Broad Agency Announcement

Systems of Neuromorphic Adaptive Plastic Scalable Electronics

Defense Sciences Office

DARPA-BAA 08-28

4/9/08

TABLE OF CONTENTS

Part One: Overview Information

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Defense Sciences Office (DSO)
- **Funding Opportunity Title –** Systems of Neuromorphic Adaptive Plastic Scalable Electronics (SyNAPSE)
- **Announcement Type –** Initial Announcement
- **Funding Opportunity Number –** Broad Agency Announcement (BAA) 08-28
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – 12.910 Research and Technology Development
- **Dates**
  - **Initial Full Proposals due 4:00 pm ET, May 22, 2008**
  - Closing Date, 4:00 pm ET, April 8, 2009
- **Brief Description** - DARPA's Defense Sciences Office is soliciting innovative research proposals in the area of Systems of Neuromorphic Adaptive Plastic Scalable Electronics (SyNAPSE). Proposed research should investigate innovative approaches that enable revolutionary advances in neuromorphic electronic devices that are scalable to biological levels.
- **Multiple awards are anticipated**
- **Types of instruments that may be awarded** -- Procurement contract or other transaction.
- **Agency contact**
  - Points of Contact
    The BAA Technical POC is Dr. Todd Hylton, who can be reached at Todd.Hylton@darpa.mil

    The BAA Administrator for this effort can be reached at:
    Electronic mail: BAA08-28@darpa.mil
    DARPA/DSO
    ATTN: BAA 08-28
    3701 North Fairfax Drive
    Arlington, VA 22203-1714
    Phone: (571) 218-4565

    Solicitations can be viewed at:
    Web: http://www.darpa.mil/dso/solicitations/solicit.htm

Part Two: Full Text of Announcement

I. FUNDING OPPORTUNITY DESCRIPTION

The Defense Advanced Research Projects Agency often selects its research efforts through the Broad Agency Announcement (BAA) process. The BAA will appear on the FedBizOpps website, http://www.fedbizopps.gov/. The following information is for those wishing to respond to the BAA.

DARPA's Defense Sciences Office is soliciting innovative research proposals in the area of Systems of Neuromorphic Adaptive Plastic Scalable Electronics (SyNAPSE). Proposed research should investigate innovative approaches that enable revolutionary advances in neuromorphic electronic devices that are scalable to biological levels. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

Background and Description

Over six decades, modern electronics has evolved through a series of major developments (e.g., transistors, integrated circuits, memories, microprocessors) leading to the programmable electronic machines that are ubiquitous today. Owing both to limitations in hardware and architecture, these machines are of limited utility in complex, real-world environments, which demand an intelligence that has not yet been captured in an algorithmic-computational paradigm. As compared to biological systems for example, today's programmable machines are less efficient by a factor of one million to one billion in complex, real-world environments. The SyNAPSE program seeks to break the programmable machine paradigm and define a new path forward for creating useful, intelligent machines.

The vision for the anticipated DARPA SyNAPSE program is the enabling of electronic neuromorphic machine technology that is scalable to biological levels. Programmable machines are limited not only by their computational capacity, but also by an architecture requiring (human-derived) algorithms to both describe and process information from their environment. In contrast, biological neural systems (e.g., brains) autonomously process information in complex environments by automatically learning relevant and probabilistically stable features and associations. Since real world systems are always many body problems with infinite combinatorial complexity, neuromorphic electronic machines would be preferable in a host of applications—but useful and practical implementations do not yet exist.

The key to achieving the vision of the SyNAPSE program will be an unprecedented multidisciplinary approach that can coordinate aggressive technology development activities in the following areas: 1) hardware; 2) architecture; 3) simulation; and 4) environment.

- *Hardware* implementation will likely include CMOS devices, novel synaptic components, and combinations of hard-wired and programmable/virtual connectivity. These will support critical information processing techniques observed in biological systems, such as spike encoding and spike time dependent plasticity.
- *Architectures* will support critical structures and functions observed in biological systems such as connectivity, hierarchical organization, core component circuitry, competitive

self-organization, and modulatory/reinforcement systems. As in biological systems, processing will necessarily be maximally distributed, nonlinear, and inherently noise- and defect-tolerant.

- Large scale digital *simulations* of circuits and systems will be used to prove component and whole system functionality and to inform overall system development in advance of neuromorphic hardware implementation.
- *Environments* will be evolving, virtual platforms for the training, evaluation and benchmarking of intelligent machines in various aspects of perception, cognition, and response.

Realizing this ambitious goal will require the collaboration of numerous technical disciplines such as computational neuroscience, artificial neural networks, large-scale computation, neuromorphic VLSI, information science, cognitive science, materials science, unconventional nanometer-scale electronics, and CMOS design and fabrication. We are looking for cohesive, integrated, multi-disciplinary teams capable of addressing all aspects of the problem. DARPA recognizes that many of the required elements of the program are areas of active debate and ongoing research. Therefore, we require proposers to organize their development plan into an aggressive, multi-phased effort that addresses a number of critical go/no-go metrics based milestones. Proposers have some flexibility in program structure, however they must include a "Phase 0" feasibility effort (approximately 9 months) that addresses the initial hardware and architecture metrics listed under "Phase 0 Metrics" below. DARPA believes that accomplishing the additional "Core Program Metrics" will require at least three and perhaps four additional "Phases" to achieve the final deliverable metric. While proposers may combine two sets of metrics into a single phase, in no case may the time duration of any phase exceed 18 months. Proposers must clearly demonstrate that the milestones are to be met sequentially and in the order listed below.

Phase 0 Metrics:

Hardware - Demonstrate an electronic synaptic component exhibiting Spike Timing Dependent Plasticity (STDP) with:

- Synaptic density scalable to $> 10^{10}/cm^2$
- Operating speed >10 Hz
- Consumes $< 10^{-12}$ Joules per synaptic operation at scale
- Dynamic range of synaptic conductance > 10
- Synaptic conductance increase >1%/pulse for presynaptic spike applied somewhere within 80-1 msec before a postsynaptic spike
- Synaptic conductance decrease >1%/pulse for presynaptic spike applied somewhere within 1-80 msec after postsynaptic spike.
- 0%-0.02% conductance decrease if presynaptic spike applied > 100 msec before or after postsynaptic spike
- Performance maintained over 3×10^8 synaptic operations

Architecture

- Specify and validate by simulation the function of core microcircuit assemblies using measured synaptic properties. The chosen microcircuits must support the larger system

architecture and demonstrate spike time encoding, spike time dependent plasticity, and competitive neural dynamics.

