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**DEFENSE SCIENCES RESEARCH AND TECHNOLOGY, BAA03-02; DUE November 7, 2003 ; POC: Dr. Steven G. Wax, DARPA/DSO, Fax: (571) 218-4553, URL <http://www.darpa.mil/baa/>; email: [BAA03-02@darpa.mil](mailto:BAA03-02@darpa.mil).**

## PROGRAM OBJECTIVES, SCOPE AND FUNDING

The mission of the Defense Advanced Research Projects Agency's (DARPA) Defense Sciences Office (DSO) is to identify and pursue the most promising technologies within a broad spectrum of the science and engineering research communities and to develop those technologies into important, radically new military capabilities. To this end, DSO is soliciting proposals for advanced research and development in a variety of enabling technical areas as described below. Proposals may be either basic or applied research. However, in all cases, proposers should demonstrate that their proposed effort is aimed at high-risk/high-payoff technologies that have the potential for making revolutionary rather than incremental improvements to national security, including emerging threats and operational challenges. Proposals that are not within the topical areas described below may be considered out of scope and not evaluated. Likewise, proposals that are not research, but rather integration of technologies or systems development will also be considered out of scope and will not be evaluated. 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. While there is no specific requirement for cost and duration of the proposed effort, it is

recommended that proposers include a Phase I of no more than 18 months in length that addresses the most critical issues on the path to success.

This BAA constitutes the entire solicitation for this effort. No Proposer Information Pamphlet or other additional information will be published, nor will a formal request for proposal, or other solicitation, regarding this research and development be issued. Requests for same will be disregarded.

## **TECHNICAL TOPIC AREAS OF INTEREST TO DSO**

This section describes the general technical interests of DSO. However, the ultimate success of a proposal is based on the specific technical idea(s) advanced within these areas and especially the uniqueness of the proposed approach. Consequently, proposing within one of these topic areas is not sufficient to make a compelling case for funding. For this reason white papers are strongly suggested before submitting a full proposal. (See below)

**New Materials, Materials Concepts, Materials Processing and Devices:** Specific areas of interest include, but are not limited to: Biomaterials and biomimetic materials; Engineered materials (meta-materials); Fracture phenomena and prognostics; Femtosecond Laser Diodes and Optical Amplifiers; Functional materials (ferroelectric, magnetic, etc.); Materials and concepts for advanced (beyond silicon) electronic materials and devices; Materials and concepts for power generation and energy storage at all scales; Materials and structures for quantum information processing; Materials and structures for spin transport and control; Multifunctional (structure + function) materials; Non-destructive evaluation, property/life prediction and related technologies; Novel approaches for materials discovery, processing or manufacturing and insertion; Optical materials; Self-healing, -sensing and -adapting materials; and Smart materials and structures.

**Advanced Mathematics:** Application of advanced mathematics to problems of interest to the Department of Defense (DoD): Specific areas of interest include, but are not limited to: Computational geometry and topology; Dimensionality reduction, error propagation and uncertainty management in databases, models, and experiments; Electromagnetic modeling and simulation; Fast, scalable scientific computation; Quantum

information science; Sensor management; Signal and image processing; and Virtual materials development, processing, and evaluation.

**Biological Warfare Defense:** Technologies to render biological warfare attacks against the U.S. military harmless: Specific areas of interest include, but are not limited to: Advanced medical diagnostics; External protection (clothing, masks, etc.) for soldiers; Medical countermeasures against both known and unknown pathogens; Protection, decontamination of materials and equipment; Remote detection / characterization of biological substances; Self-decontamination concepts; and Sensor technology.

**Applications of Biology to Defense Applications:** Specific areas of interest include, but are not limited to: Accelerating the healing response of tissue; Approaches for controlling biological systems; Approaches for enhancing human performance; Biodynamics and Biological Complexity; Bio-inspired systems; Biomaterials/bioprocessing; Biomolecular motors and devices; Cell and tissue based biosensors; Hybrid biotic/abiotic systems; Human performance enhancement (including training) technologies; Investigation of the behavior of biointerfaces; Novel mathematical and computational approaches to characterizing and simulating complex biological processes; and Understanding sensory cognitive mechanisms affecting spatial orientation.

Special Focus Areas. From time to time, DARPA will publish addenda to this BAA that will highlight particular areas of interest. It is highly recommended that potential proposers look periodically for these updates. Any specific instructions or criteria in a published addendum will take precedence over this BAA in response to that addendum only. Due to the expected large volume of interested parties, it will not be possible for DARPA to establish a distribution list for automatic distribution of these addenda. Other Technical Areas: Ideas outside of the advertised focus areas will be considered in scope only if the proposers can demonstrate that they have the potential for radical improvement to national security and are within the technical interests of the office. Proposals that integrate existing technologies or products into systems generally do not fall within the purview of the Defense Sciences Office and are likely to be rejected.

