and submitting proposals. The PTACs have a presence in each state, Puerto Rico and Guam. To locate a local PTAC visit: <http://www.dla.mil/SmallBusiness/Pages/ProcurementTechnicalAssistanceCenters.aspx> or <http://www.aptac-us.org/new/>.

1) Subcontracting Plan -

For proposed contract awards exceeding \$700,000, large businesses and non-profits (including educational institutions) shall provide a Subcontracting Plan (hereafter known as ‘the Plan’) that contains all elements required by FAR Subpart 19.704, FAR 52.219-9 and as supplemented by DFARS 252.219-7003.

NOTE: Small businesses are exempt from this requirement.

The Plan must be submitted as an attachment to the “Proposal Checklist” and will not be included in the page count. If a company has a Master Subcontracting Plan, as described in FAR 19.701 or a Comprehensive Subcontracting Plan, as described in DFARS 219.702, a copy of the Plan shall also be submitted as an attachment to the “Proposal Checklist”.

Plans will be reviewed for adequacy, ensuring that the required information, goals, and assurances are included. FAR 19.702 requires the apparent successful offeror to submit an acceptable Plan. If the apparent successful offeror fails to negotiate a Plan acceptable to the contracting officer within the time limit prescribed by the contracting officer, the offeror will be ineligible for award.

Offerors shall propose a plan that ensures small businesses (inclusive of SDBs, WOSBs, HUBZone, VOSBs and SDVOSBs) will have the maximum practicable opportunity to participate in contract performance consistent with efficient performance.

As a baseline, Offerors shall, to the best extent possible, propose realistic goals to ensure small business participation in accordance with the current or most recent fiscal year subcontracting goals found on the DoD Office of Small Business Program website at: <http://www.acq.osd.mil/osbp/>. If proposed goals are below the statutory requirements, then the offeror shall include in the Plan a viable written explanation as to why small businesses are unable to be utilized and what attempts were taken to ensure that small business were given the opportunity to participate in the effort to the maximum extent practicable.

2) Small Business Participation Statement -

If subcontracting opportunities exist, all prime Offerors shall submit a Small Business Participation Statement regardless of size in accordance with DFARS 215.304 when receiving

a contract for more than the simplified acquisition threshold (i.e., \$150,000). All offerors shall provide a statement of the extent of the offeror's commitment in providing meaningful subcontracting opportunities for small businesses and other concerns subject to socioeconomic considerations through its awards and must agree that small businesses, VOSBs, SDVOSBs, HUBZones, SDBs, and WOSBs concerns will have the maximum practicable opportunity to participate in contract performance consistent with efficient performance.

This assertion will be reviewed to ensure that it supports this policy by providing meaningful subcontracting opportunities. The statement should be submitted as an attachment to the "Proposal Checklist" and will not be included in the page count.

3) Subcontracting Resources -

Subcontracting to a prime contractor can be a good way to participate in the contracting process. The following is a list of potential resources that may assist in locating potential subcontracting partners/opportunities:

- * Companies Participating in DoD Subcontracting Program Report
- * DAU Small Business Community of Practice (SB COP)
- * DefenseLink \geq \$7.0 M Award Notices
- * DoD OSBP Prime Contractors and Subcontractors with Subcontracting Plans
- * Dynamic Small Business Search
- * Electronic Subcontracting Reporting System (eSRS)
- * Federal Business Opportunities (FEDBIZOPPS)
- * Navy SBIR/STTR Search – Website or Brochure
- * DoD Procurement Technical Assistance Centers (PTAC)
- * Small Business Administration (SBA) Subcontracting Opportunities Directory
- * SBA Subnet

For a description and associated websites visit the ONR Office of Small Business webpage at:

<http://www.onr.navy.mil/Contracts-Grants/small-business.aspx>.

In accordance with FAR Subpart 5.206, the following entities may transmit a notice to a

Government Point of Entry (GPE) to seek competition for subcontracts, to increase participation by qualified small businesses, VOSBs, SDVOSBs, HUBZones, SDBs, and WOSBs, and to meet established subcontracting plan goal as follows:

- (a) A contractor awarded a contract exceeding \$150,000 that is likely to result in the award of any subcontracts;
- (b) A subcontractor or supplier, at any tier, under a contract exceeding \$150,000, that has a subcontracting opportunity exceeding \$15,000.

The notices must describe— (a) The business opportunity;

- (b) Any prequalification requirements; and
- (c) Where to obtain technical data needed to respond to the requirement.

