



Broad Agency Announcement

Unconventional Processing of Signals for Intelligent Data Exploitation  
(UPSIDE)

Microsystems Technology Office

DARPA-BAA-12-53

August 14, 2012

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## Part I: Overview Information

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Microsystems Technology Office (MTO)
- **Funding Opportunity Title** – Unconventional Processing of Signals for Intelligent Data Exploitation (UPSIDE)
- **Announcement Type** – Initial Broad Agency Announcement
- **Funding Opportunity Number** – DARPA-BAA-12-53
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – Not applicable.
- **Dates**
  - Posting Date: August 14, 2012
  - Proposer’s Day: September 10, 2012 in Arlington, VA
  - Proposal Due Date: October 12, 2012
  - Estimated period of performance start: March 2013
- **Concise description of the funding opportunity:** The UPSIDE program proposes an approach to compute-intensive data analysis using unconventional computation and data representations mapped to emerging new device technologies. By computing high level functions directly using the physics of the devices, we can expect orders of magnitude improvements in the power efficiency of these computations. Target applications include image sensor data analysis.
- **Anticipated individual awards** – Multiple awards are anticipated.
- **Anticipated funding type** - 6.1
- **Types of instruments that may be awarded** – Procurement contract, grant, cooperative agreement or other transaction.
- **Any cost sharing requirements** – None.
- **Agency contact**
  - Dr. Dan Hammerstrom, Program Manager  
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THOSE INTENDING TO SUBMIT A PROPOSAL FOR AN ASSISTANCE INSTRUMENT (GRANT OR COOPERATIVE AGREEMENT) ARE STRONGLY ENCOURAGED TO READ THE INSTRUCTIONS PROVIDED AT SECTION IV(B)(4) REGARDING THE TIME REQUIRED TO RECEIVE VALIDATION OF SUBMISSIONS MADE THROUGH GRANTS.GOV. PROPOSALS THAT ARE VALIDATED AFTER THE PROPOSAL DUE DATE/TIME WILL BE CONSIDERED LATE AND, AS SUCH, WILL NOT BE REVIEWED.

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

### **Sec. I: FUNDING OPPORTUNITY DESCRIPTION**

The Defense Advanced Research Projects Agency often selects its research efforts through the Broad Agency Announcement (BAA) process. The BAA will appear 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 BAA.

Proposed R&D activity will involve, but is not limited to:

- Inference and pattern recognition
- Emerging devices
- Target recognition and tracking
- Image processing
- Self-organization
- Sparse data representation
- Simulation
- Mixed-signal CMOS
- Sensor data processing

Proposed research should investigate innovative approaches that enable revolutionary advances in science, devices, and/or systems. Specifically excluded is research that results primarily in evolutionary improvements to the existing state of practice.

#### **A. Background:**

The DoD has become increasingly reliant on Intelligence, Surveillance and Reconnaissance (ISR) applications to accomplish their mission. Currently there is a pressing need to dramatically expand the DoD's capabilities into the real-time processing of wide-area, high-resolution video imagery, with systems performing target recognition and tracking over large numbers of objects. Not only is the volume of sensor data increasing exponentially, there is also a dramatic increase in the complexity of analysis, reflected in the number of operations per pixel per second. These expanding processing requirements for ISR missions, as well as other DoD sensor applications, are quickly outpacing the capabilities of existing and projected computing platforms.

Traditionally, Moore's Law has enabled a steady progression of low-cost, high performance digital computing hardware, providing the processing power needed to keep up with the DoD's mission-based system requirements. But Moore's law is beginning to stall, especially in power efficiency, significantly impacting the projected computation capabilities of portable platforms. In order for the U.S. to maintain technological superiority over its adversaries, the DoD seeks to develop alternative, non-Boolean, non-CMOS, computing approaches to break through the digital CMOS computational efficiency barrier that is limiting the ultimate performance of embedded digital computing hardware.

## B. Program Description

DARPA is soliciting innovative research proposals for the Unconventional Processing of Signals for Intelligent Data Exploitation (UPSIDE) program that will address the open problems facing real-time ISR systems and other power-constrained applications. The objective of the UPSIDE program is to create a high-level non-Boolean computational model and map it directly to the unique operational properties of new, power efficient, non-CMOS, nanoscale devices. UPSIDE will achieve significant increases in power efficiency and performance on an important class of sensor data and image analysis applications that identify and track large numbers of targets.

