

Broad Agency Announcement (BAA 07-68)

for

Defense Sciences Office (DSO)

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DARPA/DSO SOL, DARPA Mathematical Challenges, BAA 07-68; BAA CLOSING DATE: 9/8/08; TECHNICAL POC: Dr. Benjamin Mann, DARPA/DSO, Ph: (571) 218-4246, Email: BAA07-68@darpa.mil; CFDA#: 12.910; URL: <http://www.darpa.mil/dso/solicitations/solicit.htm>; Website Submission: <http://www.sainc.com/dsobaa/>

I. Funding Opportunity Description

DARPA is soliciting innovative research proposals in the area of DARPA Mathematical Challenges, with the goal of dramatically revolutionizing mathematics and thereby strengthening the scientific and technological capabilities of DoD. To do so, the agency has identified twenty-three mathematical challenges, listed below, which were announced at DARPA Tech 2007.

DARPA seeks innovative proposals addressing these Mathematical Challenges. Proposals should offer high potential for major mathematical breakthroughs associated to one or more of these challenges. Responses to multiple challenges should be addressed individually in separate proposals. Submissions that merely promise incremental improvements over the existing state of the art will be deemed unresponsive.

Mathematical Challenge One: The Mathematics of the Brain

- Develop a mathematical theory to build a functional model of the brain that is mathematically consistent and predictive rather than merely biologically inspired.

Mathematical Challenge Two: The Dynamics of Networks

- Develop the high-dimensional mathematics needed to accurately model and predict behavior in large-scale distributed networks that evolve over time occurring in communication, biology, and the social sciences.

Mathematical Challenge Three: Capture and Harness Stochasticity in Nature

- Address Mumford's call for new mathematics for the 21st century. Develop methods that capture persistence in stochastic environments.

Mathematical Challenge Four: 21st Century Fluids

- Classical fluid dynamics and the Navier-Stokes Equation were extraordinarily successful in obtaining quantitative understanding of shock waves, turbulence, and solitons, but new methods are needed to tackle complex fluids such as foams, suspensions, gels, and liquid crystals.

Mathematical Challenge Five: Biological Quantum Field Theory

- Quantum and statistical methods have had great success modeling virus evolution. Can such techniques be used to model more complex systems such as bacteria? Can these techniques be used to control pathogen evolution?

Mathematical Challenge Six: Computational Duality

- Duality in mathematics has been a profound tool for theoretical understanding. Can it be extended to develop principled computational techniques where duality and geometry are the basis for novel algorithms?

Mathematical Challenge Seven: Occam's Razor in Many Dimensions

- As data collection increases can we “do more with less” by finding lower bounds for sensing complexity in systems? This is related to questions about entropy maximization algorithms.

Mathematical Challenge Eight: Beyond Convex Optimization

- Can linear algebra be replaced by algebraic geometry in a systematic way?

Mathematical Challenge Nine: What are the Physical Consequences of Perelman's Proof of Thurston's Geometrization Theorem?

- Can profound theoretical advances in understanding three dimensions be applied to construct and manipulate structures across scales to fabricate novel materials?

Mathematical Challenge Ten: Algorithmic Origami and Biology

- Build a stronger mathematical theory for isometric and rigid embedding that can give insight into protein folding.

Mathematical Challenge Eleven: Optimal Nanostructures

- Develop new mathematics for constructing optimal globally symmetric structures by following simple local rules via the process of nanoscale self-assembly.

Mathematical Challenge Twelve: The Mathematics of Quantum Computing, Algorithms, and Entanglement

- In the last century we learned how quantum phenomena shape our world. In the coming century we need to develop the mathematics required to control the quantum world.

Mathematical Challenge Thirteen: Creating a Game Theory that Scales

- What new scalable mathematics is needed to replace the traditional Partial Differential Equations (PDE) approach to differential games?

Mathematical Challenge Fourteen: An Information Theory for Virus Evolution

- Can Shannon's theory shed light on this fundamental area of biology?

Mathematical Challenge Fifteen: The Geometry of Genome Space

- What notion of distance is needed to incorporate biological utility?

Mathematical Challenge Sixteen: What are the Symmetries and Action Principles for Biology?

- Extend our understanding of symmetries and action principles in biology along the lines of classical thermodynamics, to include important biological concepts such as robustness, modularity, evolvability, and variability.