An example of a GPE is the SBA SUB-Net which is a place in which prime contractors may post solicitations or sources sought notices for small business. The SUB-Net database provides a listing of subcontracting solicitations and opportunities posted by large prime contractors and other non-federal agencies.

C. Options

The Government will evaluate options for award purposes by adding the total cost for all options to the total cost for the basic requirement. Evaluation of options will not obligate the Government to exercise the options during contract performance.

D. Evaluation Panel

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. Restrictive notices notwithstanding, one or more support contractors may be utilized as subject-matter-expert technical consultants. 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.

E. General Information Regarding the Review and Selection Process for Grants

- i) Prior to making an award with total amount of Federal share greater than the simplified acquisition threshold, ONR shall review and consider any information about the applicant that is in the designated integrity and performance system accessible through SAM (currently FAPIIS).
- ii) The applicant, at its option, may review information in the designated integrity and performance systems accessible through SAM and comment on any information about itself that a Federal awarding agency previously entered and is currently in the designated integrity and performance system accessible through SAM.
- iii) ONR will consider any comments by the applicant, in addition to the other information in the designated integrity and performance system, in making a judgment about the applicant's integrity, business ethics, and record of performance under Federal awards when completing the review of risk posed by the applicant as described in Title 2, Part 200, Subsection 200.205 Federal awarding agency review of risk posed by applicants.

VI. AWARD ADMINISTRATION INFORMATION

A. Administrative Requirements

System for Award Management (SAM): All Offerors submitting proposals or applications must:

- 1) be registered in the SAM prior to submission;
- 2) maintain an active SAM registration with current information at all times during which it has an active Federal award or an application under consideration by any agency; and
- 3) provide its DUNS number in each application or proposal it submits to the agency.

SAM may be accessed at <https://www.sam.gov/portal/SAM/>

NOTE TO FORMER CCR REGISTRANTS: If you had an active record in CCR, you have an active record in SAM. You do not need to do anything in SAM at this time, unless a change in your business circumstances requires a change in SAM in order for you to be paid or to receive an award. SAM will send notifications to the registered user via email 60, 30, and 15 days prior to expiration of the record. You can search for registered entities in SAM by typing the DUNS number or business name into the search box.

North American Industry Classification System (NAICS) code: The NAICS code for this announcement is _____ with a small business size standard of _____. (*Applies to contracts only.*)

B. Reporting

In general, for each grant award, annual reports and a final report are required to summarize the technical progress and accomplishments during the performance period, as well as any other report requested by the program area Research Topic Chief.

C. Access to your Grant, Cooperative Agreement, Other Transaction and Contract Award

Office of Naval Research (ONR) award/modification documents are only available via the Department of Defense (DoD) Electronic Document Access System (EDA) within the WideArea WorkFlow e-Business Suite (<https://wawf.eb.mil/>).

Unless otherwise specified by the Offeror, notifications for the posting of award and modification documents to EDA will be directed to both the Technical Point of Contact and the Business Point of Contact identified in the Offeror's proposal.

EDA is a Web-based system that provides secure online access, storage and retrieval of awards and modifications to DoD employees and vendors.

If you do not currently have access to EDA, you may complete a self-registration request as a "Vendor" via <https://wawf.eb.mil/> following the steps below:

- 1) Click "Accept"
- 2) Click "Register" (top right)
- 3) Click "Agree"
- 4) In the "What type of user are you?" drop down, select "Vendor"
- 5) Select the systems you would like to access (iRAPT at a minimum)
- 6) Complete the User Profile and follow the site instructions

Allow five business days for your registration to be processed. EDA will notify you by email when your account is approved.

To access awards after your registration has been approved, log into <https://wawf.eb.mil/>, select "EDA", select either EDA location, Select "Contracts", select your search preference, enter the Contract Number (or, if applicable, enter the Grant Number in the Contract Number field), and select "View".

Registration questions may be directed to the EDA help desk toll free at 866-618-5988, commercial at 801-605-7095, or via email at disa.ogden.esd.mbx.cscassig@mail.mil (Subject: EDA Assistance).