The UPSIDE program will result in a new generation of computing structures based on revolutionary advances in ISR processing, particularly for DoD applications requiring embedded, real-time sensor data analysis. Because Boolean data representations are inherently power-inefficient for many datasets, particularly those produced by noisy, analog, real-time sensors, the UPSIDE program aims to establish an unconventional, non-Boolean computing paradigm, that will enable new and needed capabilities in the area of sensor data analysis.

To this end, the UPSIDE program will drive the development of a synergistic approach to computing based on probabilistic computational models, sparse data structures, self-organizing systems, and new device technologies that will emerge (“emerging devices” in this BAA) to become alternatives to today’s commercial CMOS FETs. The goal is to develop a computing infrastructure and functional implementations that demonstrate three orders of magnitude improvement in processing speed, and four orders of magnitude improvement in power efficiency. These gains will constitute a new and disruptive level of embedded computational efficiency for future real-time sensor systems.

Inference is the fundamental computational model of the UPSIDE program. An “Inference Module” (IM) is a specific implementation of the computational model. We expect this module to have the following characteristics:

1. A probabilistic inference based model that leverages energy minimization.
2. Systems organized into multiple levels of abstraction, where each level consists of self-organizing (adapting) devices.
3. Data represented in a sparse distributed form, mapping efficiently to collections of non-digital computing devices.
4. The capability to handle both spatial and temporal data, for target tracking and processing of other time-based information.

The IM is loosely defined in this BAA to allow the proposers some freedom in crafting their model.

Formally, one can think of the entire image analysis hierarchy as a Bayesian network, where the sensor input is the evidence and the inference process determines the probability distribution of the output to find the object that is the most likely interpretation of the input presented to the network. A simple definition of inference is a weighted pattern match of its inputs against a set of internal patterns. Such matching requires the existence of a suitable metric over the vector

space as well as estimates of conditional and prior probabilities (beliefs). For many systems, feedback from higher levels can also be provided as part of the inference process. IMs developed by the use of “Deep Learning” procedures, for example, fit the general notion of inference as defined here.

Instead of being programmed, each IM is expected to self-organize, adapting to its inputs. Self-organization, as defined by this BAA, is the process of learning the internal patterns based on the statistics of the input and certain key parameters. Generally, the conditional and prior probabilities are approximated by statistics collected about the inputs. By restricting the number of internal patterns or hidden layer dimensions, a kind of maximum entropy data-reduction is performed. Self-organization should be possible in real-time during system operation. Self-organization should be controllable, since some modules may have their representations provided a priori. Other modules may never need to adapt after an initial learning phase, or may continue to adapt during system operation.

There is an additional requirement that the data representations used by the IMs be sparsely distributed. There are a variety of ways to develop sparsely distributed vectors and proposers are free to use any technique that fits the hardware architectures they are developing. The purpose of this requirement is to ease the implementation of the IMs in mixed signal CMOS and emerging devices.

### **C. Tasks**

The UPSIDE program consists of an interdisciplinary approach which has three mandatory tasks performed over two phases. Proposers must address all three tasks.

Task 1 forms the foundation for the program and involves the development of the computational model as well as the image processing application that will be used for demonstration and benchmarking. Tasks 2 and 3 build upon the results of Task 1 to demonstrate the IM implemented in mixed signal CMOS in Task 2, and with non-CMOS emerging devices in Task 3. The ability to successfully address all three tasks will require close collaboration within the proposer’s team, and will be an important aspect of any successful UPSIDE effort.

Phase 1 will focus primarily on system feasibility by building a sophisticated imaging application using a proposer defined IM. The proposer will start with an imaging application involving object recognition and tracking in a large visual space. There should be a simulation of this application based on traditional image processing techniques. The proposer will then implement a software version of the application making extensive use of the IM computational model. The proposer should benchmark this IM based implementation, known as the “Gold” implementation, against the conventional implementation, to assess recognition accuracy. The Gold implementation will form the core technology that the hardware implementations developed in Tasks 2 and 3 will be based on and measured against.

