



BROAD AGENCY ANNOUNCEMENT (BAA):

Expeditionary Maneuver Warfare Applied Research and Advanced Technology Development

INTRODUCTION:

This publication constitutes a Broad Agency Announcement (BAA) as contemplated in Federal Acquisition Regulation (FAR) 6.102(d)(2), 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), other solicitation, or additional information regarding this announcement will not be issued.

The Office of Naval Research (ONR) will not issue paper copies of this announcement. The ONR reserves the right to fund all, some or none of the proposals received under this BAA. ONR provides no funding for direct reimbursement of proposal development costs. Technical and cost proposals (or any other material) submitted in response to this BAA will not be returned. It is the policy of ONR to treat all proposals as sensitive competitive information and to disclose their contents only for the purposes of evaluation.

I. GENERAL INFORMATION

1. Agency Name -

Office of Naval Research

2. Research Opportunity Title –

Expeditionary Maneuver Warfare Applied Research and Advanced Technology Development

3. Program Name –

Expeditionary Maneuver Warfare Applied Research and Advanced Technology Development

4. Research Opportunity Number -

ONR BAA 08-012

5. Response Date -

White Papers Due: 03 April 2008

Full Proposals Due: 22 May 2008

6. Research Opportunity Description -

The Office of Naval Research (ONR), Expeditionary Maneuver Warfare and Combating Terrorism S&T Department (ONR 30) is interested in receiving white papers and proposals for both Applied Research and Advanced Technology Development.

The seven Thrust Areas for which proposals are sought are as follows:

6.1. Command, Control, Communications, and Computers (C4)

General background information:

The S&T investment in Command and Control is focused in three main areas: (1) implementing the FORCEnet concept and its Marine Corps instantiation, Marine Air Ground Task Force Command and Control (MAGTF C2), with technologies to securely exchange data and information with and among distributed tactical forces; (2) developing decision support systems that enable tactical warfighters to take advantage of the FORCEnet and MAGTF C2 and tactically extend Net-Enabled Command and Control (NECC) for shared situational awareness; and (3) providing effective position location determination and combat identification of enemy combatants, friendly forces, and non-combatants especially in restricted communications environments. S&T investment is needed in all three of these areas to enable the realization of the USMC Distributed Operations.

The Vision: Through a seamless information architecture, future comprehensive command and coordination will be characterized by increased freedom of action and enhanced access to all distributed elements of national power through comprehensive interconnected networks.

Specific areas of interest for this BAA:

1. Basic research in materials and fabrication that has potential to lead to reduced size, weight, and power consumption components for radio frequency distribution systems in military VHF and UHF bands (30-512 MHz). Of particular interest are matching networks, channelizers, circulators, linear amplifiers, filters and electromagnetic interference architectures. Power handling ability and low-noise operation are also important factors.

2. Applied research in the areas of:
 - a. Adaptive Networks: proof-of-concept of methods to allow standard software applications (without modification of the application) to effectively work on intermittent, low-throughput, wireless tactical networks. Implicit in this is the need to work with heterogeneous devices and to provide a degree of fault tolerance and recovery. An important goal is minimization of network overhead while maximizing usefulness of the applications. Proposed solutions should be compatible with current military hierarchical network architectures and foreseeable distributed network architectures.
 - b. Adaptable Antennas: low-cost, antennas technology that can support omni-directional, sector and directional communications for individual Marines or vehicles. Though this concept would support narrowband communications, the goal is to develop antennas that can cover a wide frequency range (military UHF/VHF or UHF to S-band) in a variety of environments including urban, within structures and forested. Of particular interest are low observable designs, rapid switching between directionality modes and frequencies, and light weight.
 - c. Field Programmable Gate Array (FPGA) Software-Defined Radio Architecture: develop software-programable radio architecture using the flexibility of field-programmable gate arrays that is compatible with anticipated future versions of the Joint Tactical Radio System's software communication architecture. Paramount are capabilities to support military UHF and VHF bands, soldier radio waveform and secure versions of wireless local area networks. A goal is the ability to simultaneously host two distinct waveforms while minimizing cost, weight, size and power consumption. Of interest are complete radio architectures, including power amplifiers and antennas, and the ability to support multiple-input-multiple-output functionality.
 - d. Info on Demand Technology: develop models, predictive algorithms and computing capabilities that anticipate and deliver the exact information tactical users will need with minimal input, based on the location, environments they traverse and the missions assigned. Key to this is the ability to autonomously adapt information content delivered and presentation to the user based on local computing information storage and computing capability, throughput and reliability parameters of the communications network and perceived stress level of the user while minimizing network overhead. Of interest are methods that adaptively balance computational activities between end users and reach back point or among end users.

3. Advanced technology development in the areas of:
 - a. Advanced High Frequency Communications: technology development and demonstration of improved terrestrial beyond-line-of-sight communications focusing on reliability, predictability, and throughput. Of particular interest are application of previous work on compact broadband antennas; broadband antenna coupling; pre-coding; modulation; channel definition; networking; and methods for time-averaging environmental contributions. Effort will result in the fabrication of a minimum of three brass board units and execution of field demonstration showing enhanced capabilities.
 - b. Restricted Environment Communications: technology development and demonstration of advanced modulation, coding, channel definition, spectrum agility, and antennas to allow effective tactical communications in difficult propagation and multi-path environments such as urban areas and forested regions. Methods compatible with anticipated future versions of the Joint Tactical Radio System's software communication architecture and with established waveforms such as the soldier radio waveform are especially desirable. Link lengths of 10 km in selected restricted environment at a throughput of 50 kb/s are reasonable guidelines. Longer distance links at lower throughputs are desirable. Power management and networking are also important considerations. Three brass board prototypes should be delivered along with field demonstration of these units.

6.2. Intelligence, Surveillance, & Reconnaissance (ISR)

General background information:

The S&T investment in intelligence, surveillance and reconnaissance is focused on providing real-time actionable intelligence for small unit operations (to include Distributed Operations) at the tactical edge. Specific focus areas are (1) identity dominance enabled by biometrics and Tagging, Tracking, and Locating (TTL), (2) real time methods for the analysis of human networks, (3) exposing hidden human networks, and (4) nanotechnology enabled witness materials.

The Vision: Asymmetric and irregular warfare tactics negate our conventional combined arms superiority. Enemies blend in with locals in complex (often urban) terrain. In this environment, ISR enabled capabilities to expose and understand human networks are critical. Networks are exposed by the dynamic observation of entities in disparate data sources. Networks understanding is achieved by advanced analysis tools. Future ISR systems must also provide support to real-time tactical decision making, additive to supporting planning.

Specific areas of interest for this BAA:

1. Identity dominance - Integrated biometric/ Tagging, Tracking, and Locating (TTL), capability
 - a. Objective: Provide human tracking algorithms based on models of biometric (face, voice and soft) and TTL (optical taggant) capabilities. Investigate what track continuities are required for track classification. Model a biometric/optical taggant system relevant to human tracking across an urban 5 km x 2 km area. If funded, support a proof of concept field test.
 - b. Discussion: The accuracy of biometric and TTL capabilities degrade with distance. It is not practical, however, to saturate an urban area with sensors. The current objective of the identity dominance area of interest is to prove that sparse biometric and TTL sensors working together can provide sufficient information to form and classify tracks.
2. Real time methods for the Analysis of Human Network Modeling
 - a. Objective: Increase “battlespace awareness” of human networks, improve the accuracy of classification decisions and enable a human network predictive capability.
 - b. Discussion: Against irregular and asymmetric actors, enhanced non-kinetic capabilities against human networks are desired. Specifically, work is needed to increase “battlespace awareness” of human networks, improve the accuracy of classification decisions and enable a human network predictive capability. The first research goal involves the development of a unique human network identifier, expressed as a multi-dimensional vector or tensor. A human network can be expressed by what it has been, how it is behaving now and the external forces influencing its behavior. Each of these three terms is also a multidimensional vector, made up of observable and latent variables. Novel network descriptors are needed to complement currently available metrics which are based on composition, structure, roles and communication flows. New attributes should be dynamic and include attributes such as the semantic distance between a network and other entities (events, places, and people). Research must mature our ability to translate open source information into relevant and enduring categories of external forces. Classic social-cultural insights must also be modeled as external force attributes. A human network tensor, once defined and computed, is intended to be precise enough to allow the recognition of the same network in disparate data sources and for the recognition of closeness between one network and another. Classification decisions can be based on an examination of difference between the current state of the multi-dimensional human network vector and its past state. Markov hidden models can be used to test if measured differences are due to a human network state change or due to some other reason. Classification decisions can also be based on

the nearness of a human network tensor and events of interest in time/space. Once a human network tensor can be defined and dynamically observed in a common feature space, predictive capabilities are realized. If one network is observed to be moving towards at-risk behavior, a generalized force warning may be enabled addressing the threat associated with all networks with similar human network tensors. When combined, research into human network awareness, network classification and network prediction, will be a powerful tool for warfare against the irregular actor.