Core Program Metrics

Go/No-Go Milestones Set 1 ("Phase 1"):

Hardware

- Demonstrate all core micro-circuit functions in hardware
- Specify a chip fabrication process supporting the architecture with > 10^{10} synapse/cm^2, > 10^6 neurons/cm^2

Architecture

- Demonstrate a neuromorphic design methodology that can specify all the components, subsystems, and connectivity of a complete system
- Specify a corresponding electronic implementation of the neuromorphic design methodology supporting > 10^{14} synapses, > 10^{10} neurons, mammalian connectivity, < 1 kW, < 2 L

Simulation

- Demonstrate dynamic neural activity, network stability, synaptic plasticity, and self-organization in response to sensory stimulation and system-level modulation/reinforcement in a system of ~ 10^6 neurons

Environment

- Demonstrate virtual Visual Perception, Decision and Planning, and Navigation Environments with a selectable range of complexity corresponding roughly to the capabilities demonstrated across a ~10^4 range in brain size in small-to-medium mammalian species

Go/No-Go Milestones Set 2 ("Phase 2"):

Hardware

- Demonstrate chip fabrication of > 10^{10} synapse/cm^2, > 10^6 neurons/cm^2

Architecture

- Design a complete neural system of ~ 10^{10} synapses and ~ 10^6 neurons for simulation testing
- Design a corresponding single chip neural system of ~ 10^{10} synapses and ~ 10^6 neurons

Simulation

- Demonstrate a simulated neural system of ~10^6 neurons performing at "mouse" level in the virtual environment

Environment

- Expand the Sensory Environment to include training and evaluation of Auditory Perception and Proprioception
- Expand the Navigation Environment to include features stressing Competition for Resources and Survival
- Demonstrate a selectable range of complexity corresponding roughly to the capabilities demonstrated across a ~10^6 range in brain size mammalian species

Go/No-Go Milestones Set 3 ("Phase 3"):
Hardware

- Fabricate a single chip neural system of ~ 10^6 neurons and package into a fully functioning assembly. Show "mouse" level performance in the virtual environment. Architecture
- Design a neural system of ~ 10^{12} synapses and ~ 10^8 neurons for simulation testing
- Design a corresponding single chip neural system of ~ 10^{12} synapses and ~ 10^8 neurons

Simulation

- Demonstrate a simulated neural system of ~10^8 neurons performing at "cat" level

Environment

- Add Touch to the Sensory Environment
- Add a Symbolic Environment

Final Deliverable Metric – Milestone Set 4 ("Phase 4"):
Hardware

- Fabricate a multi-chip neural system of ~ 10^8 neurons and instantiate into a robotic platform performing at "cat" level

The animal tokens (e.g. "mouse") used in the above metrics are indicators of complexity; they are not intended to specify particular architectural requirements or environmental behaviors.

The responsive proposal will be from a team that articulates a Phase 0 work plan followed by a multi-phased Core Program that addresses, sequentially, all of the critical metrics detailed above in a comprehensive plan addressing the overall vision of the program. In addition, proposals should include discussions of the following fundamental SyNAPSE issues. All key unknowns that need to be resolved should be identified.

Proposals should address the following items with regard to the development of hardware, architecture, and simulation:

1. Describe an approach to developing an integrated neuromorphic architecture serving as a foundation for the development of intelligent machines:
    a. Describe the base components of your architecture and their function. These base components may be the analogs of biological neurons, synapses and/or small assemblies of such elements. Describe the computational, communication, and learning functions of these base components.
    b. Describe one or more core micro-assemblies of the base components and their corresponding function.
    c. Describe your approach for developing functional assemblies from the core assemblies. These assemblies should provide core cognitive functions such as sensory perception, motor control, executive control, and others.
    d. Describe your approach to integrate functional assemblies into complete cognitive systems including sensory perception, declarative learning and memory, procedural learning and memory, executive control, and motor function.

e. Describe any plan to incorporate neuro-anatomical/physiological data into the architecture.

2. Describe a high-level, conceptual electronics implementation capable of supporting the neuromorphic architecture of (1) having:
   a. 10^{14} synapses;
   b. 10^{10} neurons;
   c. Temporal dynamics operation comparable to biological systems;
   d. Total power < 1kW;
   e. Total volume < 2 L; and
   f. Interfaces for sensory inputs and motor outputs.
3. Describe an approach to developing nanometer-scale, plastic synaptic components consistent with (1) and (2). Multiple approaches are encouraged for this task.
4. Describe an approach to developing electronic neuronal processing units (neurons) consistent with (1), (2), and (3).
5. Describe an electronic coding, communication and synaptic update scheme consistent with (1), (2), (3), and (4).
6. Describe a plan of computer simulation/emulation to enable the near real-time simulation of neuromorphic systems up to 10^{12} synapses and 10^{8} neurons.
7. Describe a plan to obtain and import descriptions of neural systems from neuro-biological databases (as appropriate).
8. Describe key technical challenges and approaches to achieving these goals and any other items on the critical path.

Machine intelligence is an emerging and diverse discipline, which lacks standards of evaluation. The techniques used to measure human intelligence suggest that measures of machine intelligence should comprise a diversity of tasks that collectively provide both quantitative and comparative measures of performance.

1. Describe an approach for developing a virtual training and evaluation environment comprised of the following tasks:
   a. A Planning and Decision (Game) Task that provides quantitative measures of complexity and objective and comparative measures of performance.
   b. A Sensory Perception Task that provides quantitative measures of performance of identification/classification of spatio-temporal objects in animation or video.
   c. A Navigation Task that captures the challenges confronted in navigating in complex, dynamic environments. The purpose of this task is to evaluate a collection of cognitive capabilities and to provide a point of comparison to animal studies.
2. Describe a means to scale the complexity of these tasks over the entire range of mammalian intelligence (~10^{6} range in brain size).

3. Describe a capability for hosting the environment including hardware, software and system support.
4. Describe a virtual interface for interacting with the environment.

The collection of these tasks should form an overarching environment with the following characteristics and features:

a. Adaptation in dynamic, uncertain, probabilistic environments that include partial, erroneous and sometimes contradictory information;

b. Response times that force speed-accuracy tradeoffs;

c. Knowledge integration over different sources and times of knowledge acquisition; and multiple levels of perception, planning and reasoning;

d. Interaction with other agents;

e. Feedback based on generic, high-level goals and supervision of a tutor;

f. Scalability to match system complexity and support incremental learning;

g. Scoring to provide quantitative measures of performance; and

h. Benchmarking to provide comparative measures of performance.

II. AWARD INFORMATION

Multiple awards are anticipated. The amount of resources made available to this BAA will depend on the quality of the proposals received and the availability of funds. Proposals identified for funding may result in a procurement contract or other transaction depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. Proposers should note that the required degree of interaction between parties will be to the maximum extent possible as allowed by the contractual vehicle.

The Government reserves the right to select for negotiation all, some, one, or none of the proposals received in response to this solicitation and to make awards without discussions with proposers. The Government also reserves the right to conduct discussions if the Source Selection Authority later determines them to be necessary. If warranted, portions of resulting awards may be segregated into pre-priced options. Additionally, DARPA reserves the right to accept proposals in their entirety or to select only portions of proposals for award. In the event that DARPA desires to award only portions of a proposal, negotiations may be opened with that proposer. If the proposed effort is inherently divisible and nothing is gained from the aggregation, proposers should consider submitting it as multiple independent efforts. The Government reserves the right to fund proposals in phases with options for continued work at the end of one or more of the phases.

Awards under this BAA will be made to proposers on the basis of the evaluation criteria listed below (see Sec. V., "Application Review Information") and to provide overall value to the Government.