Mathematical Challenge Seventeen: **Geometric Langlands and Quantum Physics**

- How does the Langlands program, which originated in number theory and representation theory, explain the fundamental symmetries of physics? And vice versa?

Mathematical Challenge Eighteen: **Arithmetic Langlands, Topology, and Geometry**

- What is the role of homotopy theory in the classical, geometric, and quantum Langlands programs?

Mathematical Challenge Nineteen: **Settle the Riemann Hypothesis**

- The Holy Grail of number theory.

Mathematical Challenge Twenty: **Computation at Scale**

- How can we develop asymptotics for a world with massively many degrees of freedom?

Mathematical Challenge Twenty-one: **Settle the Hodge Conjecture**

- This conjecture in algebraic geometry is a metaphor for transforming transcendental computations into algebraic ones.

Mathematical Challenge Twenty-two: **Settle the Smooth Poincare Conjecture in Dimension 4**

- What are the implications for space-time and cosmology? And might the answer unlock the secret of “dark energy”?

Mathematical Challenge Twenty-three: **What are the Fundamental Laws of Biology?**

- Dr. Tether’s question will remain front and center in the next 100 years. I place this challenge last as finding these laws will undoubtedly require the mathematics developed in answering several of the questions listed above.

Please Note: White Papers and Full Proposals may be submitted and received at any time until the final BAA deadline of 4:00PM ET, September 8, 2008.

II. Award Information

Multiple awards are anticipated. The Government reserves the right to select for award all, some, or none of the proposals received and to make awards without discussion. In the event that DARPA desires to award only portions of a proposal, negotiations will be opened with that proposer.

Proposals identified for funding may result in a procurement contract, grant, cooperative agreement, or other transaction depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. If warranted, portions of resulting awards may be segregated into pre-priced options.

Funding may be requested for multiple years. If so, they should be broken out on a year by year basis with measurable annual milestones. After the first year, funding for subsequent years will be at the discretion of DARPA.

III. Eligibility Information

A. Eligible applicants

All responsible sources capable of satisfying the Government's needs may submit a proposal which shall be considered by DARPA. Also, Historically Black Colleges and Universities (HBCUs), Minority Institutions (MIs), and Small and Small Disadvantaged Businesses 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 research in DARPA Mathematical Challenges. Independent proposals from Government/National Laboratories may be subject to applicable direct competition limitations, though certain Federally Funded Research and Development Centers may be exempt per P.L. 103-337 § 217 and P.L. 105-261 § 3136.

Proposals may include, or be led by, foreign firms and/or personnel provided all export control laws and U.S. national security requirements are adhered to in the conduct of the effort and that the work relating to the foreign firm or personnel is unclassified. The onus of understanding and complying with export control rests with the proposer, not the Government.

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

Certain post-employment restrictions on former federal officers and employees may exist, including special Government employees (including, but not limited to, Title 18, Section 207, United States Code, the Procurement Integrity Act, 41 U.S.C. 423, and FAR 3.104.) Current federal employees are prohibited from participating in particular matters involving conflicting financial, employment, and representational interests (18 USC 203, 205, and 208.) Prior to the start of proposal evaluations, the Government will assess whether any potential conflict of interest exists in regards to the DARPA Program Manager, as well as those individuals chosen to evaluate proposals received under this BAA. 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 include an effective mitigation plan, or that do not include a mitigation plan at all, 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 proposer contact information and a summary of the potential conflict by email to the mailbox address for this BAA at BAA07-68@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, the proposal may be returned without technical evaluation and withdrawn from further consideration for award under this BAA.

B. Cost Sharing or Matching

Cost sharing is not required and is not an evaluation criterion but 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, especially when interdisciplinary approaches to a problem are required.

IV. APPLICATION AND SUBMISSION INFORMATION

A. Address to Request Application Package

This announcement contains all information required to submit a white paper or full proposal. No additional information is available, nor will a formal Request for Proposal (RFP) or additional solicitation regarding this announcement be issued.

B. Content and Form of Submission

Proposers are strongly encouraged to submit a white paper in advance of a full proposal. This procedure is intended to minimize unnecessary effort in proposal preparation and review. The time and date for submission of white papers is specified in Section IV.C.1. below. DARPA will acknowledge receipt of the submission and assign a control number that should be used in all further correspondence regarding the white paper.