VII. OTHER INFORMATION

A. Applies to Grant, Cooperative Agreement and Other Transaction Agreement applications only:

i. Federal Funding Accountability and Transparency Act of 2006:

The Federal Funding Accountability and Transparency Act of 2006 (Public Law 109-282), as amended by Section 6202 of Public Law 110-252, requires that all agencies establish requirements for recipients reporting information on subawards and executive total compensation as codified in 2 CFR Part 170. Any company, non-profit agency or university that applies for financial assistance (either grants, cooperative agreements or other transaction agreements) as either a prime or sub-recipient under this BAA must provide information in its proposal that describes the necessary processes and systems in place to comply with the reporting requirements identified in 2 CFR Part 170 Appendix A. Entities are required to meet reporting requirements unless an exception or exemption applies. Please refer to 2 CFR Part 170, including Appendix A, for a detailed explanation of the requirements, exceptions, and exemptions.

ii. Military Recruiting on Campus (DoDGARS Part 22.520):

This applies to domestic U. S. colleges and universities. Appropriate language from

32 CFR 22.520, Campus access for military recruiting and Reserve Officer Training Corps (ROTC), will be incorporated in all university grant awards.

iii. Certification regarding Restrictions on Lobbying:

Grant and Cooperative Agreement awards greater than \$100,000, as well as OTAs not under Section 845, 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](https://www.grants.gov) (complete Block 17). The following certification applies likewise to each Cooperative Agreement and normal OTA applicant seeking federal assistance funds exceeding \$100,000:

- (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.

iv. Representation Regarding an Unpaid Delinquent Tax Liability or a Felony Conviction Under any Federal Law - DOD Appropriations:

All grant applicants are required to complete the "Representation on Tax Delinquency and Felony Conviction" found at <http://www.onr.navy.mil/Contracts-Grants/submit-proposal/grants-proposal.aspx> by checking the "I agree" box in block 17 and attaching the representation to block 18. of the SF424 (R&R) as part of the electronic proposal submitted via Grants.gov. The representation reads as follows:

(1) The applicant represents that it ____ is not ____ a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

(2) The applicant represents that it ____ is not ____ a corporation that was convicted of a felony criminal violation under any Federal law within the preceding 24 months.
NOTE: If an applicant responds in the affirmative to either of the above representations, the applicant is ineligible to receive an award unless the agency suspension and debarment official (SDO) has considered suspension or debarment and determined that further action is not required to protect the Government's interests. The applicant therefore should provide information about its tax liability or conviction to the agency's SDO as soon as it can do so, to facilitate completion of the required consideration before award decisions are made.

v. Representation Regarding the Prohibition on Using FY15 Funds with Entities that Require Certain Internal Confidentiality Agreements

Agreement with the representation below will be affirmed by checking the "I agree" box in block 17 of the SF424 (R&R) as part of the electronic proposal submitted via Grants.gov. The representation reads as follows:

By submission of its proposal or application, the applicant represents that it does not require any of its employees, contractors, or subrecipients seeking to report fraud, waste, or abuse to sign or comply with internal confidentiality agreements or statements prohibiting or otherwise restricting those employees, contractors, subrecipients from lawfully reporting that waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

Note that: (1) the basis for this representation is a prohibition in section 743 of the Financial Services and General Government Appropriations Act, 2015, Pub. L. 113-235) on provision of funds through grants and cooperative agreements to entities with certain internal confidentiality agreements or statements; and 92) section 743 states that it does not contravene requirements applicable to Standard Form 312, Form 4414, or any other form

issued by a Federal department or agency governing the nondisclosure of classified information.

- vi. Applicants for grants, cooperative agreements, or other transaction agreements as applicable are required to comply with 2 CFR 215.42, Codes of Conduct, to prevent real or apparent conflicts of interest in the award and administration of any contracts supported by federal funds. This provision will be incorporated into all assistance instruments awarded under this BAA.

B. Applies to Contracts only:

- i. 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 indicate in the Proposal Checklist, Section II, Blocks 8 and 9, which of these facilities are critical for the project's success.

- ii. Use of Arms, Ammunition and Explosives:

Safety

The Offeror is required to be in compliance with DoD manual 4145.26-M, *DoD Contractor's Safety Manual for Ammunition and Explosives* if ammunitions and/or explosives are to be utilized under the proposed research effort. (See DFARS 223.370-5 and DFARS 252.223-7002)

If ammunitions and/or explosives (A&E) are to be utilized under the proposed research effort, the Government requires a preaward safety survey in accordance with DFARS PGI 223.370-4(C)(iv) entitled *Preaward survey*. The Offeror is solely responsible for contacting the cognizant Defense Contract Management Agency (DCMA) office and obtaining a required preaward safety survey before proposal submission. The Offeror should include required preaward safety surveys with proposal submissions.