3. Exposing Hidden Enemy Networks

- a. Objective: Based on an uncovered human network identity (past and current structure and function), automatically develop own action decision options with predicted consequence.
- b. Discussion: A game changer in irregular warfare is gaining the capability to encourage positive behavior and disrupt negative behavior. Additionally, enhanced knowledge of how action can increase the separation in feature space between the behavior of good and bad actors or actors is needed. Higher resolution human network models, enabled by advanced network analysis, a richer understanding of human nature and environmental factors, need to be developed in order to enable effective warfighter decisions. Understanding the consequence of action taken to influence human networks ahead of time is critical to improving warfighter effectiveness and efficiency.

4. Decision space modeling

- a. Objective: Develop fused models of decision surfaces for groups of people from models of decision making that incorporate the boundary conditions dictated by the limits of the human mind/brain and the boundary conditions dictated by cultural, political and economic factors.
- b. Discussion: Human decision making is constrained by what a person is capable of thinking about or considering. Natural cognitive processing can be very different across disparate populations. Additional work is needed to translate available evidence on how people process information into boundary conditions on decision making. Additionally human decision making is influenced by cultural, political and economic factors. For a group of people to achieve some agreed upon final state, the decisions they make over time must align. This generates another set of boundary conditions that can be used to define decision spaces. Lastly, work is needed to learn how to fuse decision states derived from knowledge of the person with knowledge of the group.

5. Nanotechnology-Enabled Witness Fields
 - a. Objective: Development of sensors that provide near real time decision support to distributed operations by detecting specific interactions.
 - b. Discussion: Nanotechnology offers the potential to revolutionize tactical sensors. For example, very small sensors that can “witness” environments as well as the proximity between specific people and between specific people and places could be used by the warfighter to verify information. To enable this, nanomaterials that change state in the presence of another nanomaterial need to be developed.

6.3. Force Protection

General background information:

The S&T investment in Force Protection is focused on the prediction, prevention, detection, neutralization, and mitigation of hostile actions against personnel, facilities, and equipment. Proactive initiatives are intended to help shape the battlefield and enable the application of decisive military force how, when, and where desired. Three specific areas of interest apply to the Force Protection Thrust: defeat of explosive hazards (landmines, improvised explosive devices, suicide bombers); personnel and platform protection (counter-rocket, artillery, mortars, rocket propelled grenades and counter sniper); and personnel protective equipment. Proposals for 6.1 basic research, 6.2 applied research, and 6.3 advanced technology development are encouraged. White papers and proposals should document the specific phenomenology and previous research that supports the proposed technical approach. Submissions should reference the specific area of interest being addressed on the cover page. *Proposals based on mature technologies that do not require research to implement will not be considered.*

The Vision: Our vision is to provide advanced technology capabilities to the Marine Corps and Navy forces operating in an expeditionary environment by predicting, preventing, detecting, neutralizing, and mitigating known and anticipated threats. The investment is intended to minimize the impact of threats on military operations planning and execution, and to provide increased survivability across the spectrum of conflict.

Specific areas of interest for this BAA:

1. Explosive hazard defeat
 - a. Mine Countermeasures

Mine countermeasures should emphasize scientific concepts that can be applied to the detection, neutralization, and mitigation of these devices in both the land and riverine environments. Desire to enable detection and neutralization from significant standoff distances, over a wide area, and have the capability to provide rapid and effective in-stride route clearance is stressed. Classes of mines of interest include single anti-tank and

anti-personnel types, buried and surface laid, and mine fields. Neutralization of the explosive component is of particular interest; however, proposals cannot assume that the device exact location is known. The final focus area is the mitigation of the effects of the device through methods other than armor and vehicle geometry approaches.

b. Counter-improvised explosive devices

Counter-improvised explosive devices (CIEDs) should emphasize scientific concepts that can be applied to the standoff detection, neutralization, and mitigation of the effects of these devices in both the land and riverine environments, and to the prediction of the occurrence or potential for occurrence of IED events. Detection and neutralization approaches should be plausible from significant standoff distances and over a wide area, while neutralization of the explosive component (TNT, C4, TATP, Urea Nitrate, etc.) is of particular interest. Neutralization concepts that are based on knowing the exact location of the device or rely on the presence of specific associated IED components (electronics, triggers, electro-explosive devices, etc) will not be considered. Research addressing social networks and organizations as related to the construction and deployment of IEDs and that may assist in the prediction of IED events should be proposed. Prediction proposals that utilize statistical or pattern associations from past events in order to predict future events need not be submitted; however, proposals that seek to understand or exploit particular Intelligence, Surveillance, and Reconnaissance (ISR) signatures to either aid in detection or prediction are particularly relevant. Classes of IEDs that are of interest include stationary explosive devices (either exposed, buried, or concealed), vehicle-borne explosive devices such as car or truck bombs, and explosive devices that may be carried by humans (see separate heading), animals, or other normally innocuous transportation methods. Fully assembled devices and components in storage or assembly locations should be considered.

c. Counter Bomber

Counter Bomber is a subset of the CIED problem. Proposals specifically addressing scientific approaches to the defeat of the suicide bomber should address methods of detection at either a security check point or in open uncontrolled public spaces. Research goals are focused on development of individual or combined sensor modalities, fusion of data from multiple sensors, and algorithms to autonomously analyze fused sensor data. Performance goals for this focus area are high probability of detection with low false alarm rate against stationary and moving targets from all aspect angles.

2. Self protection

a. Counter-rocket, artillery, mortars, rocket propelled grenades

Emphasis in the Counter-rocket, artillery, mortars, rocket propelled grenades (CRAM) area is on technologies that can be applied at the small unit or individual level, and therefore self sufficiency and light weight will be key criteria. CRAM should focus on standoff sensing, warning of targeting, or warning of incoming threats. CRAM

neutralization technologies are desired that can intercept or defeat incoming threats with minimal chance of fratricide.

b. Counter Sniper

Counter sniper seeks scientific concepts that detect the sniper *before the shot* and that could enable detection of snipers in real time, in all weather conditions, from a moving platform or dismounted troops, and offer 360⁰ surveillance at a threshold range of 300 meters and to a height of 20 meters. Concepts should be capable of operating in a variety of terrains (complex urban to densely vegetated waterways) and offer high probability of detection with low false alarm rate.

3. Personnel protective equipment

Personnel protective equipment should enhance existing protection levels without adversely affecting human performance objectives. Scientific goals for this topic may include advanced ballistic materials, physics and mathematical-based human models and surrogates for analysis of injury mitigation and optimized modular design analysis. Specific areas of research interest are: modeling and simulation aimed at understanding the dynamic interaction of the protective equipment and the body to assess loads, individual movement, and fatigue with the goal of improving the load bearing capability of the system; and development of validated, robust, biofidelic test surrogates correlated to injury criteria for analyzing behind armor effects such as blast, blunt trauma, and ballistic effects.