Phase 2 will focus on benchmarking software and hardware implementations of the IM, including a system test bed implementation of the IM in mixed signal CMOS.

## **D. Metrics**

All of the UPSIDE tasks require benchmarking against the Gold model developed in Task 1. It is the goal of the UPSIDE program to develop computational techniques that show many orders of magnitude improvement in speed and power without any critical loss in accuracy. For this benchmarking there are three general system metrics that will be measured: speed or throughput, power efficiency, and accuracy. It should be possible to derive these metrics from performance data provided by the various simulations. Proposers should specify in the proposal, in detail, the metrics that will be used to measure improvements realized in the UPSIDE program.

The metrics are intended to measure the value and general progress of the proposer's approach and therefore the proposer is free to define these metrics, as well as any other additional metrics they may identify. The metrics defined by the proposer should be consistent with standard industry usage and with the UPSIDE program goals of delivering three orders of magnitude in increased performance, and four orders of magnitude reduction in power consumption, without critical loss of accuracy.

## **E. Task 1: UPSIDE Computational Model**

### **1. Task 1a: Inference Module**

Task 1a involves the development of the probabilistic computation model for the UPSIDE program as discussed above. The IM is the primary building block for the required object recognition and tracking application. The chief aim of this task is to develop the basic IM abstraction, sparse data representation and self-organization capability necessary to form a complete, high-level, functional framework that can be used to re-implement a full-scale imaging application based on the IM abstraction. The IM is the centerpiece of the program.

### **2. Task 1b: Image Processing Pipeline Demonstration Application:**

Task 1b involves the development of the application driver for the UPSIDE technology. In most imaging applications, a series of transformations and analyses are applied to an image. These may start with filters that operate directly on image sensor data, followed by several stages of feature extraction for increasingly complex features. Together, the series of linked components that perform these operations and analyses is called a *pipeline*. Unlike a conventional pipeline, in the pipeline defined here, latter stages of the pipeline may feed information, such as upper level hypotheses or regions of interest, back to earlier stages. Performance on the UPSIDE program requires an Image Processing Pipeline (IPP) application that can identify and track stationary and moving objects. It is assumed that the performer will have access to a conventional implementation of an IPP that will serve as a baseline benchmark. Performers will also be required to provide the necessary data to adequately exercise the pipeline.

Near the end of the pipeline, it is likely that there will be some knowledge or contextual processing. Since one of the goals of the UPSIDE program is to explore unconventional

computing for the entire pipeline, it is expected that proposers will also use the IM as much as possible for back end processing.

### **3. Task 1c (option): Multi-Sensor Data Fusion Demonstration Application**

Proposers are encouraged to show the general applicability of the IM developed in Task 1a beyond the IPP, by using it in a second application performing sensor fusion and data analysis, or in some other relevant sensor data analysis system of interest to the DoD. One example might be a Tactical Remote Sensor (TRS) system. TRS systems collect data from large numbers of geographically dispersed sensors for detection and recognition, providing real-time situational awareness. The sensor modalities investigated may include seismic, acoustic, magnetic, imaging (thermal and electro-optical), radio frequency, ultra-wide band, and electromagnetic. The approach for this task should be similar to Task 1b. Again it is assumed that the performer will have access to a conventional implementation of the sensor application and the necessary data to adequately exercise the pipelines, thereby demonstrating the improvement in speed and power efficiency, with comparable accuracy, based on the UPSIDE approach. This task will be performed during Phase 2 and need not be a part of any of the hardware demonstrations in Tasks 2 and 3.

#### ***Phase 1 Task 1a: Required Program Elements***

- Definition and simulation of Inference Module (IM).

#### ***Phase 1 Task 1b: Required Program Elements***

- Definition of the Gold IPP simulation for video data supporting a DoD relevant image application involving target recognition and tracking.
- Software simulations of the IPP in the following forms:
  - Conventional object recognition and tracking of images.
  - An implementation of the Gold IPP using the IM as the fundamental building block.
- Benchmark the accuracy of the Gold IPP against a conventional implementation of the original IPP using still images and short sequences of video data.

