



Research Announcement

Young Faculty Award

Director's Office

DARPA-RA-09-14

December 18, 2008



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## Part One: Overview Information

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Director's Office (DIRO)
- **Funding Opportunity Title** – Young Faculty Award (YFA)
- **Announcement Type** – Initial announcement
- **Funding Opportunity Number** – DARPA Research Announcement (RA) DARPA-RA-09-14
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – 12.910
- **Dates**
  - Posting Date: 18 December 2008
  - Proposal Due no later than 4:00 PM Eastern Time on February 16, 2009

**Concise description of the funding opportunity** – This RA solicits single investigator proposals from junior faculty for research and development in the areas of the Physical Sciences, Engineering and Mathematics of interest to DARPA's Microsystems Technology Office (MTO) and Defense Sciences Office (DSO).

- **Anticipated individual awards** – Multiple awards are anticipated.
- **Types of instruments that may be awarded** – DARPA intends to award grants (each at a maximum level of \$300,000 for 24 months) to eligible university faculty.
- **Agency contact**
  - Points of Contact  
The RA Coordinator for this effort can be reached via electronic mail:  
[RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)  
DARPA/DIRO  
ATTN: DARPA-RA-09-14  
3701 North Fairfax Drive  
Arlington, VA 22203-1714

## **Part Two: Full Text of Announcement**

### **I. FUNDING OPPORTUNITY DESCRIPTION**

The Defense Advanced Research Projects Agency (DARPA) often selects its research efforts through the Research Announcement (RA) process. The RA will appear first on the FedBizOpps website, <http://www.fedbizopps.gov/>, and Grants.gov website at <http://www.grants.gov/>. The following information is for those wishing to respond to the RA.

The DARPA Young Faculty Award (YFA) program will identify and engage rising research stars in junior faculty positions in academia and expose them to Department of Defense (DoD) needs and DARPA's program development process. The YFA program will provide high-impact funding to these rising stars early in their careers in order to develop their research ideas in the context of DoD needs. The long term goal is to develop the next generation of academic scientists, engineers, and mathematicians in key disciplines who will focus a significant portion of their career on DoD and National Security issues.

This RA solicits single investigator proposals for research and development in the areas of the Physical Sciences, Engineering and Mathematics of interest to DARPA's Microsystems Technology Office (MTO) and Defense Sciences Office (DSO) as described in the topic list below. Proposed research should focus on innovations that will enable revolutionary advances in the selected topic area. High-risk/high-payoff ideas are strongly encouraged.

This solicitation is limited to participation by young investigators as defined in the Proposer Eligibility Section III.

This solicitation seeks proposals for a 24 month research activity consisting of a 12 month base period and a 12 month option period, with a maximum funding level of \$150K per each 12 month period (\$300K maximum total funding).

The proposal should clearly describe the problem being addressed, the current state-of-the-art, new insights to address the problem, a credible research plan and schedule, and critical milestones to be pursued over each 12 month funding period.

During the 12 month base period, a number of visits/exercises at a variety of military sites and facilities will be scheduled. These briefings and visits will provide YFA recipients a unique, first-hand exposure to our war fighters, current DoD technologies in the field, and issues being faced by the services in execution of their missions. It is expected that YFA recipients will participate in a subset of the visits/exercises made available to them. Participation in all such opportunities is not a requirement. However, lack of participation may impact the execution of the follow-on option period. Proposers are expected to include funds for such visits within the total budget of their proposal.

The proposals will be reviewed by panels of Government experts. The proposal review process is expected to be very competitive and highly selective.

### **Technical Areas**

This RA solicits single investigator proposals for research and development in the areas of the Physical Sciences, Engineering and Mathematics which are of interest to DARPA DSO and MTO as described in the topic list below. (For an overview of DARPA and its programs, please read the DARPA strategic plan which can be accessed by clicking here: <http://www.darpa.mil/body/pdf/DARPA2007StrategicPlanfinalMarch14.pdf>.) **Proposers must specify ONE of these topics for their proposal and identify this topic on the cover page.** DARPA reserves the right to assign proposals to a different topic area than what was proposed.

Applicants having questions about specific topic areas should email [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil) with the topic area stated in the subject line. Your question will be distributed to the appropriate person.