4. Other

This section offers an opportunity for proposals not strictly defined under any of the above headings. Using the general guidance provided in the background and vision statements and the themes discussed in the above focus areas, scientific proposals that seek to enhance force protection and increase survivability can be submitted.

6.4. Logistics

General background information:

The S&T investment in logistics emphasizes the research and development of new technologies pertinent to the following three aspects of logistics: (1) providing comprehensive asset visibility, (2) optimizing asset transport/delivery (3) ensuring sustainment of operations by enhancing the self-sufficiency of operational units.

The Vision: Marines of the future, operating as distributed forces supported from the sea, will benefit from a precisely tailored level of logistic sustainment from sea-based platforms to rapidly maneuvering forces ashore. Logistic planning and delivery systems of the future will be both more responsive and flexible, enabling them to keep pace with rapidly changing operational scenarios. Likewise, the commodities that are delivered will provide more operational value per unit weight in order to enhance both self

sufficiency and operational maneuverability. Finally, operational units will benefit from technologies that permit them to safely capitalize on the opportunistic local availability of logistic commodities such as fuel and water.

Specific areas of interest for this BAA:

1. Seabased Air Cargo Delivery System for Small Combat Units:

ONR solicits novel concepts for precision air deliveries of at least 500 lbs of supplies over distances of up to 200 miles from ships operating off shore to squad or platoon-sized combat units operating inland. Novel solutions are sought toward the intersecting needs of two emerging expeditionary warfare concepts: Seabasing and Distributed Operations. As the name implies, Seabasing is intended to significantly reduce or eliminate the necessity for establishing land bases to support expeditionary warfare. With Seabasing, the traditional functions of a land base would instead be shifted to a number of ships operating in the vicinity of land combat operations. From a logistics standpoint Seabasing would sharply curtail or eliminate the establishment of fixed shore-based supply depots. Distributed Operations describes an expeditionary warfare option whereby squad or platoon-sized units operate geographically separate from one another, but close enough to coordinate operations as required. Distributed units would be highly mobile and most likely required to operate for extended periods without the benefit of secure ground supply links. In order to avoid the confluence of Seabasing and Distributed Operations from placing an undue strain on limited helicopter assets, innovative alternatives to conventional helicopter re-supply are sought that would that would: 1) free-up limited helicopter flight hours toward other pressing Seabase-related needs, 2) decrease the necessity to conduct repetitive helicopter operations over unsecured terrain, and 3) conceivably provide a quicker response to emergency supply needs.

Potential solutions might include modifying established air or ship launched ordnance delivery methods and technologies for the precision delivery of supplies. Or, they might involve the direct transfer of supplies from non-aviation ships to fixed wing aircraft in flight. Concepts might utilize non-traditional approaches such as gliders, powered parafoils, seaplanes, airships, and gyroplanes; or conventional fixed or rotary wing aircraft operating in conjunction with such non-traditional airframes. The only restriction on the type of ship required to launch a logistic payload is that it be a vessel normally used in conjunction with expeditionary warfare. Although it is intended that an award would culminate in a realistic demonstration of the concept, it is well understood that some concepts might require non-risk bearing portions only to be implemented via surrogates or simulation in order to stay within the available budget.

2. Advanced Materials to Reduce Maintenance Requirements of Marine Corps Equipment:

ONR solicits basic and applied research toward innovative materials intended to reduce the frequency of maintenance required for Marine Corps vehicles, helicopters, ordnance or electrical equipment. The intent is to increase operational readiness by reducing the impact of mechanical wear, corrosion, and thermal degradation.

Possible topics for research might include novel metallic or nonmetallic materials whose bulk properties have been selectively and gradually modified toward the surface, self-healing coatings, sacrificial material layers or other concepts that can be economically applied to existing materials or structures. Concepts may include extremely hard coatings that reduce wear, corrosion resistant materials or surface treatments, materials formulated to resist high temperature degradation or other concepts that lessen routine maintenance and component replacement. Basic research efforts would likely pursue novel concepts of general applicability, whereas applied research would seek to investigate novel materials as applied to specific hardware components.

3. Modular Composite Bridge Technology Demonstration:

ONR seeks to conduct a full scale technology demonstration of a modular composite bridge structure that could serve as a replacement for the currently used metal Medium Girder Bridge. The intent is to demonstrate the capability of a modular design fabricated from composite materials to 1) simplify the process for manufacturing military tactical bridge components, 2) decrease the time required for field assembly of components, 3) increase the versatility of assembly options to meet local field conditions and anticipated load requirements, and 4) simplify logistic storage and transport.

The modular components of the technology demonstration prototype must be capable of constructing a bridge 4.5 meters wide, up to 42 meters long and capable of achieving a maximum Military Load Classification (MLC) of 100.

6.5. Human Performance/Training & Education

General background information:

The S&T investment in Human Performance Training and Education (HPT&E) is intended to enhance future Marine Corps capabilities by developing technologies, which seek to close human performance gaps utilizing training and education technologies as well as physiological and nutritional solutions. The focus shall be to prepare Marines for distributed/asymmetric warfare— from fire teams through the MAGTF level – by exploiting emerging simulation and collaborative training technologies and enablers, which permit integration of live, virtual, and constructive simulations for training.

The Vision:

HPT&E seeks to enhance the combat efficiency of the U.S. Marine Corps through the development of technology enablers. HPT&E is based on the perspective that the Marines and their supporting elements – gear, weaponry and information – must be addressed as an integrated system. HPT&E S&T efforts are predicated on the principal hypothesis that success in combat is optimized by application of innovative technologies, techniques and methodologies across a comprehensive range of Warfighting domains. The ultimate product of the HPT&E vision is a Marine and their unit optimized and prepared for complex operations-- a scalable Marine infantry unit, acting in concert with

the commander's intent, exercising the initiative to act independently and/or as part of a task-organized team.

The Goal:

The goal of the Human Performance (HP) Focus Area is the optimization of individual and team performance in distributed/asymmetric combat environments using a range of solutions, scaleable across all leadership levels, elements of the MAGTF, and command echelons. HP places dual emphasis on understanding Warfighter capabilities and limitations as they apply to the combat arena by expanding the former and mitigating the latter. The goal of the Training & Education (T&E) Focus Area is to provide technologies which support the fundamental Knowledge, Skills and Abilities (KSAs) that make up the complete Warfighter. T&E includes a continuum of methods that support combat effectiveness, from basic knowledge and skills acquisition, to consolidation in mission-specific, scenario-based training, to targeted education in specialties such as critical thinking to prepare for complex, ambiguous combat conditions ("Train for certainty...educate for uncertainty"). Optimized T&E is the edge that enables Marines to respond quickly and to "think on their feet."

Specific areas of interest for this BAA:

1. Command Post Information Integration - Current Marine Corps Command Posts are overwhelmed with information overload, leading to poor Situation Awareness (SA), poor decision-making and the inability to share and process important relevant information to seniors or subordinates. With the increase in distributed/asymmetric operations, this problem may increase significantly. Therefore, establishing and validating quantitative benchmarks for operational perceptual and decision-making performance are necessary. Also, key information and data exchange strategies, including both hardware and software infrastructures and adaptive, technological prototypes, are needed to facilitate efficient and effective sharing and distribution of information and Situation Awareness attainment and understanding of contributing operational factors (e.g., sensor data quality, stress, fatigue, operational metrics). Key metrics include increased cognitive processing in the combat environment by greater than 50%.