III. ELIGIBILITY INFORMATION

A. Eligible Applicants

All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities (HBCUs), Small Businesses, Small Disadvantaged Businesses 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 these organizations' participation due to the impracticality of reserving discrete or severable areas of this research for exclusive competition among these entities. Independent proposals from Government/National laboratories may be subject to applicable direct competition limitations, though certain Federally Funded Research and Development Centers are excepted per P.L. 103-337§ 217 and P.L 105-261 § 3136. Proposers from Government/National Laboratories must provide documentation to DARPA to establish that they are eligible to propose and have unique capabilities not otherwise available in private industry. If documentation is unavailable at the time of submission, Government/National Laboratories should remove all references to the BAA title and number, as they will be submitting non-competitively.

Foreign participants and/or individuals may participate to the extent that such participants comply with any necessary Non-Disclosure Agreements, Security Regulations, Export Control Laws, and other governing statutes applicable under the circumstances.

1. Procurement Integrity, Standards of Conduct, Ethical Considerations, and Organizational Conflicts of Interest

Current federal employees are prohibited from participating in particular matters involving conflicting financial, employment, and representational interests (18 USC 203, 205, and 208.). The DARPA Program Manager for this BAA is Dr. Todd Hylton. As of the date of first publication of the BAA, the Government has not identified any potential conflicts of interest involving this Program Manager. Once the proposals have been received, and prior to the start of proposal evaluations, the Government will assess potential conflicts of interest and will promptly notify the proposer if any appear to exist. (Please note the Government assessment does NOT affect, offset, or mitigate the proposer's own duty to give full notice and planned mitigation for all potential organizational conflicts, as discussed below.) The Program Manager is required to review and evaluate all proposals received under this BAA and to manage all selected efforts. Proposers should carefully consider the composition of their performer team before submitting a proposal to this BAA.

All proposers and proposed subcontractors must affirm whether they are providing scientific, engineering, and technical assistance (SETA) or similar support to any DARPA technical office(s) through an active contract or subcontract. All affirmations must state which office(s) the proposer supports and identify the prime contract numbers. Affirmations shall be furnished at the time of proposal submission. All facts relevant to the existence or potential existence of organizational conflicts of interest (FAR 9.5) must be disclosed. The disclosure shall include a description of the action the proposer has taken or proposes to take to avoid, neutralize, or mitigate such conflict. In accordance with FAR 9.503 and without prior approval or a waiver

from the DARPA Director, a contractor cannot simultaneously be a SETA and performer. Proposals that fail to fully disclose potential conflicts of interests and/or do not have plans to mitigate this conflict will be returned without technical evaluation and withdrawn from further consideration for award.

If a prospective proposer believes that any conflict of interest exists or may exist (whether organizational or otherwise), the proposer should promptly raise the issue with DARPA by sending the proposer's contact information and a summary of the potential conflict by email to the mailbox address for this BAA: BAA08-28@darpa.mil, before time and effort are expended in preparing a proposal and mitigation plan. If, in the sole opinion of the Government after full consideration of the circumstances, any conflict situation cannot be effectively mitigated, any proposal may be returned without technical evaluation and withdrawn from further consideration for award under this BAA.

B. Cost Sharing/Matching

Cost sharing is not required for any particular program; however, cost sharing will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument (e.g., for any other transactions under the authority of 10 U.S.C. § 2371). Cost sharing is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

C. Other Eligibility Criteria

1. Collaborative Efforts

Collaborative efforts/teaming are encouraged. A website, http://www.sainc.com/SyNAPSETeaming/index.asp has been established to facilitate formation of teaming arrangements between interested parties. Specific content, communications, networking, and team formation are the sole responsibility of the participants. Neither DARPA nor the Department of Defense (DoD) endorses the destination web site or the information and organizations contained therein, nor does DARPA or the DoD exercise any responsibility at the destination. This website is provided consistent with the stated purpose of this BAA.

IV. APPLICATION AND SUBMISSION INFORMATION

A. Address to Request Application Package

This solicitation contains all information required to submit a proposal. No additional forms, kits, or other materials are needed. This notice constitutes the total BAA. No additional information is available, nor will a formal Request for Proposal (RFP) or additional solicitation regarding this announcement be issued. Requests for same will be disregarded.

B. Content and Form of Application Submission

1. Full Proposal Information

This BAA shall remain open for one (1) year from the date of publication on www.fbo.gov. Proposers may submit a full proposal at any time up to the BAA closing date. **No proposal abstracts are requested, and any so sent will be rejected without review.** Although the Government may select proposals for award at any time during this period, it is anticipated that the majority of funding for this program will be committed during the initial selections from proposals that are submitted by 4:00PM ET, May 22, 2008. **In order to be considered during the initial round of funding, full proposals must be submitted to DARPA/DSO via http://www.sainc.com/dsobaa/ (Attn.: BAA08-28) on or before 4:00PM ET, May 22, 2008.** Further awards after the initial round of funding will be made contingent on the availability of funds. DARPA will acknowledge receipt of the submission and confirm the control number assigned during the online submission process. This control number should be used in all further correspondence regarding the full proposal. All submitted proposals will be fully reviewed against the criteria detailed in Section V.

Full proposals may not be submitted by fax or e-mail; any so sent will be disregarded.

The typical proposal should express a consolidated effort in support of one or more related technical concepts or ideas. Disjointed efforts should not be included into a single proposal.

Restrictive notices notwithstanding, proposals may be handled, for administrative purposes only, by a support contractor. This support contractor is prohibited from competition in DARPA technical research and is bound by appropriate nondisclosure requirements.

Proposals not meeting the format described in the BAA may not be reviewed and will be rejected back to the submitter.

General Submissions (For Proposers Submitting to DSO's Electronic Business Application):

All proposals submitted electronically by means of an Electronic Business Application Tool or proposal submission web site (not including Grants.gov) must be encrypted using Winzip or PKZip with 256-bit AES encryption. Only one zipped/encrypted file will be accepted per proposal and proposals not zipped/encrypted will be rejected by DARPA. An encryption password form must be completed and emailed to BAA08-28@darpa.mil at the time of proposal submission. See https://www.tfims.darpa.mil/baa/ for the encryption password form.

Note the word "PASSWORD" must appear in the subject line of the above email and there are minimum security requirements for establishing the encryption password. Failure to provide the encryption password may result in the proposal not being evaluated. For further information and instructions on how to zip and encrypt proposal files, see https://www.tfims.darpa.mil/baa/.

Note that the TFIMS website listed above (https://www.tfims.darpa.mil/baa/) will **NOT** host DSO solicitations. **For responses to DSO solicitations, a website,**

http://www.sainc.com/dsobaa/, has been established to facilitate the submission of proposal abstracts and full proposals electronically. This site will allow submission of contact information and the upload of a single document in either Word or PDF format, up to 25 MB. As noted above, all BAA submissions must be zipped and encrypted using Winzip or PKZip with 256-bit AES encryption. Again, only one compressed/encrypted file, containing a single proposal document, will be accepted per submission and those submissions that are not compressed/encrypted will be rejected by DARPA/DSO. The aforementioned password form and detailed encryption instructions are available for download at http://www.sainc.com/dsobaa/.