#### ***Phase 2 Task 1b: Required Program Elements***

- Port the IPP simulator to a high performance computing system.
- Benchmark IPP simulations using longer, more complex object tracking sequences of higher definition video data.

#### ***Phase 2 Task 1c: Optional Program Element***

- Definition of Tactical Remote Sensor (TRS) pipeline for sensor data supporting a DoD relevant TRS application or other sensor system of interest.
- Software simulations of TRS system (or other sensor system of interest).
- Analyze performance, power, and accuracy of the IM based TRS system.

## **F. Task 2: Mixed Signal (MS) CMOS Implementation Inference Processors**

The primary focus of Task 2 is to produce a MS CMOS implementation of the IM developed in Task 1. The goal of the MS CMOS IM implementation is to demonstrate that the computational model developed under Task 1 has considerable advantages over conventional Boolean approaches, even when implemented in traditional hardware. Although the power and performance benefit of the UPSIDE approach will be fully realized through the combination of the emerging devices (Task 3) with the computational model (Task 1), it is expected that there will be a substantial power and performance benefit gained from implementing the UPSIDE non-Boolean computational model in MS CMOS. Development of a MS CMOS IM and system testbed will also allow the concepts developed in Task 1 to be implemented in a proven technology, thus verifying the viability of the performer's specific approach prior to implementation with emerging device technology. The MS CMOS IM may also result in a useful interim technology for real DoD applications.

### **1. Task 2: Phase 1**

In Phase 1, a MS CMOS IM chip will be designed and fabricated. The MS CMOS IM chip will normally consist of multiple IMs. The output for this task will be both a hardware level description and a simulation of the design, as well as a fabricated, packaged and tested chip produced in a state of the art MS CMOS process. The MS CMOS IM design should implement all of the necessary inference characteristics modeled in Task 1, and include any necessary circuitry for I/O and control. Proposers have the freedom to utilize digital logic and conventional computation for control and data communication.

Also in this task, a version of the IPP will be developed where the IM components in the pipeline simulate the CMOS IM operation specifications, factoring into the IPP the degree to which the MS CMOS approximates the ideal IM defined in Task 1a. The simulation should account for the data movement and transformations through the MS CMOS IM chips used throughout the IPP. The simulated version of the IPP will be used to validate results of the hardware version in Phase 2. Validation and benchmarking of the simulated MS CMOS IM IPP will be performed to compare the performance, power consumption, and accuracy results against the conventional, non-IM based IPP.

### **2. Task 2: Phase 2**

In Phase 2 performers will demonstrate the functionality of the MS CMOS IM chip in an IPP testbed that is a hardware implementation of the MS CMOS IPP simulation. The hardware testbed will be validated against the simulations developed in Phase 1. The testbed will be used to prove the capability of the UPSIDE approach by self-organizing to a set of training images with the subsequent processing of image sensor data in real-time. Improvements in performance and power efficiency will be measured. The requirements for moving to a commercial version of the MS CMOS chip, including an estimate of the expected performance/power will be provided as a report.

### ***Phase 1: Task 2 Required Program Elements***

- An implementation of IPP simulation using a simulation of the MS CMOS IM chip.
  - Obtain estimates of system performance, power requirements, data precision, and accuracy.
- The design of a MS CMOS IM implementation.
  - Develop IM digital control and communication circuitry.
- Fabricate, package and test the MS CMOS IM chip.
  - Verify performance, power, and accuracy.

### ***Phase 2: Task 2 Required Program Elements***

- Develop a hardware IPP testbed system based on the MS CMOS IM chip fabricated in Phase 1.
- Validate and benchmark system testbed.
- Report on requirements for commercialization of MS CMOS IM chip.

## **G. Task 3: Emerging Nanoscale Devices**

The biggest impact on speed and power efficiency delivered by the UPSIDE program, will result from leveraging the physics of new and emerging nanoscale devices for the implementation of the UPSIDE IM. Designing and fabricating circuits based on such devices is the focus of the third task. Circuits will be produced from emerging devices to demonstrate the device's ability to perform the basic IM computation. Emerging device circuit measurements will provide the basis for a realistic IM simulation, showing the expected orders of magnitude gains in performance and power efficiency.