## **PROPOSAL SUBMISSION AND DEADLINES**

Proposals may be submitted at any time until the final proposal deadline of 4:00pm ET 7 November 2003. Proposals will be evaluated against the criteria set forth in this solicitation and within 30 days of receipt an offeror will be notified either that: 1) the proposal has been selected for funding; 2) the proposal has not been selected for funding; or 3) the proposal is still under review and an estimate of when this review will be completed will be provided. 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. One copy only of proposals that are not selected for funding will be retained for administrative purposes.

The Government reserves the right to select for award all, some, or none of the proposals received in response to this announcement. 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. The offeror must submit a separate list of all technical data or computer software that will be furnished to the Government with other than unlimited rights (see DFARS Part 227).

**White Paper Submissions.** Before proposers put together a full proposal it is highly recommended (though not required) that they submit a white paper in response to the BAA. This white paper should clearly state the uniqueness of the idea presented in the context of existing state-of-the-art in the technical area of interest. Demonstrating that the proposer has a clear understanding of the state of the art and that the proposal will make significant improvements therein is essential for a successful proposal. The white paper should also describe the proposed approach and explain why it is unique. Further, the proposer should demonstrate an understanding of the payoff of the technical idea, especially in terms of how it might make a difference to Defense capabilities. Key milestones expected in the effort should be described. Also, a brief discussion of the technical expertise of the proposed principal investigator and other key team members should be provided. Finally, an estimate of the program costs and duration should be included. White papers should not be longer

than 8 pages; however, shorter white papers that can cover the content above are strongly encouraged. Procedures have been put in place that will help proposers to rapidly determine the applicability of their proposal to DARPA/D SO and to help develop promising ideas into formal proposals with a reasonably high probability of funding.

A website <http://www.sainc.com/dso/> has been set up to facilitate the submission of white papers. This site will allow the filling in of contact information and the uploading of a white paper document in (format). It will provide a method by which proposers can track their submissions. White paper submissions may also be made by attachment to an e-mail sent to [BAA03-02@darpa.mil](mailto:BAA03-02@darpa.mil) (Word 97 or higher is recommended). Embedded text and Postscript are also acceptable. Note: if the website is not used, then the body of the e-mail AND the attachment must include name, mailing address, phone number, and fax of the proposer. If this information is not contained in the body, the e-mail will be returned for inclusion of that information. (If proposers choose not to use e-mail, U.S. mail may be used. White papers will not be accepted by way of facsimile transmissions.) Within two weeks of receipt of the white paper, the proposer will be informed of receipt of the white paper, provided a proposal log number and given both a technical and administrative point of contact. The formal recommendation about whether a formal proposal is recommended will be made as soon as possible. However, the exact time for response will depend on a variety of circumstances, including the number of white papers received. Please note, this recommendation is for the benefit of the proposer and is not a guarantee that the full proposal will be funded. All full proposal submissions will be evaluated regardless of the disposition of the white paper. White papers may be submitted at any time. However, proposers should leave sufficient time for technical interactions before the due date of the full proposals, November 7, 2003.

## **FORMAT AND CONTENT OF FULL PROPOSAL**

Full proposals shall consist of two volumes, technical and cost. Offerors should submit one (1) original and three (3) copies of the full proposal to the address shown below. For full proposals, facsimile transmissions or electronic media transmissions will not be accepted. All pages shall be printed on 8-1/2 by 11 inch paper with type not smaller than 12 point and a minimum of one and one-half spacing. This includes the type on figures and charts.

Copies of up to three papers referenced in the proposal may be included with the submission, but will be read at the discretion of the reviewers. Proposers are cautioned not to count on these papers in meeting the evaluation criteria described below. All other supporting materials including videotapes and CDs submitted with the proposal will be disregarded.

**Volume 1: Technical.** The technical volume is limited to a maximum of 30 pages including all figures, references, tables, charts, cover sheet, and appendices and consists of the following sections:

- a. Executive Summary (two pages or less);
- b. Technical section that clearly describes the innovation of the work to be accomplished, specific metrics for the effort, the risks to achieving those metrics and approaches for mitigation of those risks. All milestones should be clearly delineated, especially those early (first year to 18 months) milestones that are critical to demonstration of the concept or approach. Supporting rationale for performance enhancements should be included. The perceived need for this research and the potential impact on the DoD should be described, and a Statement of Work (SOW) that summarizes critical tasks to be accomplished should be presented;
- c. Time-phased schedule-milestone chart;
- d. Summary of relevant prior work;
- e. Brief description of applicable facilities and equipment;
- f. Short resumes of key individuals. The level of effort and specific roles and qualifications of key individuals should be included. If the team is large (greater than 3 separate entities) a management plan for coordination of the effort should also be included; and
- g. Current and pending support (award title, amount, period of performance, degree of overlap with this proposal.)