DARPA will respond to each white paper with a recommendation to propose or not propose and the time and date for submission of a full proposal. DARPA will attempt to review white papers within thirty (30) calendar days after receipt and will allow proposers at least thirty (30) calendar days after review of their white papers in order to complete and submit their proposals. White papers will be reviewed as they are received. Early submissions of white papers and full proposals are strongly encouraged because selections may be made at any time during the evaluation process. Regardless of the recommendation, the decision to propose is the responsibility of the proposer.

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 together in a single proposal. Proposals not meeting the format described in the BAA may not be reviewed.

General Submissions:

A website, <http://www.sainc.com/dsobaa/>, has been established to facilitate the submission of white papers and full proposals electronically. This site will allow submission of contact information and uploading of a single document in either Word or PDF format, up to 25 MB. Proposals and white papers may not be submitted by fax; any so sent will be disregarded.

Hard Copy Submissions:

Should a proposer choose to submit via hard copy only, an original and one (1) copy of the white paper or full proposal and one (1) electronic copy [as a single document in Word or PDF format] on a CD-ROM shall be submitted.

Grants.gov Applications (Non-profits, Universities, etc.):

Proposers may use the grants.gov APPLY function if seeking a grant or cooperative agreement. The APPLY function replaces the General Submissions process described above.

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

DARPA/DSO
ATTN: BAA 07-68
3701 North Fairfax Drive
Arlington, VA 22203-1714

BAA07-68@darpa.mil
BAA Administrator, Phone: (571) 218-4565

Upon review, DARPA/DSO will use facsimile transmission and standard post mail for correspondence regarding BAA 07-68 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.

1. White Paper Format

It is **STRONGLY ENCOURAGED** that a white paper be submitted to determine the acceptability of the proposed concept to the Broad Agency Announcement. This allows for comments to the proposer.

White papers should be concise and limited to 8 pages in length. All pages shall be printed single-spaced on 8-1/2 by 11 inch paper with type not smaller than 12 point font. The page limitation for white papers includes all figures, tables, and charts. No formal transmittal letter is required. The white paper should contain the following sections:

- A. A cover sheet that includes the Technical Point of Contact's information (name, address, phone, fax, email, lead organization and business type), the title of the proposed work, the estimated cost, and the duration of the proposed work. (Note: cover sheet does not count toward page limit.)
- B. An executive summary, including the Mathematical Challenge being addressed and a clear statement of the novelty and uniqueness of the proposed idea.
- C. A concise description of the technical approach to the Mathematical Challenge and discussion of project milestones. Clearly outline any technical challenges inherent in the approach and possible solutions for overcoming potential problems.
- D. Address how the proposed technical approach is revolutionary and how it rises above the current state of the art.
- E. Brief outline of the research plans, including timeline, relevant to achieving program goals, initial research to be conducted, and how progress toward these goals will be assessed.
- F. A cost estimate for resources over the proposed timeline. This cost estimate should include both labor and materials costs.
- G. A brief summary of expertise of the key personnel on the project relevant to the program goals. If the team is multi-organizational, a proposed management structure should also be included.
- H. List of relevant references.

2. Full Proposal Format

All full proposals must be in the format given below. Non-conforming proposals may be rejected without review. Proposals shall consist of two volumes. All pages shall be printed single-spaced on 8-1/2 by 11 inch paper with type not smaller than 12 point font. 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 documents the

technical ideas and approach upon which the proposal is based. Intellectual Property/Patents Requirements and the bibliography are not included in the page counts. The submission of other supporting material along with the proposals is strongly discouraged and will not be considered for review. Volume I, Section II, Detailed Proposal Information, shall not exceed {30} pages. Maximum page lengths for each section are shown in braces { } below.

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) Date proposal was prepared.
 - (11) Total Funds requested from DARPA
 - (12) Duration (in months) of Proposed Work
- B. Official Signed Transmittal Letter (View Sample: [\(add hyperlink\)](#)).

Section II. Detailed Proposal Information

This section provides an overview of the proposed work as well as an introduction to the associated technical and management issues.