1. *Quantum Science and Technology*: DARPA is interested in leading edge experimental and/or theoretical research that advances our understanding of quantum information science and technology to overcome fundamental limits of current processing and communications technologies. Proposed research should offer the potential to dramatically improve the underlying materials, devices, quantum algorithms or employ novel quantum effects for significant advantage. Research topics of interest include but are not limited to: understanding and mitigation of decoherence; novel types of qubits; revolutionary materials for qubits; quantum information theory; quantum algorithms; novel applications of unique quantum properties; quantum communication; and quantum metrology.

Point of Contact: Dr. Jag Shah, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

2. *Bio-Info-Micro*: DARPA is interested in exploiting and developing the synergies among the science and technology of biology, information technology, and micro/nanotechnology to achieve new insights and new capabilities. Advances in one area often benefit the others. For example, research to discover the fundamental laws of biology that extend across biological scales can be used to predict biological function and behaviors. Specific areas of interest include but are not limited to: bioelectronic and biophotonic interfaces; nanotechnological modulation of cellular signal transduction pathways; advanced molecular analysis and synthesis devices; information-driven self-assembly in vitro; biomolecular strategies for information processing; approaches to global understanding in genomics and proteomics; and disruptive ideas in rational protein design.

Point of Contact: Dr. Jon Mogford, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

3. *Mathematics*: DARPA is interested in both fundamental mathematical research to build the foundation for advanced science and technology programs and in applied mathematics and computational mathematics to achieve cutting-edge technical superiority. Areas of interest include but are not limited to: algorithms; geometric and topological methods; inverse methods; multiresolution analysis; and computation that can be applied to design and control complex systems, extract knowledge from data, forecast and assess risk, and perform efficient computations. Potential applications include interdisciplinary efforts that illuminate the mathematical aspects of the other core technologies listed in this RA.

Point of Contact: Dr. Benjamin Mann, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

4. *Structural Materials*: DARPA is interested in leading edge research aimed at creating new materials opportunities and discoveries that might change how the military operates. The importance of materials technology to defense systems is critical and longstanding—many fundamental changes in war fighting capabilities have sprung from new or improved materials. The breadth of this impact is large, ranging from stealth to advanced aircraft/spacecraft and engines. In keeping with this broad impact, DARPA seeks innovative research in the following specific areas of interest to include but not limited to: high-strength composites; ultra-lightweight materials; energy absorbing structures; adaptive materials and structures; new polymeric materials with unique structural capabilities; and computational materials science.

Point of Contact: Dr. Judah Goldwasser, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

5. *Functional Materials*: DARPA is interested in the critical development of materials that are dynamic in both shape and activity as military systems and missions become more complicated. Specific areas of interest include but are not limited to: adaptive electromagnetic and optical materials and metamaterials; advanced electronic, photonic and magnetic materials; phase change materials; new polymeric materials with unique/extreme functional properties; materials based on unusual elements including the semimetals and metalloids; novel multi-sensor materials; biologically inspired materials; new material architectures with extreme functional plasticity, utilizing geometric, topological, origami, or other principles; revolutionary armor systems; and predictive approaches for new material discovery.

Point of Contact: Dr. Mitchell Zakin, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

6. *Power and Energy*: DARPA is interested in innovative research that can lead to portable, efficient, and compact power technologies that increase our military's reach,

decrease the logistics burden, and improve the overall efficiency of our war fighting forces – especially for distributed and net-centric operations. Specific areas of interest include but are not limited to: advanced energy storage; energy conversion; energy harvesting; micro-scale power sources; and novel electric and magnetic materials.

Point of Contact: Ms. Sharon Beermann-Curtin, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

7. *Micro/Nano-electronics*: DARPA is interested in innovative fundamental and applied research in next-generation semiconductor devices, integrated circuit technologies, circuit architectures and design methodologies for future DoD electronic systems. Research topics of interest include but are not limited to: end-of-roadmap-and-beyond nanoscale devices; spintronic devices; high-power RF/microwave devices; power electronics; sub-mm-wave and THz electronics; power electronics; emerging memory technologies; high-speed mixed-signal circuits; adaptive and reconfigurable circuits; linearization; ultra-low-power electronics; radiation hard electronics; system-on-chip (SoC), heterogeneous, and 3D integration strategies; computer-aided-design and modeling; and co-design of hardware and algorithms. Integrated microsystems, incorporating components from other domains such as MEMS/NEMS and photonics are also of great interest.