2. Ergonomic and Physiologic Optimization Tools - Strict ergonomic and physiologic rules dictate how much 'power' an Infantryman can produce in order to physically perform, cognitively prepare himself, and sustain himself under the rigors of extended combat. The applied sciences of human factors and ergonomics offer powerful tools for optimizing physical and cognitive performance and the interactive effects among brain, body, combat gear and environment. These tools have yet to be fully harnessed to the challenge of optimizing the Infantryman. Models are needed that quantify the power production potential of the individual Infantryman and relate that potential to time-to-failure for extended periods, taking into account the modifying effects of environmental conditions (including terrain, weather, combat situation). Also needed are tools that enable rapid and simultaneous prototyping of multiple technology solutions to a desired system/component requirement level; include system specifications and form factor analyses, bounded by the multi-factor aspects of the Marine System and small unit teams,

to ensure a smooth, integrated capability; and enable the attainment/maintenance of physiological readiness before, during and after missions.

3. Culture, Language, Ethics, and Values Non-kinetic Training Techniques – Optimizing situational awareness requires forward deployed forces to have linguistic and cultural knowledge and tools to distinguish adversary behavior from civilian non-combatants and understand/identify relationship(s) between the two. Direct communication that provides both the semantic meaning and the cultural context/perspective is critical to successful non-kinetic aspects of military operations amongst civilian populations. Currently, ground forces rely almost entirely on human translators to provide language translation and cultural context. The goal of this BAA is to address the needs of the USMC and other Naval ground forces by providing tools, techniques, and systems to enhance second language learning and cultural understanding including improving diagnostics for language proficiency. These capabilities will be built using recent findings in the fields of cognitive, cultural and social linguistics. Longer-term research agendas that will support future tools is also necessary. This includes work developing empirically tested computational models of language acquisition and processing (both Level 1 and Level 2) that incorporate cross-cultural variation, identifying cognitive and neural signatures that are identifiers of aptitude for second language learning, and understanding cross-cultural differences in neural processing of language. Work may include research in cross-cultural learning of non-verbal cues and communication.

6.6. Maneuver

General background information:

The Maneuver Thrust Area develops advanced technologies to increase the capabilities and effectiveness of the Marine Corps Air Ground Task Force (MAGTF) and aids in the execution of the Global War on Terrorism. Innovative technologies are pursued that address the entire fleet of USMC ground assets in the areas of survivability, mobility, fuel efficiency and unmanned systems. Specifically, there is interest in technologies in the following areas: (1) Advanced power plants, drive trains, and suspensions, (2) Advanced materials and survivability technology to enhance the performance and survivability of combat vehicles, and (3) Advanced robotic systems.

The Vision: Marines will maneuver from the seabase in a family of high-speed connectors that include amphibious vehicles, tilt-rotor and rotary bladed aircraft, and high-speed surface craft. Once ashore, Marines will maneuver utilizing a family of highly mobile and survivable combat and tactical vehicles.

Specific areas of interest for this BAA:

1. Propulsion, Drive Trains, Suspensions and Fuel Efficiency
 - a. Develop technologies to improve current vehicle mobility and support a new family of vehicles that are lighter in weight, more fuel efficient, and more capable of being effectively transported by air from the seabase

ashore. Advanced propulsion, drive trains, steering systems, and suspensions to improve performance over rough terrain are required to enable greater agility and efficiency without sacrificing speed or mobility.

- b. Develop technologies relative to infinitely variable transmissions to improve fuel efficiency, reduce weight and volume, reduce complexity, and be cost affordable specifically for wheeled vehicles in the HMMWV class and for future vehicles in the 10,000 to 30,000 lb. range.
- c. Develop technologies to improve fuel efficiency and reduce fuel consumption for diesel powered wheeled vehicles to include carburetion, turbo charging improvements. These technologies may also focus on increasing reliability, availability and maintainability of vehicular platform structures and power plants to include revolutionary coating and plating techniques which will reduce wear/friction and increase lubricity resulting in increased component life, fuel efficiency and mean time between failures. Coating techniques and applications should be able to coat to tolerance, be stable over the lifetime of the application and meet MIL-STD-810C specifications.

2. Platform Survivability

- a. Develop technologies to improve the survivability of both current and future tactical and combat vehicles through the use of innovative passive and active technologies.
- b. Develop novel, affordable, and producible lightweight armor technologies appropriate to B-kit appliqué as well as integral armor for medium tactical vehicles. Innovative Explosively Formed Penetrator (EFP) armor solutions and spall liners with improved performance over current state-of-the-art (i.e. Kevlar, Dyneema, S2 glass) are also of interest.
- c. Develop combat / tactical vehicle seating systems with shock mitigating characteristics to reduce the incidence or severity of injuries during mine blast or IED events. Innovative seat restraint systems which allow occupants rapid ingress / egress, good visibility, and low probability of fouling on body armor or other combat equipment is of special interest.
- d. Develop technologies to improve crash avoidance for military vehicles in environments such as fog, night, white out, stealth, and sandstorm conditions, and during convoy operations.

3. Robotics, Unmanned Platforms and Autonomous Operations

- a. Develop technologies for robotics, teleoperation, autonomous operation, machine vision, and related means for taking the human out of direct involvement in hazardous and exceptionally arduous missions.

- b. Develop technologies which serve to enhance multiple robotic platforms working in consonance, manned and unmanned platform collaborative warfighting, unmanned platform obstacle/collision avoidance and autonomous sense and respond operations in multiple domains (air/land/sea). It is desirable to have the respective unmanned platforms operate under a common UxV architecture to promote interoperability and modularity. The technologies and their operating protocols must be capable of complying with the Department of the Navy Autonomous Operations Precepts. All technologies additionally must be capable of supporting coastal warfare, riverine and expeditionary operations, over-the-horizon at the tactical/task unit level. The multi-platform footprint should not exceed the weight, cube and space characteristics for transport to the area of operations in one (1) C-17.

6.7. Fires

General background information:

The Fires Thrust Area develops advanced technologies to increase the capabilities and effectiveness of the Marine Corps Air Ground Task Force (MAGTF) and aids in the execution of the Global War on Terrorism. Innovative technologies are pursued that address the entire arsenal of USMC fire power assets in the areas of Targeting and Engagement technologies, Advanced Munitions, and Advanced Weapons. Specifically, there is interest in technologies in the following areas: 1) integrated day night sights for personal/crew-served weapons, 2) precise and accurate delivery of 81mm mortar rounds through trajectory shaping of the ballistic flight path and on-board guidance/seeker system, and 3) precise and accurate delivery of 81mm mortar rounds through compensation of the wind direction/velocity effects at the point of launch.

The Vision:

Marines will maneuver from the seabase and operate in all climes and places. Small, distributed Marine units will locate, close with, and destroy larger enemy units through precise and accurate fires. They will use integrated optics/sensors that can see through all battlefield conditions (day, night, low light, and obscuration) and organic, precision delivery weapons that will give them rapid and accurate overwhelming firepower.

Specific areas of interest for this BAA:

1. Integrated Day Night Sight Technology (IDNST)
 - a. Objectives: Develop a system and supporting technologies for ground troops to have a highly functional, lightweight, weapon aiming device/optic that is capable of operating day and night in a wide variety of weather/visibility conditions. This device must allow US Forces to detect potential enemy forces out to the maximum effective range of their personal weapon (not handguns) before they can engage US Forces.