Though new devices have been under investigation for some time as potential replacements for digital CMOS, most efforts have focused on demonstrating a digital switch. It may not be possible to create a commercial, integrated chip based on emerging devices within the time frame or scope of the UPSIDE program. However, building and demonstrating real IM circuits based on emerging devices (ED IM) will help prove their intrinsic benefits, which will lead to their eventual commercialization. The objective of Task 3, which is the culmination of the UPSIDE program, is to produce a functioning IM based on emerging devices with sufficient functionality that an implementation of the entire IPP is possible.

### **1. Task 3: Phase 1**

Task 3 Phase 1 begins with the development of a non-CMOS, nanoscale emerging device. This development includes the fabrication and testing of simple emerging device circuits to evaluate the performance, power efficiency, and accuracy of the selected device(s). This development will help guide the design requirements of more complex circuits and the development of the full ED IM simulation. Proposers should explain how the physics of their emerging device(s) can be leveraged to perform within the UPSIDE computational IM and estimate the resulting IM's prospective performance. Proposers need not be limited to a single candidate device.

Phase 1 will also develop an ED IM simulation of the behavior of circuits implemented using emerging devices. High level ED IM simulations that incorporate the functional properties of the emerging devices will be integrated into the IPP to produce a more realistic estimate of the performance benefits gained from the ED IM. The ED IM simulation should exhibit all the described properties of the UPSIDE compute model, including spatial and temporal inference, self-organization, and sparse data representation.

Finally, Phase 1 will develop any I/O and control circuitry required to operate a hardware implementation of the ED IM. In order to test and demonstrate the ED IM, a digital interface is needed. The I/O and control circuitry to perform this function will be designed and tested during Phase 1 in anticipation of the IPP demo in Phase 2. An objective of the program is to fabricate the devices directly on a CMOS substrate as a precursor to a commercial emerging-device-based product. Such an approach would require the development of a custom CMOS chip for the ED IM implementation. While such direct CMOS fabrication is desirable for Task 3, it is not required; however, some mechanism for controlling and communicating with the ED IM during testing is required.

## **2. Task 3: Phase 2**

In Phase 2, the ED IM simulated version of the IPP will be used to compare its accuracy and performance against the Gold version built in Task 1. The ED IM simulated IPP should accurately reflect the emerging device behavior. The ED IM based IPP simulation will be tested with the same image/video data used to validate the Gold version, to benchmark the estimated power savings, increased performance gains, and accuracy of the ED IM. The ED IM version of the IPP should be instrumented to allow the simulation of static and dynamic faults and errors. An estimate of possible ED IM implementation yield should be factored into the simulation to determine whether fault or error correction, beyond that provided by the basic IM algorithms, is required.

Also in Phase 2, a physical ED IM will be fabricated and integrated with the control circuitry designed in Phase 1. The accuracy of the hardware ED IM will be validated against the simulated version of the ED IM. The power and performance of the hardware ED IM will also be determined.

A detailed written analysis of the performance, power efficiency, system accuracy and yield of an ED IM implementation of the entire IPP is required. In addition, any remaining problems, including those of fabrication, yield, operating parameters and system integration, that will need to be solved for commercial realization of an IM IPP based on emerging devices, should be included as well as potential solutions to those problems.

### ***Phase 1: Task 3 Required Program Elements***

- Develop emerging device technology including demonstration of simple circuits.
- Develop a software simulation of the ED IM and insert into the IPP.
- Develop test, I/O and control circuitry for the ED IM.

**Phase 2: Task 3 Required Program Elements**

- Benchmark the software version of IPP based on the ED IM models against the Gold simulation.
- Add a fault simulation capability to the ED IM IPP and demonstrate operation over a reasonable set of yield assumptions.
- Fabrication of ED IM, and integration with the test, I/O and control circuitry.
- Benchmark the physical realization of ED IM against the ED IM simulation.
- Report describing technical challenges for commercialization of an ED IM based IPP system.

**H. Summary – Program Structure and Deliverables**

Phase 1 = up to 30 months.

Phase 2 = 21 months.