For All:

Any administrative questions or issues regarding this solicitation should be directed to the administrative address below; e-mail is preferred:

BAA08-28@darpa.mil
BAA Administrator, Phone: (571) 218-4565

DARPA/DSO
ATTN: BAA 08-28
3701 North Fairfax Drive
Arlington, VA 22203-1714

Upon review, DARPA/DSO will use facsimile transmission and standard post mail for correspondence regarding BAA 08-28 evaluation results. DARPA encourages use of the Internet (http://www.darpa.mil/dso/solicitations/solicit.htm) for retrieving the BAA and any other related information that may subsequently be provided.

2. Full Proposal Format

All full proposals must be in the format given below. **Nonconforming proposals may be rejected without review.** Proposals shall consist of two volumes, combined into one document prior to submission. All pages shall be printable on 8-1/2 by 11 inch paper with type not smaller than 12 point. Smaller font may be used for figures, tables, and charts. The page limitation for full proposals includes all figures, tables, and charts. Volume I, Technical and Management Proposal, may include an attached bibliography of relevant technical papers or research notes (published and unpublished) which document the technical ideas and approach upon which the proposal is based. Copies of not more than three (3) relevant papers can be included with the submission. Intellectual Property/Patents Requirements, the bibliography, and attached papers are not included in the page counts given below. The submission of other supporting materials along with the proposals is strongly discouraged and will not be considered for review. Except for the attached bibliography and Section I, Volume I shall not exceed {**55**} number pages. Recommended maximum page lengths for each section are shown in braces { } below. All full proposals must be written in English.

Volume I, Technical and Management Proposal

Section I. Administrative

A. Cover sheet to include:
   (1) BAA number
   (2) Technical area
   (3) Lead Organization submitting proposal
   (4) Type of Business, selected among the following categories: "LARGE BUSINESS", "SMALL BUSINESS", "SMALL DISADVANTAGED BUSINESS", "8A", "OTHER SMALL BUSINESS", "EMERGING SMALL BUSINESS", "VETERAN-OWNED SMALL BUSINESS", "SERVICE-DISABLED VETERAN OWNED", "OTHER VETERAN", "WOMAN-OWNED BUSINESS", "HUBZONE", "JWOD PARTICIPATING NONPROFIT AGENCY", "OTHER NONPROFIT", "HOSPITAL", "FOREIGN CONCERN OR ENTITY", "DOMESTIC FIRM PERFORMING OUTSIDE U.S.", "HISTORICALLY BLACK COLLEGE OR UNIVERSITY (HBCU)", "MINORITY INSTITUTION (MI)", "OTHER EDUCATIONAL", "FFRDC (INCLUDING DOE LABORATORIES)", "DOD COMPONENT", "OTHER GOVERNMENT", "OTHER"
   (5) Contractor's reference number (if any)
   (6) Other team members (if applicable) and Type of Business for each
   (7) Proposal title
   (8) Technical point of contact to include: salutation, last name, first name, street address, city, state, nine-digit zip code, telephone, fax (if available), electronic mail (if available)
   (9) Administrative point of contact to include: salutation, last name, first name, street address, city, state, nine-digit zip code, telephone, fax (if available), electronic mail (if available)
   (10) Total Funds requested from DARPA, and the amount of cost share (if any)
   (11) Duration (in months) of proposed work, and
   (12) Date proposal was submitted.

B. Official signed transmittal letter.

Section II. Summary of Proposal

A. {1} Innovative claims for the proposed research. This section is the centerpiece of the proposal and should succinctly describe the uniqueness and benefits of the proposed approach relative to the current state-of-art alternate approaches.
B. {2} Deliverables associated with the proposed research. Include in this section all proprietary claims to the results, prototypes, intellectual property, or systems supporting and/or necessary for the use of the research, results, and/or prototype. If there are not proprietary claims, this should be stated.
C. {1} Cost, schedule and payable milestones for the proposed research, including estimates of cost for each task in each year of the effort delineated by the prime and major subcontractors, total cost and company cost share, if applicable. **Note:**

Measurable critical milestones should occur 9 months after start of the Phase 0 effort and at intervals not to exceed 18 months thereafter. These payable milestones should enable and support a go/no-go decision for the next part of the effort. Additional interim non-critical management milestones are also highly encouraged at a regular interval.

D. {4} Technical rationale, technical approach, and constructive plan for accomplishment of technical goals in support of innovative claims and deliverable production. (This section should be supplemented by a more detailed plan in Section III.)
E. {1} General discussion of other research in this area.
F. {1} A clearly defined organization chart for the program team which includes, as applicable: (1) the programmatic relationship of team members; (2) the unique capabilities of team members; (3) the task of responsibilities of team members; (4) the teaming strategy among the team members; and (5) the key personnel along with the amount of effort to be expended by each person during each year.

Section III. Detailed Proposal Information

This section provides the detailed discussion of the proposed work necessary to enable an in-depth review of the specific technical and managerial issues. Specific attention must be given to addressing both risk and payoff of the proposed work that make it desirable to DARPA.

A. {8} Statement of Work (SOW) - In plain English, clearly define the technical tasks/subtasks to be performed, their durations, and dependencies among them. The page length for the SOW will be dependant on the amount of the effort; however, it should be written so that it can be made a part of any resulting award instrument. For each task/subtask, provide:

- A general description of the objective (for each defined task/activity);
- A detailed description of the approach to be taken to accomplish each defined task/activity);
- Identification of the primary organization responsible for task execution (prime, sub, team member, by name, etc.);
- The exit criteria for each task/activity - a product, event or milestone that defines its completion;
- Define all deliverables (reporting, data, reports, software, etc.) to be provided to the Government in support of the proposed research tasks/activities.

Note: It is recommended that the SOW should be developed so that each Phase of the program is separately defined. Do not include any proprietary information in the SOW as it is intended to be made a part of any resulting award instrument.

B. {3} Description of the results and deliverables enhancing that of Section II.B. See also "Intellectual Property" below, and include any and all necessary documentation.
C. {20} Detailed technical rationale enhancing that of Section II.D.
D. {3} Discussion of proposer's previous accomplishments and work in closely related research areas.
E. {3} Description of the facilities that would be used for the proposed effort.

F. {3} Detailed support enhancing that of Section II.F., including formal teaming agreements which are required to execute this program.

G. {5} Expanded cost schedules and payable milestones for the proposed research, including estimates of cost for each task in each year of the effort delineated by the primes and major subcontractors, total cost, and any company cost share. **Note: Measurable critical milestones should occur no later than 9 months after the start of the Phase 0 effort and no later than every 18 months thereafter.** These metrics-based payable milestones should enable and support a go/no-go decision for the next part of the effort. Additional interim non-critical management milestones are also highly encouraged at regular intervals. Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each. Additionally, proposals should clearly explain the technical approach(es) that will be employed to meet or exceed each program metric and provide ample justification as to why the approach(es) is/are feasible.