These potential adversary personnel may also be operating in highly cluttered urban environment with both short and long range weapons and optical devices. The IDNST will operate day and night once mounted on the Marine's weapon and/or helmet and provide the operator with sufficient information to make an engagement decision within an appropriate time of possible detection. If helmet mounted, a clear aimpoint for the weapon must be displayed. Once detection is made, the IDNST will allow the operator to utilize magnification (at least 2x – 8x) to point and track the weapon at the selected target. The decision to engage the target will be left to the operator. The low visibility/night system display may be B&W and/or color. If the system utilizes laser technology during operations, then it must be eye safe for all personnel at appropriate ranges depending on aided or unaided operation. ONR envisions that the completed IDNST may use technologies such as near infrared (NIR), short wave infrared (SWIR), medium wave infrared (MWIR), or long wave infrared (LWIR) and able to provide vital military utility value in fog, rain, smoke, dust, day & night operations, and inside buildings/caves to allow the operator to have key visual standoff features.

b. Technical challenges (include, but not limited to):

1. Detect enemy personnel carrying weapons preferably before they fire a shot when utilizing the IDNST in a manual scan mode. The key objective is to see crisp/clear/high resolution images to make positive identification of enemy personnel at ranges out to the maximum effect range of the weapon system (up to 1000m or more).
2. Develop techniques to reject clutter and maximize probability of correctly detecting, locating and identifying targets.
3. Reduce system design complexity minimizing moving parts while maximizing robustness to include providing a laser and be a lightweight system (must be ~ 2 lbs or less, but a weight of 1.5 lbs or less is the preferred goal to include power source).
4. System will be used by Marines and/or Soldiers to aim personal infantry weapons (M4, M16 series, M249) in a wide variety of combat environments to include urban environments and will undergo firing in these environments.
5. The IDNST must be fully integrated with the infantry weapon to include zeroing weapon, ballistic compensation, windage and elevation adjustments, etc.
6. The IDNST must be capable of operating in temperatures from -40 deg F to +140 deg F.
7. If weapon mounted, the IDNST must be capable of being affixed to standard Picatinny rail mounting systems found on infantry weapons.

2. Precision 81mm round delivery

a. Distributed Operations Precision Engagement – Wind Sensing Technology

1. Wind velocity sensing technology. Lack of precise knowledge of wind velocity severely impacts the precision of unguided munitions. This source of inaccuracy is traditionally quantified in terms of range error (head or tail wind dependent) and azimuthal error (cross wind dependent). A wind velocity sensing system is needed capable of determining head and cross wind velocity components along a 5,000 meter unguided munitions trajectory (2,500 meter max ordinate). The sensing system shall be accurate to within 2 knots (1 sigma) for each orthogonal velocity component. The system shall be of size, weight, and power (SWaP) and ruggedness appropriate for the dismounted warfighter operating under challenging physical and meteorological conditions.

Specifically, this BAA seeks proposals for development of Technology Readiness Level (TRL)-4 breadboard prototypes that demonstrate wind velocity sensing feasibility. Breadboard prototypes shall be configured for laboratory use. The TRL-4 prototypes shall be subjected to appropriate and credible accuracy testing. The TRL-4 prototypes shall meet or exceed the following minimum performance criteria:

Wind Velocity Sensing Accuracy	2 knots 1 sigma
Wind Velocity Sensing Range	2,000 meters

In addition to meeting/exceeding the above criteria, the TRL-4 prototypes shall credibly demonstrate how the SWaP, ruggedness, and longer sensing range (5,000 m) requirements will be achieved by more advanced prototypes.

2. Wind velocity prediction, interpolation, and extrapolation algorithms. Wind velocity sensing will not occur at the precise time and location of a particular shot. Yet, the ballistic computation for a particular shot assumes the wind velocity data are current and along the trajectory. A prediction, interpolation, and extrapolation algorithm is needed that will project prior sensed wind velocity data to the moment of a planned shot. Furthermore, the algorithm shall interpolate/extrapolate from the actual sensed location(s) to the planned trajectory itself. The predictions/interpolations/ extrapolations of the algorithm shall be accurate to 2 knots (1 sigma) or for each orthogonal velocity component given perfect sensed data up to 30 minutes old and 1,000 meters remote.

It is anticipated that accurate atmospheric modeling on small time and length scales will be required to fulfill this need. Methods for accuracy testing of prototype algorithms shall be addressed. The algorithms shall be capable of running on a standalone laptop or tablet computer under the Microsoft Windows or Linux operating systems.

Specifically, this BAA seeks proposals for algorithmic investigations that demonstrate the feasibility of wind velocity prediction/interpolation/extrapolation meeting or exceeding the following minimum performance criteria:

Computed Wind Velocity Accuracy	2 knots 1 sigma (each velocity component)
Age of Input Data	30 minutes
Remoteness of Input Data	1,000 meters

The investigative results shall provide appropriate and credible methods for algorithm accuracy testing.

b. Flight Control Kinematic Unit for 81mm Mortar

The Office of Naval Research is seeking whitepapers describing concepts to affordably outfit unguided existing and future 81-mm mortar rounds with guidance, navigation, and controls (GNC) to enable trajectory shaping in urban environments with a resultant delivery accuracy within 5-m circular error probable (CEP) excluding target location errors. Trajectory shaping in this urban environment means the ability to guide the munition to impact at locations in-between buildings. The Flight Control Kinematic Unit shall have a means to load mission parameters; set flight operation as guided or unguided; set the programmed trajectory in guided mode to divert from the ballistic flight to precisely achieve the 5m CEP; or be able to sense, acquire, and appropriately divert to impact an aimpoint from a designation system within a 5m CEP, and set the detonation mode as either point detonation upon target impact or point in space mode that detonates along a specified point in the programmed trajectory. Each mode shall be uniquely selectable and programmed during the setting operation. In the event Flight Control Kinematic Unit is gun-launched without having been set, it shall function as an unguided round in the Point Detonating mode.

Flight Control Kinematic Unit shall withstand the forces encountered during manual loading and launch operations. It shall be supplied, handled, loaded, fired and extracted in a similar manner as a conventional fuze. In guided flight mode it shall reach at least 90% of the maximum range as its unguided counterpart.

7. Point(s) of Contact –

Questions of a technical nature should be submitted to:

Point of Contact Name: Ms. Laura Worcester

Point of Contact Occupation Title: Deputy, Programming, Planning and Operations

Department Title: Expeditionary Maneuver Warfare & Combating Terrorism S&T
Department

Department Code: ONR 30

Address: Office of Naval Research
One Liberty Center, OLC 1163
875 N. Randolph Street
Arlington, VA 22203-1995

E-mail address: laura.worcester@navy.mil

Questions of a business nature should be submitted to:

Point of Contact Name: Pleshette Brown

Point of Contact Occupation Title: Contract Specialist

Division Title: Contract & Grant Awards, Management

Division Code: Code ONR 0253

Address: Office of Naval Research
One Liberty Center, OLC 127E
875 N. Randolph Street
Arlington, VA 22203-1995

Email Address: Pleshette.brown@navy.mil

8. Instrument Type(s) -

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

9. Catalog of Federal Domestic Assistance (CFDA) Numbers -

12.300

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

Basic Scientific Research

11. Other Information -

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

II. AWARD INFORMATION

The estimated total amount of awards is \$50M anticipated to be made available over a three year period. ONR may issue BAAs annually with a potential open period of one

year. ONR may award less than \$50M under this BAA and apply subsequent funding as it is made available in the out-years.

*Anticipated Range of Individual Award Amounts:

\$300K to \$3M per year

*Anticipated Period of Performance:

Up to three (5) years

* Funding Type:

Research and Development Funding of Budget Activity 1 (Basic Research), Budget Activity 2 (Applied Research), and Budget Activity 3 (Advanced Technology Development) is available for this effort.

III. ELIGIBILITY INFORMATION

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

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

Navy laboratories and warfare centers as well as other Department of Defense and civilian agency laboratories are also not eligible to receive awards under this BAA and should not directly submit either white papers or full proposals in response to this BAA. If any such organization is interested in one or more of the programs described herein, the organization should contact an appropriate ONR 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.

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

Some topics cover export controlled technologies. Research in these areas is limited to "U.S. persons" as defined in the International Traffic in Arms Regulations (ITAR) - 22 CFR § 1201.1 et seq.