Total program not to exceed 51 months.

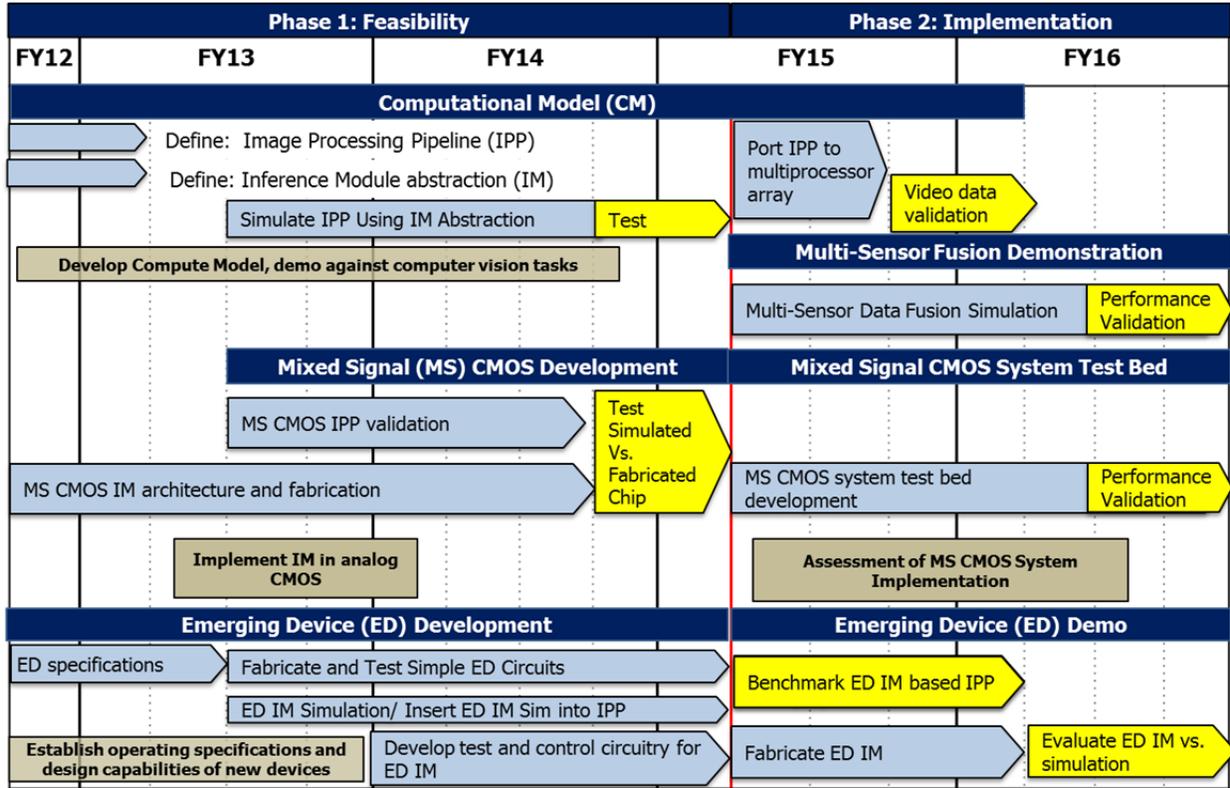
**Table 1: UPSIDE Technology Development**

| Computational Model and Application Development | Task Milestones and Deliverables   |
|---|--|
| <b>Task 1 – Phase 1</b>                         | <ul style="list-style-type: none"> <li>• Definition and simulation of IM.</li> <li>• Definition of the IPP and “Gold” software simulation.</li> <li>• Benchmark the Gold IPP against conventional implementation.</li> </ul> |
| <b>Task 1 – Phase 2</b>                         | <ul style="list-style-type: none"> <li>• Port the IPP simulator to a high performance computing system.</li> <li>• Benchmark the Gold IPP using more complex data.</li> </ul>  |
| <b>Optional Task 1c - Phase 2</b>               | <ul style="list-style-type: none"> <li>• Benchmark of the non-IM against the IM based TRS system.</li> </ul>   |