Point of Contact: Dr. Mark Rosker, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

8. *MEMS/NEMS*: DARPA is interested in innovative research addressing fundamentals, technologies, and devices based on the unique mechanical and chemical properties and capabilities available at the micro and nanoscale. Microelectromechanical and nanoelectromechanical systems (MEMS/NEMS) with applications for improved energy capture and conversion; navigation; communication; thermal management; and sensing of chemical, biological, optical, infrared, acoustic, magnetic, and many other signals are areas of interest. DARPA is also interested in capabilities to predict the behavior and failure of micro and nanomechanical structures based on theoretical and/or experimental studies. In addition, the integration of such devices and structures with signal processing and communications electronics to realize complex microsystems is of great interest.

Point of Contact: Dr. Dennis Polla, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

9. *Photonics*: DARPA is interested in innovative research addressing fundamental and applied research in emerging integrated photonic materials, devices, photonic integrated circuit (PIC) technologies, and photonics-based micro-system architectures for future DoD information sensing and processing systems. Research topics of interest include but are not limited to: RF/microwave signal processing; chip-scale optical interconnects; opto-fluidics; novel integrated photo-voltaic devices; analog

and digital computing; PICs for optical signal processing in networks; Laser Detection and Ranging (LADAR) technologies; novel multispectral focal plane sensor technologies and concepts; photonic-based bio/chemical sensing and processing; integrated optical NEMS/MEMS concepts; and integrated electronic/photonic technologies.

Point of Contact: Dr. Ron Esman, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

*10. Lasers:* DARPA is interested in basic and applied research in lasers, particularly diode and fiber lasers, although other novel architectures are also of interest. Lasers are used by military forces for target designation, communication, electronic warfare, defensive countermeasures, and directed energy weapons. Specific areas of interest include but are not limited to: high energy/power/brightness lasers; ultra-short pulse lasers; advanced semiconductor lasers and optical fiber lasers; novel laser array and coupling architectures; quantum cascade lasers; novel laser implementations including operation in MWIR, LWIR, visible, UV and X-ray spectral ranges; and modeling for next-generation laser/array design.

Point of Contact: Dr. Jeff Rogers, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

*11. Manufacturing Science and Technology:* DARPA is interested in innovative research addressing reliable, robust, and cost-effective manufacturing technologies that meet the DoD's needs for critical defense-specific materials and components. Specific areas of interest include but are not limited to: semiconductor manufacturing technology and advanced lithography; nanofabrication and self-assembly; disruptive 3D manufacturing techniques; polymer, composite and ceramic synthesis; and biologically inspired processes.

Point of Contact: Dr. William Coblenz, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

*12. Neuroscience:* DARPA is seeking cutting-edge neuroscience programs to enable breakthrough science and technology for improved human performance, and more specifically, to overcome the challenges of the operational environment. The areas for research may span fundamental, applied and computational neuroscience. Operational neuroscience: the use of neuroscience tools and techniques to design systems, train individuals, and measure cognitive state in military settings, is of particular interest. Areas of investigation may include but are not limited to: the adaptability and resilience of individuals to high stress environments; novel wearable neural sensors and recording technologies; real-time neural signal acquisition and analysis in applied environments; and investigations into the cognitive state of war fighters during real and simulated task environments.

Point of Contact: Dr. Amy Kruse, [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil)

Proposers are encouraged to review current program descriptions at the MTO/DSO websites (<http://www.darpa.mil/mto/index.html>; [www.darpa.mil/dso](http://www.darpa.mil/dso)) for examples of current DARPA investments in the various areas outlined here. Their programs are aimed at research which will substantially advance our capabilities in these areas. Once awards are made, each YFA performer will be assigned a current MTO or DSO Program Manager with interests closely related to their research topic as project manager and mentor. This is likely to be a different individual than the technical point of contact identified in this RA.

## **II. AWARD INFORMATION**

Multiple awards are anticipated. The amount of resources made available under this RA will depend on the quality of the proposals received and the availability of funds. DARPA expects to make multiple awards, each at a maximum of \$300,000.

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 it is later determined to be necessary. 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 the phases.