**Volume 2: Cost.** The cost volume shall contain the following:

- 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 DISADVANTAGED BUSINESS," "Woman Owned Business," "Service Disabled Veteran Owned Business," "OTHER SMALL BUSINESS," "HBCU," "MI," "OTHER EDUCATIONAL," or "OTHER NONPROFIT," (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, 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, zip code, telephone, fax (if available), and electronic mail (if available); (10) Award instrument requested: cost-plus-fixed-fee (CPFF); cost-award-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 offeror's cognizant Defense Contract Management Agency (DCMA) administration office (if known); (14) Name, address, and telephone number of the offeror's cognizant Defense Contract Audit Agency (DCAA) audit office (if known); (15) Date proposal was prepared; and (16) DUNS, TIN, CAGE CODE.

- b. Detailed cost breakdown to include: (1) total program cost broken down by major cost items (direct labor, subcontracts, materials, travel, other direct costs, overhead charges, etc.) and (2) an itemization of major subcontracts (labor, travel, materials and other direct costs) and equipment purchases. Where the effort consists of multiple portions that 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 supporting documentation. Note: cost or pricing data as defined in FAR Subpart 2.101 shall be required if the offeror's proposal is for a procurement contract award of \$550,000 or greater unless the offeror requests an exception from the requirement to submit cost or pricing

data. ?Cost or pricing data? are not required if the offeror proposes an award instrument other than a procurement contract (e.g., a grant, cooperative agreement, or other transaction). The requirements for submission of ?cost or pricing data? are specified in FAR Subpart 15.403-4 (see <http://www.arnet.gov/far>).

**Other Relevant Information for Proposal Submission. Teaming and Team Composition.** Teaming is encouraged, especially when interdisciplinary approaches to a problem are required. 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. Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals and to join others in submitting proposals. Awards made under this BAA are subject to the provisions of the Federal Acquisition Regulation (FAR) Subpart 9.5, Organizational Conflicts of Interest. Consequently, all offerors and proposed subcontractors must, therefore, 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 offeror supports, and identify the prime contract numbers. Affirmations should be furnished at the time of proposal submission. All facts relevant to the existence or potential existence of organizational conflicts of interest, as that term is defined at FAR 9.501, must be disclosed. The disclosure shall include a description of the action the offeror has taken or proposes to take to avoid, neutralize or mitigate such conflict.

**Technology Transition.** Proposers are strongly encouraged to engage commercial and military end-users and commercial manufacturers from the program inception. The engagement of these communities also helps ensure that the various technologies being developed will be commercially viable (cost effective, manufacturability, etc.) and available to the military. Thus, proposals are strongly encouraged to include/involve the user-community that intends to bring the technology to practice as a result of this research. This relationship encourages the participation of researchers, end-users and manufacturers as collective contributors to the technology definition,

implementation, and performance evaluation. Proprietary Information. All proprietary information should be marked on both the white paper and 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. Standard proprietary disclaimers notwithstanding, proposals may be reviewed by non-Government technical experts who have signed a non-disclosure agreement (NDA) with DARPA, unless the specific phrase "TO BE REVIEWED BY GOVERNMENT EMPLOYEES ONLY" appears on the cover sheet. In any case, personnel under exclusive contract with DARPA who have completed the appropriate nondisclosure agreements will handle the proposals for administrative purposes. Security. Proposals and white papers may contain classified information or data (up to the level of Top Secret/SCI). Offerors that intend to include classified information or data in their proposals above DoD SECRET should contact DARPA security at the address identified in this BAA (or alternatively, the point-of-contact for this BAA) for guidance and direction in advance of proposal preparation. DO NOT SEND CLASSIFIED WHITE PAPERS BY EMAIL. Offerors must have existing approved capabilities (personnel and facilities) to perform research and development at the classification level they propose.

### **Evaluation Criteria**

The following evaluation criteria are listed in order of decreasing importance. Proposals that are considered less than satisfactory in Scientific and Technical Merit will not be evaluated further. 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 state of the art must be demonstrated. All milestones must be clearly and quantitatively described. Value to Defense. Proposers must demonstrate the 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. 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. Cost Realism. Costs of the proposal must be reasonable and provide a high value to the Government.

### **Administration**

Address for Submission of White Papers or Full Proposals (Except Classified Proposals): DARPA/DSO, ATTN: BAA03-02, 3701 North Fairfax Drive, Arlington, VA 22203-1714. Web address for White Paper Submission: <http://www.sainc.com/dso/>. Guidance for Classified Information and Data. Proposers should contact the Contracting Officer for information on security or for instructions for the submission of a classified proposal. All Other Correspondence: Fax: (571) 218-4553 (Addressed to: DARPA/DSO, BAA03-02), Electronic Mail: [BAA03-02@darpa.mil](mailto:BAA03-02@darpa.mil). This announcement may be retrieved via the WWW at URL <http://www.darpa.mil/baa>.

### **Original Point of Contact**

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