If the Offeror proposes that the Government provide Government-furnished A&E containing any nitrocellulose-based propellants and/or nitrate ester-based materials (such as nitroglycerin) or other similar A&E with a tendency to become chemically unstable over time, then NMCARS 5252.223-9000 will also apply to a resulting contract award. (See NMCARS 5223.370-5)

Security

If arms, ammunition or explosives (AA&E) are to be utilized under the proposed research effort, the Government requires a preaward security survey. The Offeror is solely responsible for contacting the cognizant DCMA office and obtaining a required preaward security survey before proposal submission. The Offeror should include a required preaward security survey with proposal submission. (See DoD manual 5100.76-M, *Physical Security of Sensitive Conventional Arms, Ammunition and Explosives*, paragraph C1.3.1.4)

If AA&E are to be utilized under the proposed research effort, the Government may require the Contractor to have perimeter fencing around the place of performance in accordance with DoD 5100.76-M, Appendix 2.

If AA&E are to be utilized under the proposed research effort, the Offeror is required to provide a written copy of the Offeror's AA&E accountability procedures in accordance with DoD 5100.76-M. If the Offeror is required to provide written AA&E accountability procedures, the Offeror should provide the respective procedures with its proposal submission. See DoD 5100.76-M Appendix 2.12.

iii. System for Award Management (SAM):

FAR 52.204-7 System for Award Management and FAR 52.204-13 System for Award Management Maintenance are incorporated into this BAA, and FAR 52.204-13 will be incorporated in all awards.

iv. Employment Eligibility Verification (E-verify):

As per FAR 22.1802, recipients of FAR-based procurement contracts must enroll as Federal Contractors in E-verify and use E-verify to verify employment eligibility of all employees assigned to the award. All resultant contracts from this solicitation will include FAR 52.222-54, "Employment Eligibility Verification."

v. Conflicts of Interest:

(1) Organizational Conflicts of Interest. All Offerors and proposed subcontractors must affirm whether they are, or are not, providing scientific, engineering, and technical assistance (SETA) or similar support to any ONR technical office(s) through an active contract or subcontract. (For the purposes of this BAA, SETA is defined as work that provides analysis and engineering services in a consulting capacity as opposed to performing research and development.) All affirmations must state which office(s) the offeror supports and identify the prime contract numbers. Affirmations shall be furnished at the time of proposal submission. Offerors and proposed subcontractors must disclose all facts relevant to the existence or potential existence of organizational conflicts of interest

(FAR 9.5). The disclosure shall include a description of the action the offeror has taken or proposes to take to avoid, neutralize, or mitigate such conflict. Unless a waiver is granted under FAR 9.503, a contractor cannot simultaneously be a SETA and a research and development performer. Proposals that fail to fully disclose potential conflicts of interests will be rejected without technical evaluation and withdrawn from further consideration for award. Additional ONR OCI guidance can be found at <http://www.onr.navy.mil/About-ONR/compliance-protections/Organizational-Conflicts-Interest.aspx>.

(2) Personal Conflicts of Interest. All Offerors and proposed subcontractors must report whether any covered employees are performing acquisition functions closely associated with inherently governmental functions for ONR, as defined in FAR 3.11. Offerors must include which ONR office(s) those covered employees support and identify the prime contract numbers. This information must be furnished at the time of proposal submission. Offerors and proposed subcontractors must disclose all facts relevant to the existence or potential existence of any personal conflicts of interest involving covered employees and describe any actions taken to avoid, neutralize, or mitigate any such conflicts. Proposals that fail to fully disclose potential personal conflicts of interests will be rejected and withdrawn from further consideration for award.

(3) If a prospective offeror believes that any conflict of interest exists or may exist (whether organizational or otherwise), the offeror should promptly raise the issue with ONR by sending his/her contact information and a summary of the potential conflict by e-mail to the Business Point of Contact in Section I, item 7 above, before time and effort are expended in preparing a proposal and mitigation plan. If, in the sole opinion of the Contracting Officer after full consideration of the circumstances, any conflict situation cannot be effectively avoided, the proposal may be rejected without technical evaluation and withdrawn from further consideration for award under this BAA.

vi. FAR / DFARS Provisions:

For purposes of illustration and not of limitation, the following provisions may be applicable to ONR contracts:

#	Provision
52.204-7	System for Award Management
52.215-16	Facilities Capital Cost of Money
52.215-22	Limitations on Pass Through Charges - Identification of Subcontract Effort
52.216-1	Type of Contract
52.216-27	Single or Multiple Awards
52.217-4	Evaluation of Options Exercised at time of Contract Award
52.217-5	Evaluation of Options