| Mixed Signal CMOS IM Implementation | Task Milestones and Deliverables  |
|-------------------------------------|---|
| <b>Task 2 – Phase 1</b>             | <ul style="list-style-type: none"> <li>• Implement the IPP based on a simulation of the CMOS IM chip.</li> <li>• Design the MS CMOS IM chip.</li> <li>• Fabricate, package and test the MS CMOS IM chip.</li> </ul>   |
| <b>Task 2 – Phase 2</b>             | <ul style="list-style-type: none"> <li>• Develop a hardware IPP testbed system based on the MS CMOS IM chip fabricated in Phase 1.</li> <li>• Validate and benchmark the system testbed.</li> <li>• Report on requirements for commercialization of MS CMOS IM chip.</li> </ul> |

| Emerging / Nanoscale Devices Implementation | Task Milestones and Deliverables   |
|---|--|
| <b>Task 3 – Phase 1</b>                     | <ul style="list-style-type: none"> <li>• Develop emerging device technology and demonstrate simple circuits.</li> <li>• Develop a software simulation of the ED IM and insert into the IPP.</li> <li>• Develop test, I/O and control circuitry for the ED IM.</li> </ul>   |
| <b>Task 3 – Phase 2</b>                     | <ul style="list-style-type: none"> <li>• Benchmark the software version of ED IM IPP.</li> <li>• Fabricate ED IM, and integrate with the test, I/O and control circuitry.</li> <li>• Benchmark the physical realization of ED IM against the ED IM simulation.</li> <li>• Report describing technical challenges to commercialization of an ED IM based IPP system.</li> </ul> |

**Table 2: UPSIDE Schedule**



It is anticipated that four principal investigator (PI) meetings will be held each year for each performer at roughly three month intervals, with the first PI meeting occurring at program initiation. Difficulties encountered and possible solutions will be discussed. The goals of the PI meetings will be to: (a) review program activities and overall program progress; (b) review innovations / accomplishments; (c) coordinate system test and simulation activities; and (d) plan for the next three month period. The locations for these program reviews, coordination and technical interchanges, PI meetings, and other events will be specified by the Government. In general, for budgeting travel, assume the locations of any detailed performer program reviews will be held at the performer’s location. In addition, the government may want to conduct monthly teleconferences to assess program status.

There will also be two UPSIDE Program conferences for all the performers prior to the end of each phase. For planning purposes these two meetings will be held alternately at east and west coast locations. Additional meetings may be necessary if important issues arise between planned program meetings.

**Sec II. AWARD INFORMATION**

Multiple awards are anticipated. The amount of resources made available under this BAA will depend on the quality of the proposals received and the availability of funds.

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. If warranted, portions of resulting awards may be segregated into pre-priced options. Additionally, DARPA reserves the right to accept proposals in their entirety or to select only portions of proposals for award. In the event that DARPA desires to award only portions of a proposal, negotiations may be opened with that proposer. The Government reserves the right to fund proposals in Phases with options for continued work at the end of one or more of the Phases.

Awards under this BAA will be made to proposers on the basis of the evaluation criteria listed below (see section labeled “Application Review Information”, Sec. V.), and program balance to provide overall value to the Government. Proposals identified for negotiation 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 Government reserves the right to request any additional, necessary documentation once it makes the award instrument determination. Such additional information may include but is not limited to Representations and Certifications. The Government reserves the right to remove proposers from award consideration should the parties fail to reach agreement on award terms, conditions and cost/price within a reasonable time or the proposer fails to timely provide requested additional information.

As of the date of publication of this BAA, DARPA expects that program goals for this BAA may be met by proposers intending to perform 'fundamental research,' i.e., basic or applied research performed on campus in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as 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 BAA criteria for submissions. If proposals are selected for award that offer other than a fundamental research solution, then DARPA will either work with the proposer to modify the proposed statement of work to bring the research back into line with fundamental research or else the proposer will agree to restrictions in order to receive an award. See Section VI.B.4 for further information on fundamental, non-fundamental and restricted research. In all cases, the DARPA contracting officer shall have sole discretion to select award instrument type and to negotiate all instrument provisions with selectees.