Section IV. Other Required Information (Does Not Count Toward Volume I Page Limitation)

A. Intellectual Property – Procurement Contract Proposers

Noncommercial Items (Technical Data and Computer Software)

Proposers responding to this BAA requesting a procurement contract to be issued under the FAR/DFARS shall identify all noncommercial technical data and noncommercial computer software that it plans to generate, develop, and/or deliver under any proposed award instrument in which the Government will acquire less than unlimited rights, and to assert specific restrictions on those deliverables. Proposers shall follow the format under DFARS 252.227-7017 for this stated purpose. In the event that proposers do not submit the list, the Government will assume that it automatically has "unlimited rights" to all noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, unless it is substantiated that development of the noncommercial technical data and noncommercial computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, then proposers should identify the data and software in question, as subject to Government Purpose Rights (GPR). In accordance with DFARS 252.227-7013 Rights in Technical Data - Noncommercial Items, and DFARS 252.227-7014 Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation, the Government will automatically assume that any such GPR restriction is limited to a period of five (5) years in accordance with the applicable DFARS clauses, at which time the Government will acquire "unlimited rights" unless the parties agree otherwise. Proposers are admonished that the Government will use the list during the source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer, as may be necessary, to evaluate the proposer's assertions. If no restrictions are intended, then the proposer should state "NONE."

A sample list for complying with this request is as follows:

NONCOMMERCIAL			
Technical Data Computer Software To be Furnished With Restrictions	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(LIST)	(LIST)	(LIST)

Commercial Items (Technical Data and Computer Software)
Proposers responding to this BAA requesting a procurement contract to be issued under the FAR/DFARS shall identify all commercial technical data and commercial computer software that may be embedded in any noncommercial deliverables contemplated under the research effort, along with any applicable restrictions on the Government's use of such commercial technical data and/or commercial computer software. In the event that proposers do not submit the list, the Government will assume that there are no restrictions on the Government's use of such commercial items. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer, as may be necessary, to evaluate the proposer's assertions. If no restrictions are intended, then the proposer should state "NONE."

A sample list for complying with this request is as follows:

COMMERCIAL			
Technical Data Computer Software To be Furnished With Restrictions	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(LIST)	(LIST)	(LIST)

B. Intellectual Property – Non-Procurement Contract Proposers

Noncommercial and Commercial Items (Technical Data and Computer Software)
Proposers responding to this BAA requesting an other transaction shall follow the applicable rules and regulations governing these various award instruments, but in all cases should appropriately identify any potential restrictions on the Government's use of any Intellectual Property contemplated under those award instruments in question. This includes both Noncommercial Items and Commercial Items. Although not required, proposers may use a format similar to that described in paragraph A. above. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions, and may request additional information from the proposer, as may be necessary, to evaluate the proposer's assertions. If no restrictions are intended, then the proposer should state "NONE."

C. All Proposers – Patents

Proposers shall include documentation proving their ownership of, or possession of, appropriate licensing rights to all patented inventions (or inventions for which a patent application has been filed) that will be utilized under their proposal for the DARPA program. If a patent application has been filed for an invention that the proposal utilizes, but the application has not yet been made publicly available and contains proprietary information, the proposer may provide only the patent number, inventor name(s), assignee names (if any), filing date, filing date of any related provisional application, and a summary of the patent title, together with either: 1) a representation that they own the invention, or 2) proof of possession of appropriate licensing rights in the invention.

D. All Proposers – Intellectual Property Representations

Proposers shall provide a good faith representation that they either own or possess appropriate licensing rights to all other intellectual property that will be utilized under their proposal for the DARPA program. Additionally, proposers shall provide a short summary for each item asserted with less than unlimited rights that describes the nature of the restriction and the intended use of the intellectual property in the conduct of the proposed research.

Section V. Additional Information

A brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas upon which the proposal is based. Copies of not more than three (3) relevant papers can be included in the submission.

Volume II, Cost Proposal – {No Page Limit}

A. Cover sheet to include:
   (1) BAA number
   (2) Technical area
   (3) Lead Organization submitting proposal
   (4) Type of business, selected among the following categories: "LARGE BUSINESS", "SMALL BUSINESS", "SMALL DISADVANTAGED BUSINESS", "8A", "OTHER SMALL BUSINESS", "EMERGING SMALL BUSINESS", "VETERAN-OWNED SMALL BUSINESS", "SERVICE-DISABLED VETERAN OWNED", "OTHER VETERAN", "WOMAN-OWNED BUSINESS", "HUBZONE", "JWOD PARTICIPATING NONPROFIT AGENCY", "OTHER NONPROFIT", "HOSPITAL", "FOREIGN CONCERN OR ENTITY", "DOMESTIC FIRM PERFORMING OUTSIDE U.S.", "HISTORICALLY BLACK COLLEGE OR UNIVERSITY (HBCU)", "MINORITY INSTITUTION (MI)", "OTHER EDUCATIONAL", "FFRDC (INCLUDING DOE LABORATORIES)", "DOD COMPONENT", "OTHER GOVERNMENT", "OTHER"

(5) Contractor's reference number (if any)
(6) Other team members (if applicable) and Type of Business for each
(7) Proposal title
(8) Technical point of contact to include: salutation, last name, first name, street address, city, state, nine-digit zip code, telephone, fax (if available), electronic mail (if available)
(9) Administrative point of contact to include: salutation, last name, first name, street address, city, state, nine-digit zip code, telephone, fax (if available), and electronic mail (if available)
(10) Award instrument requested: cost-plus-fixed-free (CPFF), cost-contract—no fee, cost sharing contract – no fee, or other type of procurement contract (*specify*) or other transaction
(11) Place(s) and period(s) of performance
(12) Total proposed cost separated by basic award and option(s) (if any)
(13) Name, address, and telephone number of the proposer's cognizant Defense Contract Management Agency (DCMA) administration office (*if known)*
(14) Name, address, and telephone number of the proposer's cognizant Defense Contract Audit Agency (DCAA) audit office (*if known*)
(15) Date proposal was prepared
(16) DUNS number
(17) TIN number
(18) Cage Code
(19) Subcontractor Information, and
(20) Proposal validity period.

B. Detailed cost breakdown to include:
(1) Total program cost broken down by major cost items (direct labor, including labor categories; subcontracts; materials; other direct costs, overhead charges, etc.) Government Fiscal Year (GFY = Oct 1 – 30 Sep);
(2) Major program tasks by GFY;
(3) An itemization of major subcontracts and equipment purchases;
(4) An itemization of any information technology (IT[1]) purchases broken down by month/year for each computer hardware cost, computer software cost,

[1] IT is defined as "any equipment, or interconnected system(s) or subsystem(s) of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the agency." (a) For purposes of this definition, equipment is used by an agency if the equipment is used by the agency directly or is used by a contractor under a contract with the agency which – (1) Requires the use of such equipment; or (2) Requires the use, to a significant extent, of such equipment in the performance of a service or the furnishing of a product. (b) The term "information technology" includes computers, ancillary, software, firmware and similar procedures, services (including support services), and related resources. (c) The term "information technology" does not include – (1) Any equipment that is acquired by a contractor incidental to a contract; or (2) Any equipment that contains imbedded information technology that is used as an integral part of the product, but the principal function of which is not the acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. For example, HVAC (heating, ventilation, and air conditioning) equipment such as thermostats or temperature control devices, and medical equipment where information technology is integral to its operation, are not information technology."

and other related costs such as computer maintenance fees or support services costs;

(5) A summary of projected funding requirements by month;

(6) The source, nature, and amount of any industry cost-sharing; and

(7) Identification of pricing assumptions of which may require incorporation into the resulting award instrument (e.g., use of Government Furnished Property/Facilities/Information, access to Government Subject Matter Expert(s), etc.)