- A. {2} Executive summary, including the Mathematical Challenge being addressed and a clear statement of the novelty and uniqueness of the proposed idea.
- B. {15} Detailed description of the technical approach to the Mathematical Challenge and discussion of project milestones. Clearly outline any technical challenges inherent in the approach and possible solutions for overcoming potential problems.
- C. {2} Address how the proposed technical approach is revolutionary and how it rises above the current state of the art.
- D. {8} A Statement of Work (SOW), describing in detail the research and tasks to be performed and their relevance and importance to the Mathematical Challenge. The SOW should include a timeline and how progress toward success will be assessed.
- E. {2} Time-phased schedule milestone chart. These milestones should enable and support a go/no go decision for the next phase of the effort.
- F. {2} Any deliverables associated with the proposed research and the plans and capability to accomplish technology transition and commercialization. (See Section III below for guidance on Proprietary Claims and Intellectual Property.)
- G. {2} Discussion of key personnel's previous accomplishments and work in closely related research areas. If the team is multi-organizational, a proposed management structure should also be included.

Section III. 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 a Grant, Cooperative Agreement, Technology Investment Agreement, or Other Transaction for Prototype 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 Paragraphs 1.a and 1.b 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

Please include documentation proving your 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 your proposal for the DARPA program. If a patent application has been filed for an invention that your proposal utilizes, but the application has not yet been made publicly available and contains proprietary information, you 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 you own the invention, or 2) proof of possession of appropriate licensing rights in the invention.

D. All Proposers – Intellectual Property Representations

Please provide a good faith representation that you either own or possess appropriate licensing rights to all other intellectual property that will be utilized under your 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 IV. 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 may 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
 - (9) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), and electronic mail (if available)
 - (10) Award Instrument Requested: Cost-Plus-Fixed-Fee (CPFF), Cost-Contract - no fee, Cost Sharing Contract - no fee, or Other Type of Procurement Contract (*specify*), Grant, Cooperative Agreement, 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, Office of Naval Research (ONR) Administration Office, or Other Applicable Government Organization (*if known*)
 - (14) Name, Address, and Telephone Number of the Proposer's Cognizant Defense Contract Audit Agency (DCAA) Audit Office, ONR, or Other Applicable Government Office (*if known*)

- (15) Date Proposal was Prepared
- (16) DUNS Number
- (17) TIN Number
- (18) Cage Code

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.) and further broken down by year;
- (2) Major program tasks by year;
- (3) An itemization of major subcontracts and equipment purchases;
- (4) An itemization of any information technology (IT) purchases;
- (5) A summary of projected funding requirements by month; and
- (6) The source, nature, and amount of any industry cost-sharing.

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.

- 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 provide 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 request 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 (e.g., a grant, cooperative agreement, or other transaction.)

C. Submission Dates and Times

1. *White Papers*

White papers may be submitted and received at any time until the white paper deadline. **WHITE PAPERS ARE DUE ON OR BEFORE 4:00PM ET, SEPTEMBER 8, 2008.** White Papers received after this time and date may not be reviewed.

2. *Full Proposals*

To receive consideration under this BAA, **FULL PROPOSALS MUST BE RECEIVED ON OR BEFORE 4:00 PM ET, SEPTEMBER 8, 2008.** Full proposals submitted after the due date specified in the BAA or due date otherwise specified by DARPA after review of white papers may be selected contingent upon the availability of funds.

DARPA will acknowledge receipt of complete submissions via email and assign control numbers that should be used in all further correspondence regarding proposals. If you have not received a confirmation within 2 business days, please contact the BAA Administrator at BAA07-68@darpa.mil.

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

Unclassified Addresses for Submission

UNCLASSIFIED white papers and full proposals may be submitted online via the following websites:

<http://www.sainc.com/dsobaa/>, or
www.grants.gov

UNCLASSIFIED white papers and full proposals may be submitted by hard copy, to the following address:

DARPA/DSO
ATTN: BAA 07-68, Dr. Benjamin Mann
3701 North Fairfax Drive
Arlington, VA 22203-1714

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

D. Intergovernmental Review

This section is not applicable to this BAA.

E. Funding Restrictions

This section is not applicable to this BAA.

V. EVALUATION INFORMATION

A. Evaluation Criteria

Evaluation of proposals will be accomplished through a technical review of each proposal using the following criteria, which are listed in descending order of relative importance: (1) Scientific and Technical Merit; (2) Long-Term Value to Defense; (3) Capabilities of the Personnel and Facilities to Perform the Proposed Effort; and (4) Cost Realism.

(1) 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. Successful proposals must offer high potential for major mathematical breakthroughs associated to one or more of these challenges. Submissions that merely promise incremental improvements over the existing state of the art will be deemed unresponsive. A significant improvement in capability or understanding above the state of the art must be demonstrated. All milestones must be clearly and quantitatively described.

(2) *Long-Term 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.