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

As of this publication date, DARPA expects that program goals for this RA may be met only by proposers intending to perform 'fundamental research,' i.e., basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community. These are distinguished from proprietary research and from industrial development, design, production, and product utilization the results of which ordinarily are restricted for proprietary or national security reasons. Notwithstanding this statement of expectation, DARPA is not prohibited from considering and selecting research proposals that, while perhaps not qualifying as 'fundamental research' under the foregoing definition, still meet the RA criteria for submissions. In all cases, DAPRA expects to award only grants. However, the contracting officer shall have sole discretion to select award instrument type and to negotiate all instrument provisions with selectees.

### III. ELIGIBILITY INFORMATION

#### A. Eligible Applicants

This RA solicits single investigator proposals for research and development in the broad areas of the Physical Sciences, Engineering, and Mathematics of interest to DARPA DSO and MTO as described in Section I above.

**Participation is limited to untenured Assistant or Associate Professors within 6 years of appointment to a tenure-track position at a U.S. institution of higher learning.**

**Previous YFA recipients are not eligible to apply to this or any future YFA program. Applicants are limited to a maximum of three (3) applications to the DARPA YFA program during their term of eligibility.** Applicants should clearly state on the cover sheet their prior YFA submissions. Applicants are also limited to ONE submission to this RA.

**Since this is a new requirement, for the 2009 YFA program, previous unsuccessful submissions to the 2006 and/or 2007 DARPA MTO YFA programs will NOT be counted against this 3 application limitation.**

Proposers should provide in their proposal a listing of past, current and pending support, including sponsor, funding level, performance dates, and level of effort. DARPA is particularly interested in identifying outstanding researchers who have previously *not been performers* on DARPA programs, but the program is open to all qualified applicants with innovative research ideas.

The ability to obtain a U.S. security clearance is required. Please refer to the Defense Security Service website for guidance on eligibility requirements to obtain a U.S. security clearance ([https://www.dss.mil/GW/ShowBinary/DSS/psco/ps\\_faqs.html](https://www.dss.mil/GW/ShowBinary/DSS/psco/ps_faqs.html)).

Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals; however, no portion of this announcement 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.

#### **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 RA is Dr. Robert Leheny. As of the date of first publication of the RA, 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, with focus on the DARPA Program Manager and those individuals chosen to evaluate proposals received under this RA, 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.). Proposers should carefully consider the composition of their performer team before submitting a proposal to this RA.

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 rejected 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's contact information and a summary of the potential conflict by email to the mailbox address for this RA at RA09-14@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 rejected without technical evaluation and withdrawn from further consideration for award under this RA.

## **B. Cost Sharing/Matching**

Cost sharing is not required for this particular program. 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**

This solicitation is for single author proposals. After final selection and prior to issuance of award, the authors will be given the opportunity to discuss teaming, should it be

required. Should DARPA and a selected author agree that it is necessary to team, potential team members must also be University professors, with preference given to faculty fitting the proposer eligibility guidelines. Specific content, communications, networking, and team formation will be the sole responsibility of the participants.

#### **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 RA. 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. Proprietary Issues**

**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.

Security classification guidance via 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.

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 the formal request is received at this office within 5 days after unsuccessful notification.

###### **2. Proposal Information**

**The YFA proposal process consists of a full-proposal submission only.** There will not be a preceding abstract phase. The technical volume of the proposal will consist of a 1 page executive summary, a pentachart (an example is available in Attachment I), a 5 page technical proposal and statement of work (SOW), a 1 page biosketch, and references.

Proposers are required to submit full proposals by the time and date specified in the RA in order to be considered during the initial round of selections. DARPA may evaluate proposals received after this date for a period up to one year from date of posting on

FedBizOpps and Grants.gov. Ability to review late submissions remains contingent on availability of funds.

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

Proposals not meeting the format described in the RA may not be reviewed.

Grant proposals may only be submitted to DARPA through Grants.gov. Grant proposals may not be submitted through any other means (including T-FIMS, and other comparable systems, or in hard-copy). Proposers must submit their entire proposal through Grants.gov; proposals cannot be submitted in part to Grants.gov and in part as a hard-copy. The APPLY function replaces the proposal submission process that other proposers follow. The APPLY function does not affect the proposal content or format. The APPLY function is electronic; proposers do not submit paper proposals in addition to the Grants.gov APPLY electronic submission.