The prime contractor is responsible for compiling and providing all subcontractor proposals for the Procuring Contracting Officer (PCO). Subcontractor proposals should include Interdivisional Work Transfer Agreements (ITWA) or similar arrangements.

Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as option with separate cost estimates for each.

NOTE: For IT and equipment purchases, include a letter stating why the proposer cannot provide the requested resources from its own funding.

C. Supporting cost and pricing information in sufficient detail to substantiate the summary cost estimates in B. above. Include a description of the method used to estimate costs and supporting documentation. Note: "cost or pricing data" as defined in FAR Subpart 15.4 shall be required if the proposer is seeking a procurement contract award of $650,000 or greater unless the proposer requests an exception from the requirement to submit cost of pricing data. "Cost or pricing data" are not required if the proposer proposes an award instrument other than a procurement contract. All subcontractor proposal documentation, prepared at the same level of detail as that required of the prime, shall be included, either by the proposer or by the subcontractor organization.

NOTE: The FY2008 Defense Appropriations Act caps indirect cost rates for any procurement contract, grant or agreement using 6.1 Basic Research FY08 Funding at 35% of the total cost of the award. Total costs include all bottom line costs. Indirect costs are all costs of a prime award that are Facilities and Administration costs (for awardees subject to the cost principles in 2 CFR part 220) or indirect costs (for awardees subject to the cost principles in 2 CFR part 225 or 230 or 48 CFR part 32). If DARPA anticipates using 6.1 funding for this effort, the Contractor must be made aware that total negotiated indirect cost rates may not exceed 35% of the total cost of the award. The cost limitations do not flow down to subcontractors. The original text of the Act can be found at Department of Defense Appropriations Act of 2008, Pub. L. No. 110-116, §8115, http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_public_laws&docid=f:publ116.110.

C. Submission Dates and Times

1. Full Proposal Date

To receive consideration under this BAA, **FULL PROPOSALS MUST BE RECEIVED VIA THE ONLINE SUBMISSION SITE ON OR BEFORE 4:00 PM ET, on 05/22/08** in order to be considered during the initial round of selections. Proposals received after this deadline may be received and evaluated up to one year from date of posting on FedBizOpps; however, further awards after the initial round of funding will be made contingent on the availability of funds.

DARPA will acknowledge receipt of complete submissions via email and confirm control numbers that should be used in all further correspondence regarding proposals. If no confirmation is received within 2 business days, please contact the BAA Administrator at BAA08-28@darpa.mil to ensure the proposal was submitted properly.

Failure to comply with the submission procedures may result in the submission not being evaluated.

Unclassified Addresses for Submission

UNCLASSIFIED full proposals should be submitted online via the following website:

http://www.sainc.com/dsobaa/

The Government anticipates that full proposals submitted under this BAA will be UNCLASSIFIED.

D. Intergovernmental Review

Not Applicable.

E. Funding Restrictions

Not Applicable.

F. Other Submission Requirements

All proposals should clearly indicate limitations on the disclosure of their contents. Proposers who include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall-

(1) 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 this proposal. If, however, a contract is awarded to this proposer 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 sheets [*insert numbers or other identification of sheets*]; and

(2) Mark each sheet of data they wish 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.

Markings such as "Company Confidential" or other phrases that may be confused with national security classifications shall be avoided. The proposer may be required to remove such markings before the proposal will be accepted. "Proprietary" or "Company Proprietary" are acceptable notations.

V. APPLICATION REVIEW INFORMATION

A. Evaluation Criteria

Evaluation of proposals will be accomplished through a scientific/technical review of each proposal using the following criteria, in order of descending importance: (1) Ability to Meet Go/No-Go Metrics; (2) Scientific and Technical Merit; (3) Value to Defense; (4) Management Approach and Proposer's Capabilities and Related Experience; and (5) Cost and Schedule Realism. Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. The following are descriptions of the above listed criteria:

(1) Ability to Meet Go/No-Go Metrics

The proposal establishes clear and well defined research go/no-go metrics to be used as exit and entry criteria for Government approval to progress through phases of the proposed effort. The feasibility and likelihood of the proposed approach for satisfying the program go/no-go metrics are explicitly described and clearly substantiated. The proposal reflects a mature and quantitative understanding of the proposed go/no-go metrics, the statistical confidence with which they may be measured, and their relationship to the concept of operations that will result from successful performance.

(2) Scientific and Technical Merit

Proposers must demonstrate that their proposal is innovative and unique, that the technical approach is sound, that they have an understanding of critical technical issues and risk, and that they have a plan for mitigation of those risks. A significant improvement in capability or understanding above the existing state of practice must be demonstrated. All milestones must be clearly and quantitatively described.

(3) Value to Defense

Proposers must demonstrate the long-term potential of successful research to radically change military capability or improve national security with a clear statement of the goals of their program, and a quantitative comparison with existing technology as appropriate. Equally

important is the capability to transition the technology to the research, industrial, and operational military communities in such a way as to enhance U.S. defense. Maximum intellectual property rights will be considered.

(4) Management Approach and Proposer's Capabilities and Related Experience

The appropriateness, effectiveness, and reliability of the management structure are appropriate to the diversity of tasks, technologies and partnering strategy. The qualifications of Principal Investigator and key Task Leaders are appropriate and support the overall management plan. The qualifications of the proposer's key personnel are of adequate range, depth, and mix of expertise to address all technical and programmatic aspects of the proposal. The proposer's prior experience in similar efforts must clearly demonstrate an ability to deliver products that meet the proposed technical performance within the proposed budget and schedule. The proposed team has the expertise to effectively manage the cost and schedule. Similar efforts completed/ongoing by the proposer in this area are fully described including identification of other Government sponsors.

(5) Cost and Schedule Realism

The objective of this criterion is to establish that the proposed costs are realistic for the technical and management approach offered, as well as to determine the proposer's practical understanding of the effort. This will be principally measured by cost per labor-hour and number of labor-hours proposed. The evaluation criterion recognizes that undue emphasis on cost may motivate proposers to offer low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. DARPA discourages such cost strategies. Cost reduction approaches that will be received favorably include innovative management concepts that maximize direct funding for technology and limit diversion of funds into overhead. The proposer's abilities to aggressively pursue performance metrics in the shortest timeframe and to accurately account for that timeframe will be evaluated, as well as proposer's ability to understand, identify, and mitigate any potential risk in schedule.

After selection and before award the contracting officer will negotiate cost/price reasonableness.
Award(s) will be made to proposers whose proposals are determined to be the most advantageous to the Government, all factors considered, including the potential contributions of the proposed work to the overall research program and the availability of funding for the effort. Award(s) may be made to any proposer(s) whose proposal(s) is determined selectable regardless of its overall rating.