(3) *Capability of the Personnel and Facilities to Perform the Proposed Effort*

Proposers must demonstrate that their team has the necessary background and experience to perform this project. The balance of the technical capabilities of the team must match that required in the program plan. The relevant experience of key personnel must be sufficient to provide confidence that the proposers can accomplish their objectives. Proposers must demonstrate that the combined facilities of the team are sufficient to accomplish the objectives of the proposal.

(4) *Cost Realism*

Costs of the proposal must be realistic and provide a high value to the Government.

B. Review and Selection Process

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.

For evaluation purposes, a proposal is the two-volume 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."

VI. Award Administration Information

A. Award Notices

Upon completion of the proposal evaluation, the proposer will be notified of selectability or non-selectability. Selectable proposals will be considered for funding.

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, grant, cooperative agreement, or "Other Transaction," depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. Proposals will be evaluated against the criteria set forth in this solicitation, and a proposer will be notified either that: (1) the proposal has been selected for funding, or (2) the proposal has not been selected for funding. 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. All full proposal submissions will be evaluated regardless of the disposition of the white paper. One copy only of proposals that are not selected for funding will be retained in DSO files until one year after the signing of the last instrument resulting from this BAA.

B. Administrative and National Policy Requirements

1. Security

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 like "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.

2. Intellectual Property

Please refer to the "Other Required Information" section (Section III) of IV. B. 2., Full Proposal Format.

3. Meeting and Travel Requirements

This section is not applicable to this BAA.

4. Human Use Regulations

Proposals selected for funding are required to comply with provisions of the Common Rule (32 CFR 219) on the protection of human subjects in research (<http://www.dtic.mil/biosys/downloads/32cfr219.pdf>) and the Department of Defense Directive 3216.2 (<http://www.dtic.mil/whs/directives/corres/htm12/d32162x.htm>). All proposals that involve the use of human subjects are required to include documentation of their ability to follow Federal guidelines for the protection of human subjects. This includes, but is not limited to, protocol approval mechanisms, approved Institutional Review Boards, and Federal Wide Assurances. These requirements are based on expected human use issues sometime during the entire length of the proposed effort.

For proposals involving "greater than minimal risk" to human subjects within the first year of the project, performers must provide evidence of protocol submission to a federally approved Institutional Review Board (IRB) *at the time of final proposal submission to DARPA*. For proposals that are forecasted to involve "greater than minimal risk" after the first year, a discussion on how and when the proposer will comply with submission to federally approved IRB needs to be provided in the submission. More information on applicable federal regulations can be found at the Department of Health and Human Services – Office of Human Research Protections website (<http://www.dhhs.gov/ohrp>).

5. Animal Welfare

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); and (ii) the guidelines described in National Institutes of Health Publication No. 86-23, "Guide for the Care and Use of Laboratory Animals."

For submissions containing animal use, proposals should briefly describe plans for 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>.

6. Publication Approval

Proposers are advised if they propose grants or cooperative agreements, DARPA may elect to award other award instruments. DARPA will make this election if it 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. Any resulting award will include a requirement for DARPA permission before publishing any information or results on the program.

The following provision will be incorporated into any resultant procurement contract or other transaction:

When submitting material for written approval for open publication as described above, the Contractor/Awardee must submit a request for public release to the DARPA Technical Information Office (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, 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 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 mailed directly to Technical Information Office, 3701 N. Fairfax Drive, Arlington VA 22203-1714. Refer to <http://www.darpa.mil/tio> for additional information about DARPA's public release process.

7. Export Licenses

The following provision will be incorporated into any resultant contract:

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, 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 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 IAW FAR 19.702(a) (1) and (2) should do so with their proposal. The plan format is outlined in FAR 19.704.

C. Reporting

All preprints, articles submitted for publication, and publications must be sent electronically to the Program Manager within 30 days of completion. Scientific and financial reports are due every six months. They should be sent electronically to both the Contracting Agent and Program Manager. Final reports are due three months following the completion of the award. Invention disclosure and patent reporting must be carried out by successful proposers via iEdison.

1. Central Contractor Registration.

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>.

2. Representations and Certifications

In accordance with Federal Acquisition Regulation 4.1201, prospective proposers shall complete electronic annual representations and certifications at <http://orca.bpn.gov>.

3. Wide Area WorkFlow (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.

VII. Agency Contacts

Point(s) of Contact

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DARPA/DSO

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