IV. APPLICATION AND SUBMISSION INFORMATION

1. Application and Submission Process -

White Papers are required prior to submitting a Full Proposal - The due date for White Papers is no later than 3 p.m. (Eastern Daylight Time) on 4/3/08. Initial Navy evaluations of the White Papers will be issued via E-mail notification on or about 4/28/08. Detailed technical and cost proposals will be subsequently encouraged from those Offerors whose proposed technologies have been identified through the above-referenced E-mail as being of “particular value” to the Navy. However, any such encouragement does not assure a subsequent award. Any offeror may submit a full proposal even if its white paper was not identified as being of “particular value.” Full Proposals will not be considered under this BAA unless a white paper was received before the white paper due date specified above.

Full Proposals - The due date for receipt of Full Proposals is 3 p.m. (EDT) on 5/22/08. It is anticipated that final selections will be made by 6/19/08. As soon as the final proposal evaluation process is completed, the Offeror will be notified via email of its selection or non-selection for an award. Proposals exceeding the page limit may not be evaluated.

2. Content and Format of White Papers/Full Proposals –

White Papers and Full Proposals submitted under the BAA are expected to be unclassified; however, confidential/classified proposals are permitted. If a classified proposal is submitted, the resultant contract will be unclassified.

Unclassified proposals shall be submitted directly to the Technical Point of Contract (TPOC). An ‘unclassified’ Statement of Work (SOW) must accompany any classified proposal.

Classified proposals shall be submitted directly to the attention of ONR’s Document Control Unit at the following address:

Office of Naval Research
Document Control Unit
ONR Code 43
875 North Randolph Street
Arlington, VA 22203-1995

The inner wrapper of the classified proposal should be addressed to the attention of the TPOC.

Proposal submissions will be protected from unauthorized disclosure in accordance with FAR Subpart 15.207, applicable law, and DoD/DoN regulations. Offerors are expected to appropriately mark each page of their submission that contains proprietary information.

The proposal shall include a severable, self-standing Statement of Work, which contains only unclassified information and does not include any proprietary restrictions.

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

The proposal format and content identified below are applicable to the submission of proposals for contracts, cooperative agreements and other transactions. As noted in Paragraph 5 below, proposals selecting grant awards are to be formatted as required by Standard Form 424 (R&R), which is available via the internet at <http://www.grants.gov/>.

a. WHITE PAPERS

White Paper Format

- Paper Size – 8.5 x 11 inch paper
- Margins – 1 inch
- Spacing – single or double-spaced
- Font – Times New Roman, 12 point
- Number of Pages – No more than six (6) single-sided pages (excluding cover page and resumes). White Papers exceeding the page limit may not be evaluated.
- Copies – one (1) electronic copy in Microsoft Word or PDF format submitted via E-mail.

White Paper Content

- **Cover Page:** The Cover Page shall be labeled “PROPOSAL WHITE PAPER” and shall include the BAA number, proposed title, relevant Thrust Area within this BAA, and the Offeror’s administrative and technical points of contact along with their telephone numbers, facsimile numbers, and Internet addresses. The cover page shall be signed by an authorized officer.
- **Technical Concept:** A three (3) page technical section which clearly describes the objectives of the proposed effort, technical issues to be resolved to accomplish objectives, the technical approach proposed to resolve these issues, an assessment of the proposed new capability over the existing state of the art, and a comparison against competing technological developments. This section should include references.
- **Programmatic Section:** A one (1) page programmatic section that includes milestones and a timetable.
- **Resumes:** – A single page (each) summary resume (including previous relevant experience and pertinent publications) for the Principal Investigator (PI) and other key personnel.

- **Deliverables:** A one (1) page list of proposed deliverables for the effort.
- **Cost:** A one (1) page summary of costs segregated by tasks.

b. FULL PROPOSALS

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

- Paper Size – 8.5 x 11 inch paper
- Margins – 1 inch
- Spacing – single or double-spaced
- Font – Times New Roman, 12 point
- Number of Pages – Volume 1 is limited to no more than twenty (20) pages (applies to Technical Proposal only). Volume 2 has no page limitations. Limitations within sections of the Technical Proposal are indicated in the individual descriptions shown below. The cover page, table of contents, and resumes are excluded from the page limitations. Full Proposals exceeding the page limit may not be evaluated.
- Copies – one (1) original, 4 copies and one electronic copy on a 3.5” Diskette or CD-ROM (in Microsoft® Word or Excel 97 compatible or .PDF format). If a grant is sought, the full proposal may be submitted electronically at <http://www.grants.gov/> as delineated below.

Full Proposal Content

Volume 1: Technical Proposal

- **Cover Page (not included in page limitation):** This should include the words “Technical Proposal” and the following:

- 1) BAA number;
- 2) Title of Proposal;
- 3) Identity of prime Offeror and complete list of subcontractors, 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) Duration of effort (differentiate basic effort and any proposed options)
- 7) Relevant Thrust Area within this BAA

- **Table of Contents (not included in page limitation):** An alphabetical/numerical listing of the sections within the proposal, including corresponding page numbers.

- **Abstract:** This should be concise (approximately 200 words) abstract of the proposed effort. It should include a discussion of how the proposed research effort will respond to the objectives of ONR.

- **Statement of Work:** A Statement of Work (SOW) clearly detailing the scope and objectives of the effort and the technical approach. It is anticipated that the proposed SOW will be incorporated as an attachment to the resultant award instrument. To this end, the proposals must include a severable, self-standing SOW without any proprietary restrictions, which can be attached to the contract or agreement award. Include a detailed listing of the technical tasks/subtasks organized by year.

Include a description of general and special facilities available for performing the proposed work, and the rationale for requested support of any facilities, equipment, or materials.

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

- **Assertion of Data Rights and/or Rights in Computer Software:** For a contract award an Offeror may provide with its proposal assertions to restrict use, release or disclosure of data and/or computer software that will be provided in the course of contract performance. The rules governing these assertions are prescribed in Defense Federal Acquisition Regulation Supplement (DFARS) clauses 252.227-7013, -7014 and - 7017. These clauses may be accessed at the following web address:

<http://farsite.hill.af.mil/VFDFARA.HTM>

The Government may challenge assertions that are provided in improper format or that do not properly acknowledge earlier federal funding of related research by the Offeror.

- **Deliverables:** A detailed description of the results and products to be delivered inclusive of the timeframe in which they will be delivered.

- **Management Approach:** A discussion of the overall approach to the management of this effort, including brief discussions of the total organization, use of personnel, project/function/subcontractor relationships, government research interfaces, and planning/scheduling/control practice. Identify which personnel and subcontractors (if any) will be involved. Include a description of the facilities that are required for the proposed effort with a description of any Government Furnished Equipment/Hardware /Software/Information required, by version and/or configuration. Discuss how the proposed effort might be coordinated with Navy and industrial counterparts.

- **Technical Approach:** The offeror shall provide a detailed plan that coherently describes the technical approach proposed for contract performance which demonstrates a technical understanding of the proposed Statement of Work (SOW). The technical

approach should address each of the numbered task areas delineated in the SOW providing specific or unique techniques to be employed and anything else the offeror considers relevant in performing the SOW. The technical approach should indicate how the work will be performed, including the capabilities and resources which will be applied, what problem areas exist, the proposed solutions and a full explanation of the proposed disciplines, procedures and techniques to be followed. Emphasis should be placed upon the extent that the offeror's technical approach ensures timely delivery and successful completion of the tasks outlined by the SOW submission.

- **Personnel:** The offeror shall provide resumes of proposed key personnel to be utilized by the contractor/subcontractor in the performance of this contract. The offeror shall ensure that the proposed personnel are fully capable of performing in an efficient, reliable and professional manner.

- **Past Performance:** Past performance consists of a description of the offeror's Government and commercial contracts (both prime and major subcontracts) received during the past three years for the performance of work similar to the effort being proposed. The offeror may describe any quality awards or certificates that indicate the offeror possesses a high quality process for providing desired research and development outcomes.