Proposers must complete the following steps before submitting proposals on Grants.gov (these steps are also detailed at [www.grants.gov/applicants/get\\_registered.jsp](http://www.grants.gov/applicants/get_registered.jsp)):

- Proposers must obtain a DUNS number
- Proposers must register their organization in the Central Contractor Registration (CCR) (<https://www.bpn.gov/CCRSearch/Search.aspx>)
- Proposers must obtain a user name and password with an E-Authentication provider
- Proposers must register the Authorized Organization Representative (AOR) in Grants.gov
- Proposers must have the organization's E-BIZ point of contact authorize the AOR to submit applications.

All administrative correspondence and questions on this solicitation, including requests for information on how to submit a full proposal to this RA, should be directed to the agency contact in Section VII; e-mail is preferred. DARPA intends to use electronic mail for correspondence regarding DARPA-RA-09-14. DARPA encourages use of the Internet for retrieving the RA 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. All pages shall be printed 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, 1 page bibliography of relevant technical papers or research notes (published and unpublished) which document the technical ideas and approach upon which the proposal is based. Volume I should also include a listing of past, current, and pending support, including sponsor, funding level, performance dates, and level of effort. There is no page limit on this item. The submission of other supporting materials along with the proposals is strongly discouraged and will not be considered for review. Except for Sections I and III.B, Volume I shall not exceed {9} pages. Maximum page lengths for each section are shown in braces { } below. All full proposals must be written in English.

### **3. Volume I, Technical and Management Proposal**

#### Section I. Administrative

- A. Cover sheet to include:
  - (1) RA number
  - (2) Technical area proposal is submitted to
  - (3) Lead organization submitting proposal
  - (4) Contractor's reference number (if any)
  - (5) Other team members (if applicable) and type of business for each
  - (6) Proposal title
  - (7) 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)
  - (8) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available), total funds requested from DARPA, and the amount of cost share (if any)
  - (9) Date proposal was submitted
  - (10) List of technical POC's submissions to previous YFA programs, to include solicitation number (e.g. DARPA-RA-09-14) and title of submission.
  
- B. Official transmittal letter.

#### Section II. Summary of Proposal – {8}

- A. {1} Executive summary
- B. {1} Pentachart (Example in Attachment I)
- C. {5} Technical proposal and statement of work (SOW)
- D. {1} Biosketch

#### Section III. Additional Information

- A. {1} A brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas upon which the proposal is based.

- B. {No page limit} Listing of past, current, and pending support, including sponsor, funding level, performance dates, and level of effort.

#### **4. Volume II, Cost Proposal – {No Page Limit}**

Cover sheet to include:

- (1) RA number;
- (2) Technical area proposal is submitted to;
- (3) Lead organization submitting proposal;
- (4) Contractor's reference number (if any);
- (5) Other team members (if applicable) and type of business for each;
- (6) Proposal title;
- (7) 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);
- (8) 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);
- (9) Place(s) and period(s) of performance;
- (10) Total proposed cost separated by basic award and option(s) (if any);
- (11) Name, address, and telephone number of the proposer's cognizant Defense Contract Management Agency (DCMA) administration office (*if known*);
- (12) Name, address, and telephone number of the proposer's cognizant Defense Contract Audit Agency (DCAA) audit office (*if known*);
- (13) Date proposal was prepared;
- (14) DUNS number;
- (15) TIN number; and
- (16) Cage Code;
- (17) Subcontractor Information; and
- (18) Proposal validity period; and

The proposers cost volume shall provide detailed budget (cost) information in sufficient detail to substantiate the program price proposed (e.g., realism and reasonableness). In doing so, the proposer shall provide a detailed cost breakdown by phase, task and month. The breakdown shall include, at a minimum, the following major cost items: direct labor (labor categories and labor hours per category); subcontracts (by subcontractor); material/equipment; other direct costs (travel, computer usage fee's, etc.), and indirect charges (rates and factors such as Overhead, G&A, Fringe Benefits, F&A, etc.). Proposers are encouraged to provide the aforementioned cost breakdown as an editable MS Excel spreadsheet with tabs (material, travel, ODC's) provided as necessary. Additionally, the proposer shall provide (1) a summary of total program costs by phase and task, (2) an itemization of major subcontracts, (3) a priced Bill-of-Materials (BOM) clearly identifying, for each item proposed, the source of the unit price (i.e., vendor quote, engineering estimate, etc.) and the type of property (i.e., material, equipment,

special test equipment, plant equipment, information technology (IT)<sup>1</sup>, etc.); (4) the source, nature, and amount of any industry cost-sharing; and (5) 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.). 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.