NOTE: PROPOSERS ARE CAUTIONED THAT EVALUATION RATINGS MAY BE LOWERED AND/OR PROPOSALS REJECTED IF SUBMITTAL INSTRUCTIONS ARE NOT FOLLOWED.

B. Review and Selection Process

It is the policy of DARPA to ensure impartial, equitable, and comprehensive proposal evaluations and to select the source (or sources) whose offer meets the Government's technical, policy, and programmatic goals. In order to provide the desired evaluation, qualified Government personnel will conduct reviews and (if necessary) convene panels of experts in the appropriate areas.

Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons.

For evaluation purposes, a proposal is the two-volume single document described in the Full Proposal Format section above.

All proprietary information should be marked on the full proposal. It is the policy of DARPA to treat all proposals as competitive information and to disclose their contents only for the purpose of evaluation. Restrictive notices notwithstanding, proposals may be handled, for administrative purposes only, by a support contractor. This support contractor is prohibited from competition in DARPA technical research and is bound by appropriate nondisclosure requirements.

Inputs on technical aspects of the proposals may be solicited by DARPA from non-Government consultants/experts who are bound by appropriate non-disclosure requirements. Non-Government technical consultants/experts will not have access to proposals that are labeled by their proposers as "Government Only."
It is the policy of DARPA to treat all proposals as competitive information and to disclose their contents only for the purpose of evaluation. No proposals will be returned. Upon completion of the source selection process, one copy of proposals that are not selected for funding will be retained in DSO files for one year after the signing of the last instrument resulting from this BAA.

VI. AWARD ADMINISTRATION INFORMATION

A. Award Notices

Proposals will be evaluated against the criteria set forth in this solicitation. Upon completion of the proposal evaluation, the proposer will be notified that 1) the proposal has been selected for funding pending contract negotiations, or 2) the proposal has not been selected. These official notifications will be sent via facsimile and/or post mail to the Technical POC identified on the proposal coversheet.

Multiple awards are anticipated. The Government reserves the right to fund all, some or none of the proposals under this solicitation, including those that do not strictly adhere to the division of technical and cost sections. Additionally, the Government reserves the right to fund the entire proposal, or selected portions thereof. The Government also reserves the right to fund proposals in phases with options for continued work at the end of one or more of the phases. Proposals

identified for funding may result in a procurement contract or an other transaction for research, depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. Proposers may elect to have their proposal withdrawn from consideration at any time during the evaluation process. If a formal request is not made, DARPA will assume that continued evaluation is desired.

B. Administrative and National Policy Requirements

1. Security

The Government anticipates that proposals submitted under this BAA will be unclassified. In the event that a proposer chooses to submit a classified proposal or submit any documentation that may be classified, the following information is applicable.

If proposals are classified, the proposals must indicate the classification level of not only the proposal itself, but also the anticipated award document classification level.

Proposals may contain classified information or data (up to the level of Top Secret/SCI). HOWEVER, DO NOT SEND CLASSIFIED FULL PROPOSALS BY EMAIL OR VIA ONLINE SUBMISSION SYSTEMS.

Proposers that intend to include classified information or data in their proposals should contact DARPA security at (571) 218-4842 (or alternatively, the point-of-contact for this BAA) for guidance and direction in advance of proposal preparation. Proposers must have existing approved capabilities (personnel and facilities) to perform research and development at the classification level they propose.
Security classification guidance on a DD Form 254 will not be provided at this time since DARPA is soliciting ideas only. After reviewing the incoming proposals, if a determination is made that the award instrument may result in access to classified information, a DD Form 254 will be issued and attached as part of the award. Proposers choosing to submit a classified proposal must first receive permission from the Original Classification Authority to use their information in replying to this BAA. Applicable classification guide(s) should be submitted to ensure that the proposal is protected appropriately.

For instructions on submitting Classified Full Proposals, contact Security & Intelligence Directorate (SID) Classification Management at (571) 218-4842.

Classified submissions shall be in accordance with the following guidance:

Collateral Classified Information: Use classification and marking guidance provided by previously issued security classification guides, the Information Security Regulation (DoD 5200.1-R), and the National Industrial Security Program Operating Manual (DoD 5220.22-M) when marking and transmitting information previously classified by another original classification authority. Classified information at the Confidential and Secret level may only be mailed via U.S. Postal Service (USPS) Registered Mail or U.S. Postal Service Express Mail. All classified information will be enclosed in opaque inner and outer covers and double wrapped. The inner envelope shall be sealed and plainly marked with the assigned

classification and addresses of both sender and addressee. The inner envelope shall be addressed to:

Defense Advanced Research Projects Agency
ATTN: DSO
Reference: BAA 08-28
3701 North Fairfax Drive
Arlington, VA 22203-1714

The outer envelope shall be sealed with no identification as to the classification of its contents and addressed to:

Defense Advanced Research Projects Agency
Security & Intelligence Directorate, Attn: CDR
3701 North Fairfax Drive
Arlington, VA 22203-1714

All Top Secret materials should be hand carried via an authorized, two-person courier team to the DARPA CDR.

Special Access Program (SAP) Information: Contact the DARPA Special Access Program Central Office (SAPCO) 703-526-4052 for further guidance and instructions prior to transmitting SAP information to DARPA. Top Secret SAP must be transmitted via approved methods for such material. Consult the DoD Overprint to the National Industrial Security Program Operating Manual for further guidance. *Prior to transmitting SAP material*, it is strongly recommended that you coordinate your submission with the DARPA SAPCO.

Sensitive Compartmented Information (SCI) Data: Contact the DARPA Special Security Office (SSO) at 703-812-1994/1984 for the correct SCI courier address and instructions. All SCI should be transmitted through your servicing Special Security Officer (SSO). SCI data must be transmitted through SCI channels only (i.e., approved SCI Facility to SCI facility via secure fax).

Proprietary Data: All proposals containing proprietary data should have the cover page and each page containing proprietary data clearly marked as containing proprietary data. It is the Proposer's responsibility to clearly define to the Government what is considered proprietary data.

Proposers must have existing and in-place prior to execution of an award, approved capabilities (personnel and facilities) to perform research and development at the classification level they propose. It is the policy of DARPA to treat all proposals as competitive information, and to disclose their contents only for the purpose of evaluation. Proposals will not be returned. The original of each proposal received will be retained at DARPA and all other non-required copies destroyed. A certification of destruction may be requested, provided that the formal request is received at this office within 5 days after unsuccessful notification.

2. Intellectual Property

Please refer to Section IV.B.3 "Full Proposal Format," specifically the "Other Required Information" section (Section IV).

3. Meeting and Travel Requirements

There will be a program kickoff meeting and all key participants are required to attend. Performers should also anticipate periodic site visits at the Program Manager's discretion.

4. Human Use

All research involving human subjects, to include use of human biological specimens and human data, selected for funding must comply with the federal regulations for human subject protection. Further, research involving human subjects that is conducted or supported by the DoD must comply with 32 CFR 219, *Protection of Human Subjects* (http://www.dtic.mil/biosys/downloads/32cfr219.pdf), and DoD Directive 3216.02, *Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research* (http://www.dtic.mil/whs/directives/corres/html2/d32162x.htm).