VOLUME 2: Cost Proposal

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

Although not required and provided for informational purposes only, detailed instructions, entitled "Instructions for Preparing Cost Proposals for Contracts and Agreements", including a sample template for preparing costs proposals for contracts and agreements, may be found at ONR's website listed under the 'Acquisition Department – Contracts & Grants Submitting a Proposal' link at:

http://www.onr.navy.mil/02/how_to.asp

Cover Page: The use of the SF 1411 is optional. The words "Cost Proposal" should appear on the cover page in addition to the following information:

- BAA number
- Title of Proposal
- Identity of prime Offeror and complete list of subcontractors, if applicable
- Technical contact (name, address, phone/fax, electronic mail address)
- Administrative/business contact (name, address, phone/fax, electronic mail address) and
- Duration of effort (separately identify basic effort and any proposed options)
- Summary Statement of Costs

- Cognizant DCAA and DCMA point of contact, address, phone/fax and e-mail address (if readily available)

Part 1 – Contract Costs: Detailed breakdown of all costs by cost category by calendar or Government fiscal year:

- Direct Labor – Individual labor categories or persons, with associated labor hours and unburdened direct labor rates;
- Indirect Costs – Fringe Benefits, Overhead, G&A, COM, etc. (Must show base amount and rate);
- Proposed Contractor-Acquired Equipment - such as computer hardware for proposed research projects should be specifically itemized with costs or estimated costs. An explanation of any estimating factors, including their derivation and application, shall be provided. Where possible, indicate purchasing method (competition, price comparison, market review, etc...);
- Travel – Number of trips, destination, duration, etc.;
- Subcontract – A cost proposal as detailed as the Offeror’s cost proposal will be required to be submitted by the subcontractor. The subcontractor’s or subrecipient’s cost proposal can be provided in a sealed envelope with the Offeror’s cost proposal or will be obtained from the subcontractor prior to award;
- Consultant – Provide consultant agreement or other document which verifies the proposed loaded daily/hourly rate;
- Materials - Should be specifically itemized with costs or estimated costs. An explanation of any estimating factors, including their derivation and application, shall be provided. Include a brief description of the Offeror's procurement method to be used (competition, engineering estimate, market survey, etc.);
- Other Directs Costs - particularly any proposed items of equipment or facilities. Equipment and facilities generally must be furnished by the contractor/recipient. (Justifications must be provided when Government funding for such items is sought). Include a brief description of the Offeror's procurement method to be used (Competition, engineering estimate, market survey, etc.);
- Grant Specific Costs – Costs not normally associated with contracts, such as Graduate Assistant tuition, laboratory fees, report and publication costs will be presented on SF 424(R&R) as discussed under Paragraph 5 below;
- Options – the Base Period of Performance and Option Periods must be priced at the submission of the proposal. Any proposal containing unpriced options will not be included in the contract;
- Fee/Profit (“CONTRACT PROPOSALS ONLY”)

Part 1 –Grant Recipient: If Offeror submits a Grant Cost/Budget Proposal via hardcopy in accordance with the Grants.gov format, the following information is provided as Cost/Budget proposal guidance. Submit a detailed breakdown of all costs by

cost category by calendar or Government fiscal year. The Cost Proposal/Budget should contain a detailed cost breakdown that includes:

- *Direct Labor - Labor category with associate hours and unburdened labor rate;
- *Graduate Assistant Tuition – Basis of estimate for Graduate Assistant Tuition;
- *Indirect Costs – Fringe benefits, overhead, G&A, etc...;
- *Equipment – Acquired equipment should be itemized with its associated cost along with the basis of estimate, i.e., quotes, invoices, catalog pricing;
- *Laboratory Costs – Basis of estimate for Laboratory Costs, inclusive of an itemized list along with basis of estimate, i.e., quotes, invoices, catalog pricing;
- *Report and Publication Costs – Basis of estimate for Report and Publication Costs;
- *Recipient Share – i.e., Cost sharing
- *Travel – Travel stating number of trips, destinations, duration, per diem, auto rental, privately owned vehicle (POV), etc...;
- *Subrecipients – A cost budget proposal as detailed as the Recipient’s cost proposal will be required to be submitted by the Subrecipient. The Subrecipient’s cost budget proposal can be provided in a sealed envelope with the Recipient’s cost budget proposal or will be obtained from the Subrecipient prior to Grant award;
- *Consultants – Consultant agreements or other document which verifies the proposed loaded daily/hourly rate;
- *Materials – Materials itemized with cost along with the basis of estimate;
- *Conferences – if during the research effort, and Recipient requires a conference in support of the project, there should be a statement within the Recipient’s cost budget proposal submission stating “the funds provided by ONR will not be used for food or beverages.”

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

3. Significant Dates and Times –

Anticipated Schedule of Events		
Event	Date	Eastern Time
White Paper Due Date	03 April 2008	3 P.M.
Notification of Initial Evaluations of White Papers*	24 April 2008	N.A
Full Proposal Due Date	22 May 2008	3 P.M.
Proposal Evaluations Complete*	18 June 2008	N.A
Estimated Award Date*	October/November 2008	N.A

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

NOTE: Due to changes in security procedures since September 11, 2001, the time required for hard-copy written materials to be received at the Office of Naval Research

has increased. Thus it is recommended that any hard-copy proposal be mailed several days before the deadline established in the solicitation so that it will not be received late and thus be ineligible for award consideration.

4. Submission of Late Proposals –

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

- If it was transmitted through an electronic commerce method authorized by the announcement, it was received at the initial point of entry to the Government infrastructure not later than 5:00 P.M. one working day prior to the date specified for receipt of proposals; or
- There is acceptable evidence to establish that it was received at the Government installation designated for receipt of proposals and was under the Government’s control prior to the time set for receipt of proposals; or
- It was the only proposal received.

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

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

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

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

Grants: Any proposal submitted through ‘Grants.gov’ after the deadline for proposal submission will be late and will not be evaluated unless the ‘Grants.gov’ website was not operational on the due date and was unable to receive the proposal submission. If this occurs, the time specified for the receipt of the proposals through Grants.gov will be extended to the same time of day specified in this BAA on the first workday on which the ‘Grants.gov’ website is operational.

5. Submission of Grant Proposals to Grants.gov

Grant Proposals may be submitted through Grants.gov or by hard copy. Regardless of whether Grants.gov is used or “hardcopy” submission, the offeror must use the Grants.gov forms from the application package template associated with the BAA on the Grants.gov website. To be considered for award, applicants must include the ONR Department Code in Block 4 entitled ‘Federal Identifier’ of the Standard Form (SF) 424 R&R. The correct Department Code is code 30. White Papers should not be submitted through the Grants.govApply process but rather should be sent directly to ONR. White paper submissions may be either mailed, faxed, or emailed directly to the appropriate ONR Program Officer/Program Manager.

For electronic submission of grant full proposals, there are several one-time actions that must be completed in order to submit an application through Grants.gov (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the Central Contract Registry (CCR), register with the credential provider, and register with Grants.gov). See www.grants.gov, specifically www.grants.gov/GetStarted.

Use the Grants.gov Organization Registration Checklist at http://www.grants.gov/applicants/register_your_organization.jsp which will provide guidance through the process. Designating an E-Business Point of Contact (EBiz POC) and obtaining a special password called ‘MPIN’ are important steps in the CCR registration process. Applicants who are not registered with CCR and Grants.gov should allow at least 21 days to complete these requirements. It is suggested that the process be started as soon as possible. Additionally, in order to download the application package, applicants will need to install PureEdgeViewer. This small, free program will allow applicants to access, complete and submit applications electronically and securely. For a free version of the software, visit the following website: www.grants.gov/DownloadViewer. Any questions that may arise 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 or support@grants.gov.