52.222-24	Preaward On-Site Equal Opportunity Compliance Evaluation (Applies if exceeds \$10M)
52.226-2	Historically Black College or University and Minority Institution Representation
52.230-7	Proposal Disclosure - Cost Accounting Practice Changes
52.232-15	Progress Payments not included
52.233-2	Service of Protest
52.252-1	Solicitation Provisions Incorporated by Reference
52.252-3	Alterations in Solicitation
52.252-5	Authorized Deviations in Provisions
252.203-7005	Representation Relating to Compensation of Former DoD Officials
252.204-7004	Alternate A, System for Award Management
252.215-7003	Requirements for Submission of Data Other than Certified Cost or Pricing Data - Canadian Commercial Corporation
252.219-7000	Advancing Small Business Growth

vii. Combating Trafficking in Persons:

Appropriate language from FAR Clause 52.222-50 will be incorporated in all awards.

viii. Certification Regarding Trafficking in Persons Compliance Plan:

Prior to award of a contract, for the portion of the contract that is for supplies, other than commercially available off-the-shelf items, to be acquired outside the United States, or services to be performed outside the United States, and which has an estimated value that exceeds \$500,000, the contractor shall submit the certificate as specified in paragraph (c) of 52.222-56, Certification Regarding Trafficking in Persons Compliance Plan.

ix. Updates of Information regarding Responsibility Matters:

FAR clause 52.209-9, Updates of Publicly Available Information Regarding Responsibility Matter, will be included in all contracts valued at \$500,000 where the contractor has current active Federal contracts and grants with total value greater than \$10,000,000.

C. Applies to Contracts, Grants, Cooperative Agreements and Other Transaction Agreements:

i. 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 in Section II, Block 11 of the Proposal Checklist.

If it is determined that access to classified information will be required during the performance of an award, a Department of Defense (DD) Form 254 will be attached to the contract, and FAR 52.204-2 - Security Requirements will be incorporated into the contract.

ONR does not provide access to classified material under grants.

ii. Use of Animals and Human Subjects in Research:

If animals are to be utilized in the research effort proposed, the Offeror must submit prior to award a Full Appendix or Abbreviated Appendix with supporting documentation (copies of IACUC Approval, IACUC Approved Protocol, and most recent USDA Inspection Report) prior to award. For assistance with submission of animal research related documentation, contact the ONR Animal Use Administrator at (703) 696-4046. Guidance:

<http://www.onr.navy.mil/en/About-ONR/compliance-protections/Research-Protections/Animal-Recombinant-DNA.aspx>

Use of Human Subjects in Research:

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 Federal wide Assurance (FWA) or the Offeror's DoD-Navy Addendum. 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 including the category of exemption and short rationale statement. Determinations that the activity is not research involving human subjects must also be provided. This documentation must be submitted to the ONR Human Research Protection Official (HRPO), by way of the ONR Program Officer. 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. For assistance with submission of human subject research related documentation, contact the ONR Human Research Protection Official at (703) 696-4046.

For contracts and orders, the award and execution of the contract, order, or modification to an existing contract or order will include a statement indicating successful completion of HRPO's review 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. Guidance: <http://www.onr.navy.mil/About-ONR/compliance-protections/Research-Protections/Human-Subject-Research.aspx>

iii. Recombinant DNA:

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

iv. Institutional Dual Use Research of Concern:

As of September 24, 2015, all institutions and USG funding agencies subject to the [United States Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern](#) must comply with all the requirements listed therein. If your research proposal directly involves certain biological agents or toxins, contact the cognizant Technical Point of Contact.. U.S. Government Science, Safety, Security (S3) guidance may be found at <http://www.phe.gov/s3/dualuse>.

v. 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/>.

vi. 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. (This statement does not apply to international offerors submitting proposals to ONRG. International

offerors should contact the cognizant ONRG Administrative Director (AD) for guidance prior to submitting a proposal.) Interim meetings are likely, but these will be accomplished via video telephone conferences, telephone conferences, or via web-based collaboration tools.

vii. Reporting Executive Compensation and First-Tier Subcontract Awards:

The FAR clause 52.204-10, “Reporting Executive Compensation and First-Tier Subcontract Awards,” will be used in all procurement contracts valued at \$25,000 or more. **A similar award term will be used in all grants and cooperative agreements.**