The cost volume shall also include a detailed cost breakdown of funding amounts for anticipated visits to military sites and facilities.

The proposer shall provide a detailed description of the methods used to estimate costs, to include, at a minimum: 1) substantiation of all rates and factors, and 2) labor and material estimates supported by a narrative basis-of-estimate (BOE) providing sufficient detail to substantiate cost estimates. The prime contractor is responsible for compiling and providing, as part of its proposal submission to the Government, subcontractor proposals prepared at the same level of detail as that required of the prime. Subcontractor proposals include Interdivisional Work Transfer Agreements (ITWA) or similar arrangements.

*Those proposing a grant may follow/use the application instructions/form templates (i.e., DARPA BAA Form Package) provided as part of the RA posting to grants.gov; however, the costing details requested above should be provided to the maximum extent possible in order to adequately substantiate all costs proposed.*

The Defense Appropriations Act caps indirect cost rates for any grant using 6.1 Basic Research FY08/FY09 funding at 35% of the total cost of the award. Total costs include all bottom line costs. For grants awardees subject to cost principles in 2 CFR part 220 (Educational Institutions), indirect costs are all costs of a prime award that are Facilities and Administration costs. For grant awardees subject to the cost principles in 2 CFR part 225 (State, Local, and Indian Tribal Governments), 2 CFR par 230 (Non-profit

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- <sup>1</sup> 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, is not information technology.”

Organizations) or 48 CFR part 23 (Federal Acquisition Regulation), indirect costs refer to any cost not directly identified with a single final cost objective, but identified with two or more final cost objectives or with at least one intermediate cost objective. The cost limitations do not flow down to subcontractors.

### **C. Submission Dates and Times**

#### **1. Full Proposal Date**

The full proposal must be submitted to DARPA on or before 4:00 p.m., local time, February 16, 2009 in order to be considered for selection.

DARPA will regularly post a consolidated Question and Answer (Q&A) document to <http://www.darpa.mil/> prior to the proposal due date. In order to receive a response to your question, it is highly recommended that you submit your questions by no later than January 26, 2009 to [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil).

DARPA will acknowledge receipt of complete submissions via email and assign control numbers that should be used in all further correspondence regarding proposals.

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

### **C. Intergovernmental Review**

Not Applicable.

### **D. Funding Restrictions**

See Part Two, Section I “Funding Opportunity Description”.

## **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: (a) Overall Scientific and Technical Merit; (b) Potential Contribution and Relevance to the DARPA Mission; (c) Realism of Proposed Schedule; (d) Proposer’s Capabilities and/or Related Experience; and (e) Cost 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:

**(a) Overall Scientific and Technical Merit**

The proposed technical approach is feasible, achievable, complete and supported by a proposed technical team that has the expertise and experience to accomplish the proposed tasks. Task descriptions and associated technical elements provided are complete and in a logical sequence with all proposed deliverables clearly defined such that a final product that achieves the goal can be expected as a result of award. The proposal identifies major technical risks and planned mitigation efforts are clearly defined and feasible.

**(b) Potential Contribution and Relevance to the DARPA Mission**

The potential contributions of the proposed effort with relevance to the national technology base will be evaluated. Specifically, DARPA's mission is to maintain the technological superiority of the U.S. military and prevent technological surprise from harming our national security by sponsoring revolutionary, high-payoff research that bridges the gap between fundamental discoveries and their military use. DARPA is particularly interested in identifying outstanding researchers who have previously not been performers on DARPA programs.

**(c) Realism of Proposed Schedule**

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.

**(d) Proposer's Capabilities and/or Related Experience**

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 manage the cost and schedule. Similar efforts completed/ongoing by the proposer in this area are fully described including identification of other Government sponsors.

**(e) Cost 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 recognize 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.

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 Recommendation Process**

It is the policy of DARPA to ensure impartial, equitable, comprehensive proposal evaluations and to select the source (or sources) whose offer meets the Government's technical, policy, and programmatic goals. The primary basis for selecting proposals for acceptance shall be technical, importance to agency programs, and fund availability. 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 document described in "Proposal Information", Section IV.B. Other supporting or background materials submitted with the proposal will be considered for the reviewer's convenience only and not considered as part of the proposal.