Detailed instructions entitled “Grants.Gov Electronic Application and Submission Information” on how to submit a Grant proposal through Grants.gov may be found at the ONR website listed under the ‘Acquisition Department – Contracts & Grants Submitting a Proposal’ link at: http://www.onr.navy.mil/02/how_to.asp

6. Address for the Submission of Hard Copy White Papers and Full Proposals for Contracts and Grants and Other Assistance Agreements.

A. Address for the Submission of White Papers (electronic copy)

White papers should be submitted as a PDF file or Microsoft Word Document email attachment to:

laura.worcester@navy.mil

B. Hard copies of white papers and full proposals for Contracts and Grants and Other Assistance Agreements should be sent to the Office of Naval Research at the following address:

Office of Naval Research
Attn: Ms. Laura Worcester
ONR Department Code: 30
875 North Randolph Street
Arlington, VA 22203-1995

FULL PROPOSALS SENT BY FAX OR EMAIL WILL NOT BE CONSIDERED

V. EVALUATION INFORMATION

1. Evaluation Criteria –

The following evaluation criteria apply to both the White Papers and the Full Proposals. Proposals will be selected through a technical/scientific/business decision process with technical and scientific considerations being more important than cost. Criteria A-D are listed in descending order of priority. Any subcriteria listed under a particular criterion are of equal importance to each other.

- A. Overall scientific and technical merits of the proposal
 - 1. The degree of innovation
 - 2. The soundness of technical concept
 - 3. The Offeror's awareness of the state of the art and understanding of the scope of the problem and the technical effort needed to address it
- B. Potential naval relevance and contributions of the effort to the agency's specific mission.
- C. Offeror's capabilities, related experience, and past performance, including the qualifications, capabilities and experience of the proposed principal investigator and personnel.
 - 1. The quality of technical personnel proposed
 - 2. The Offeror's experience in relevant efforts with similar resources
 - 3. The ability to manage the proposed effort.
- D. The amount and realism of the proposed costs.

For proposed awards to be made as contracts to large businesses, the socio-economic merits of each proposal will be evaluated based on the extent of the Offeror's commitment in providing meaningful subcontracting opportunities for small businesses, small disadvantaged businesses, woman-owned small businesses, HUBZone small businesses, veteran-owned small businesses, service disabled veteran-owned small businesses, historically black colleges and universities, and minority institutions.

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.

2. 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. Cost proposals will be evaluated by Government business professionals. Restrictive notices notwithstanding, one or more support contractors may be utilized as subject-matter-expert technical consultants. Similarly, support contractors may be utilized to evaluate cost proposals. However, proposal selection and award decisions are solely the responsibility of Government personnel. Each support contractor's employee having access to technical and cost proposals submitted in response to this BAA will be required to sign a non-disclosure statement prior to receipt of any proposal submissions.

VI. AWARD ADMINISTRATION INFORMATION

1. Administrative Requirements –

- The North American Industry Classification System (NAICS) code – The North American Industry Classification System (NAICS) code for this announcement is “541712” with a small business size standard of “500 employees”.
- Central Contractor Registry (CCR) - Successful Offerors not already registered in the CCR will be required to register in CCR prior to award of any grant, contract, cooperative agreement, or other transaction agreement. Information on CCR registration is available at <http://www.onr.navy.mil/02/ccr.htm>.
- Certifications – Proposals for contracts and grants should be accompanied by a completed certification package which can be accessed on the ONR Home Page at Contracts & Grants located at http://www.onr.navy.mil/02/rep_cert.asp.

Contracts:

For contracts, in accordance with FAR 4.1201, prospective contractors shall complete and submit electronic annual representations and certifications at <http://orca.bpn.gov>. In addition to completing the Online Representations and Certifications Application (ORCA), proposals must be accompanied with a completed DFARS and contract specific representations and certifications. These "DFARS and Contract Specific Representations and Certifications", i.e., Section K, may be accessed under the Contracts and Grants Section of the ONR Home Page at http://www.onr.navy.mil/02/rep_cert.asp.

Assistance Agreements:

For grant proposals and proposals for cooperative agreements or other transaction agreements (other than for prototypes), the certification package is entitled [Certifications for Grants and Agreements](#)

Grant awards greater than \$100,000 require a certification of compliance with a national policy mandate concerning lobbying. Grant and other assistance applicants may provide this certification in one of three (3) ways:

- 1) By signing and submitting the Standard Form (SF) 424 (R&R) as a part of a hard copy grant proposal submission (complete Blocks 18 and 19);
- 2) By electronic submission of SF424 (R&R) as a part of an electronic proposal submitted via Grants.gov (complete Blocks 18 and 19); or
- 3) By hard copy submission of the full text lobbying certification found at http://www.onr.navy.mil/02/rep_cert.asp.

The following certification applies to each applicant seeking federal assistance funds exceeding \$100,000:

CERTIFICATION REGARDING LOBBYING ACTIVITIES

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

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

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

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

- Subcontracting Plans - Successful contract proposals that exceed \$550,000, submitted by all but small business concerns, will be required to submit prior to award a Small Business Subcontracting Plan in accordance with FAR 52.219-9.

2. Reporting -

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

- *Technical and Financial Progress Reports
- *Presentation Materials
- *Final Report

Additional data deliverables may be proposed and finalized during negotiations. Research performed under contracts may also include the delivery of software, prototypes, and other hardware deliverables.

VII. OTHER INFORMATION

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

Each proposer must provide a very specific description of any equipment/hardware that it needs to acquire to perform the work. This description should indicate whether or not each particular piece of equipment/hardware will be included as part of a deliverable item under the resulting award. Also, this description should identify the component, nomenclature, and configuration of the equipment/hardware that it proposes to purchase for this effort. The purchase on a direct reimbursement basis of special test equipment or other equipment that is not included in a deliverable item will be evaluated for allowability on a case-by-case basis. Maximum use of Government integration, test, and experiment facilities is encouraged in each of the Offeror's proposals.

Government research facilities and operational military units are available and should be considered as potential government-furnished equipment/facilities. These facilities and resources are of high value and some are in constant demand by multiple programs. It is unlikely that all facilities would be used for any one specific program. The use of these facilities and resources will be negotiated as the program unfolds. Offerors should explain as part of their proposals which of these facilities are critical for the project's success.

2. Security Classification

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

3. Use of Animals and Human Subjects in Research

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

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

4. 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 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/>.

5. Protection of Proprietary and Sensitive Information

The parties acknowledge that, during performance of the contract or grant agreement resulting from this BAA, the recipient may require access to certain proprietary and confidential information (whether in its original or derived form) submitted to or produced by the Government. Such information includes, but is not limited to, business practices, proposals, designs, mission or operation concepts, sketches, management policies, cost and operating expense, technical data and trade secrets, proposed Navy budgetary information, and acquisition planning or acquisition actions, obtained either directly or indirectly as a result of the effort performed on behalf of ONR. The recipient shall take appropriate steps not only to safeguard such information, but also to prevent disclosure of such information to any party other than the Government. The recipient agrees to indoctrinate company personnel who will have access to or custody of the information concerning the nature of the confidential terms under which the Government received such information and shall stress that the information shall not be disclosed to any other party or to recipient personnel who do not need to know the contents thereof for the performance of the contract/agreement. Recipient personnel shall also be informed that they shall not engage in any other action, venture, or employment wherein this information will be used for any purpose by any other party.

6. Project Meetings and Reviews

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

7. Submission of Questions

Any questions regarding this solicitation must be provided to the Science and Technology Point of Contact and/or Business Point of Contact listed in this solicitation. All questions shall be submitted in writing by electronic mail.

Questions regarding **white papers** must be submitted by 2:00 P.M. Eastern Time on 3/26/2008. Questions after this date and time may not be answered, and the due date for submission of the white papers will not be extended.

Questions regarding **full proposals** must be submitted by 2:00 P.M. Eastern Time on 5/14/2008. Questions after this date and time may not be answered, and the due date for submission of the proposals will not be extended