Institutions awarded funding for research involving human subjects must provide documentation of a current Assurance of Compliance with Federal regulations for human subject protection, for example a Department of Health and Human Services, Office of Human Research Protection Federal Wide Assurance (http://www.hhs.gov/ohrp). All institutions engaged in human subject research, to include subcontractors, must also have a valid Assurance. In addition, personnel involved in human subjects research must provide documentation of completing appropriate training for the protection of human subjects.

For all proposed research that will involve human subjects in the first year or phase of the project, the institution must provide evidence of or a plan for review by an Institutional Review Board (IRB) upon final proposal submission to DARPA. The IRB conducting the review must be the IRB identified on the institution's Assurance. The protocol, separate from the proposal, must include a detailed description of the research plan, study population, risks and benefits of study participation, recruitment and consent process, data collection, and data analysis. Consult the designated IRB for guidance on writing the protocol. The informed consent document must comply with federal regulations (32 CFR 219.116). A valid Assurance along with evidence of appropriate training all investigators should all accompany the protocol for review by the IRB.

In addition to a local IRB approval, a headquarters-level human subjects regulatory review and approval is required for all research conducted or supported by the DoD. The Army, Navy, or Air Force office responsible for managing the award can provide guidance and information about their component's headquarters-level review process. Note that confirmation of a current Assurance and appropriate human subjects protection training is required before headquarters-level approval can be issued.

The amount of time required to complete the IRB review/approval process may vary depending on the complexity of the research and/or the level of risk to study participants. Ample time

should be allotted to complete the approval process. The IRB approval process can last between one to three months, followed by a DoD review that could last between three to six months. No DoD/DARPA funding can be used towards human subjects research until ALL approvals are granted.

5. Animal Use

Any recipient performing research, experimentation, or testing involving the use of animals shall comply with the rules on animal acquisition, transport, care, handling, and use in: (i) 9 CFR parts 1-4, Department of Agriculture rules that implement the Laboratory Animal Welfare Act of 1966, as amended, (7 U.S.C. 2131-2159); (ii) the guidelines described in National Institutes of Health Publication No. 86-23, "Guide for the Care and Use of Laboratory Animals"; and (iii) DoD Directive 3216.01, "Use of Laboratory Animals in DoD Program."

For submissions containing animal use, proposals should briefly describe plans for Institutional Animal Care and Use Committee (IACUC) review and approval. Animal studies in the program will be expected to comply with the PHS Policy on Humane Care and Use of Laboratory Animals, available at http://grants.nih.gov/grants/olaw/olaw.htm.

All recipients must receive approval by a DoD certified veterinarian, in addition to an IACUC approval. No animal studies may be conducted using DoD/DARPA funding until the USAMRMC Animal Care and Use Review Office (ACURO) or other appropriate DoD veterinary office(s) grants approval. As a part of this secondary review process, the Recipient will be required to complete and submit an ACURO Animal Use Appendix, which may be found at https://mrmc.amedd.army.mil/AnimalAppendix.asp.

6. Publication Approval

DARPA may elect to implement a contract or other award instrument. If DARPA determines that the research resulting from the proposed program will present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense, DARPA review is required before publishing any information or results of the program. This requirement includes a provisional statement in the contract outlining the process for receiving DARPA's Public Release office approval before publishing:

> When submitting material for written approval for open publication as described in subparagraph (a) above, the contractor/awardee must submit a request for public release to the DARPA TIO and include the following information: 1) Document Information: document title, document author, short plain-language description of technology discussed in the material (approx. 30 words), number of pages (or minutes of video) and document type (briefing, report, proposal abstract, article, or paper); 2) Event Information: event type (conference, principal investigator meeting, article or paper), event date, desired date for DARPA's approval; 3) DARPA Sponsor: DARPA Program Manager, DARPA office, and contract number; and 4) contractor/awardee's Information: POC name, e-mail and phone. Allow four weeks for processing; due dates under four weeks require a justification. Unusual electronic file formats may require additional processing time. Requests can be sent either via e-mail to tio@darpa.mil or via post to

3701 North Fairfax Drive, Arlington VA 22203-1714; telephone: (571) 218-4235. Refer to www.darpa.mil/tio for information about DARPA's public release process.

7. Export Control

Should this project develop beyond fundamental research (basic and applied research ordinarily published and shared broadly within the scientific community) with military or dual-use applications, the following apply:

(1) The contractor shall comply with all U.S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through 130, and the Export Administration Regulations (EAR), 15 CFR Parts 730 through 799, in the performance of this contract. In the absence of available license exemptions/exceptions, the contractor shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of (including deemed exports) hardware, technical data, and software, or for the provision of technical assistance.

(2) The contractor shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of this contract, including instances where the work is to be performed on-site at any Government installation (whether in or outside the United States), where the foreign person will have access to export-controlled technologies, including technical data or software.

(3) The contractor shall be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.

(4) The contractor shall be responsible for ensuring that the provisions of this clause apply to its subcontractors**.**

8. Subcontracting

Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. 637(d)), it is the policy of the Government to enable small business and small disadvantaged business concerns to be considered fairly as subcontractors to contractors performing work or rendering services as prime contractors or subcontractors under Government contracts, and to assure that prime contractors and subcontractors carry out this policy. Each proposer who submits a contract proposal and includes subcontractors is required to submit a subcontracting plan in accordance with FAR 19.702(a) (1) and (2) should do so with their proposal. The plan format is outlined in FAR 19.704.

C. Reporting

The number and types of reports will be specified in the award document, but will include as a minimum monthly or quarterly financial status reports. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed on before award. Reports and briefing material will also be required as appropriate to document progress in accomplishing program metrics. A Final Report that summarizes the

project and tasks will be required at the conclusion of the performance period for the award, notwithstanding the fact that the research may be continued under a follow-on vehicle.

D. Central Contractor Registration (CCR)

Selected proposers not already registered in the Central Contractor Registry (CCR) will be required to register in CCR prior to any award under this BAA. Information on CCR registration is available at http://www.ccr.gov.

E. Representations and Certifications

In accordance with FAR 4.1201, prospective proposers shall complete electronic annual representations and certifications at http://orca.bpn.gov.

F. Wide Area Work Flow (WAWF)

Unless using another approved electronic invoicing system, performers will be required to submit invoices for payment directly via the Internet/WAWF at http://wawf.eb.mil. Registration to WAWF will be required prior to any award under this BAA.

VI. AGENCY CONTACTS

E-mail is the preferred method of contact.

Administrative, technical or contractual questions should be sent via e-mail to BAA08-28@darpa.mil. All requests must include the name, email address, and phone number of a point of contact.

Points of Contact:
The technical POC for this effort is Dr. Todd Hylton.
Email: Todd.Hylton@darpa.mil

DARPA/DSO
ATTN: BAA 08-28
3701 North Fairfax Drive
Arlington, VA 22203-1714
Phone: 571-218-4565
Email: BAA08-28@darpa.mil