Restrictive notices notwithstanding, proposals may be handled for administrative purposes by support contractors. These support contractors are prohibited from competition in DARPA technical research and are bound by appropriate non-disclosure requirements.

Subject to the restrictions set forth in FAR 37.203(d), to the extent applicable, input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants /experts who are strictly bound by the appropriate non-disclosure requirements.

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. After proposals have been evaluated and selections made, the original of each proposal received will be retained at DARPA and all other copies will be destroyed.

## **VI. AWARD ADMINISTRATION INFORMATION**

### **A. Award Notices**

As soon as the evaluation of a proposal is complete, the proposer will be notified that 1) the proposal has been selected for funding pending negotiations, or 2) the proposal has

not been selected. These official notifications will be sent via email to the Technical POC identified on the proposal coversheet.

## **B. Administrative and National Policy Requirements**

### **1. Meeting and Travel Requirements**

There will be a program kickoff meeting and all key participants are required to attend. During the 12 month base period, a number of visits/exercises at a variety of military sites and facilities will be scheduled. Participation in all such opportunities is not a requirement, but lack of participation may impact the execution of the follow-on option period. **Proposers are expected to include funds for two program review meetings and at least one three day military visit within the total budget of their proposal.**

### **2. 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.

### **3. 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"; (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) grant 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>

### **4. Publication Approval**

It is the policy of the Department of Defense for products of fundamental research to remain unrestricted to the maximum extent possible. Contracted fundamental research:

Includes research performed under grants and contracts that are (a) Basic Research"), whether performed by universities or industry or (b) applied research and performed on-campus at a university. The research shall not be considered fundamental in those rare and exceptional circumstances where the applied research effort presents a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique

and critical to defense, and where agreement on restrictions have been recorded in the contract or grant.

It is anticipated that the performance resulting from this RA will be fundamental research.

Proposers are advised if they propose grants, DARPA may elect to award other award instruments if deemed in the Government's best interests by the cognizant Grants/Contracting Officer. 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 award resulting from such a determination 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 non-fundamental research procurement contract or other transaction:

There shall be no dissemination or publication, except within and between the Contractor and any subcontractors, of information developed under this contract or contained in the reports to be furnished pursuant to this contract without prior written approval of the DARPA Technical Information Officer (DARPA/TIO). All technical reports will be given proper review by appropriate authority to determine which Distribution Statement is to be applied prior to the initial distribution of these reports by the Contractor. Papers resulting from unclassified contracted fundamental research are exempt from prepublication controls and this review requirement, pursuant to DoD Instruction 5230.27 dated October 6, 1987.

When submitting material for written approval for open publication, 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, abstract, article, or paper); 2) Event Information: event type (conference, principle 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](mailto:tio@darpa.mil) or via 3701 North Fairfax Drive, Arlington VA 22203-1714, telephone (571) 218-4235. Refer to [www.darpa.mil/tio](http://www.darpa.mil/tio) for information about DARPA's public release process.

## **5. 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.

## **6. 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 Requirements**

The number and types of reports will be specified in the award document, but will include as a minimum 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. Electronic Systems**

### **1. 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 RA. Information on CCR registration is available at <http://www.ccr.gov>.

### **2. Representations and Certifications**

In accordance with FAR 4.1201, prospective proposers shall complete electronic annual representations and certifications at <http://orca.bpn.gov> if proposing a contract. If proposing a grant, prospective proposers shall complete the representations and certifications provided as part of the grants.gov application instructions document.

### **3. 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, if applicable, will be required prior to any award under this RA.

### **4. i-Edison**

The award document for each proposal selected and funding will contain a mandatory requirement for patent/invention reports and notifications to be submitted electronically through i-Edison (<http://s-edison.info.nih.gov/iEdison>).

## **VII. AGENCY CONTACTS**

Administrative, technical or contractual questions should be sent via e-mail to [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil). If e-mail is not available, you may mail requests to the address below. All requests must include the name, email address, and phone number of a point of contact.

The technical POC for this effort is Dr. Robert Leheny, fax: (703) 696-2402, electronic mail: [RA09-14@darpa.mil](mailto:RA09-14@darpa.mil).

DARPA/DIRO  
ATTN: DARPA-RA-09-14  
3701 North Fairfax Drive  
Arlington, VA 22203-1714

**VIII. OTHER INFORMATION**

Not Applicable