### **Sec. III: ELIGIBILITY INFORMATION**

#### **A. Eligible Applicants**

All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities (HBCUs), Small Businesses, Small Disadvantaged Businesses and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals; however, no portion of this

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.

Federally Funded Research and Development Centers (FFRDCs) and Government entities (Government/National laboratories, military educational institutions, etc.) are subject to applicable direct competition limitations and cannot propose to this BAA in any capacity unless they address the following conditions. FFRDCs must clearly demonstrate that the proposed work is not otherwise available from the private sector AND must also provide a letter on letterhead from their sponsoring organization citing the specific authority establishing their eligibility to propose to government solicitations and compete with industry, and compliance with the associated FFRDC sponsor agreement and terms and conditions. This information is required for FFRDCs proposing to be prime or subcontractors. Government entities must clearly demonstrate that the work is not otherwise available from the private sector and provide written documentation citing the specific statutory authority (as well as, where relevant, contractual authority) establishing their ability to propose to Government solicitations. At the present time, DARPA does not consider 15 U.S.C. 3710a to be sufficient legal authority to show eligibility. While 10 U.S.C. 2539b may be the appropriate statutory starting point for some entities, specific supporting regulatory guidance, together with evidence of agency approval, will still be required to fully establish eligibility. DARPA will consider eligibility submissions on a case-by-case basis; however, the burden to prove eligibility for all team members rests solely with the Proposer.

## **B. Procurement Integrity, Standards of Conduct, Ethical Considerations, and Organizational Conflicts of Interest**

Current federal employees are prohibited from participating in particular matters involving conflicting financial, employment, and representational interests (18 USC 203, 205, and 208). The DARPA Program Manager for this BAA is Dr. Dan Hammerstrom. Once the proposals have been received, and prior to the start of proposal evaluations, the Government will assess potential conflicts of interest and will promptly notify the Proposer if any appear to exist. (Please note, the Government assessment does NOT affect, offset, or mitigate the Proposer's own duty to give full notice and planned mitigation for all potential organizational conflicts, as discussed below.)

Without prior approval or a waiver from the DARPA Director, in accordance with FAR 9.503, a Contractor cannot simultaneously provide scientific, engineering, technical assistance (SETA) or similar support and also be a technical performer. Therefore, all Proposers as well as proposed subcontractors and consultants must affirm whether they (their organizations and individual team members) are providing 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, subcontractor, consultant, or individual supports and identify the prime contract number(s). 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 must include a description of the action the Proposer has taken or proposes to take to avoid, neutralize, or mitigate such conflict. If in the sole opinion of the

Government after full consideration of the circumstances, a proposal fails to fully disclose potential conflicts of interest and/or any identified conflict situation cannot be effectively mitigated, the proposal 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) or has questions on what constitutes a conflict of interest, the Proposer should promptly raise the issue with DARPA by sending his/her contact information and a summary of the potential conflict to the BAA mailbox (DARPA-BAA-12-53@dapra.mil) before time and effort are expended in preparing a proposal and mitigation plan.

### **C. Cost Sharing/Matching**

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

### **D. Other Eligibility Criteria**

Collaborative efforts/teaming are encouraged.

## **Sec. IV: APPLICATION AND SUBMISSION INFORMATION**

### **A. Address to Request Application Package**

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

### **B. Content and Form of Application Submission**

#### **1. Security and Proprietary Issues**

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

The Government anticipates proposals submitted under this BAA will be unclassified. However, if a proposal is submitted as “Classified National Security Information” as defined by Executive Order 13526, then the information must be marked and protected as though classified at the appropriate classification level and then submitted to DARPA for a final classification determination.

Security classification guidance via a DD Form 254, "DoD Contract Security Classification Specification," will not be provided at this time, since DARPA is soliciting ideas only. After reviewing the incoming proposals, if a determination is made that the award instrument may result in access to classified information, a DD Form 254 will be issued and attached as part of the award.

Proposers choosing to submit a classified proposal from other classified sources must first receive permission from the respective Original Classification Authority in order to use their information in replying to this BAA. Applicable classification guide(s) should also be submitted to ensure the proposal is protected at the appropriate classification level.

Classified submissions shall be appropriately and conspicuously marked with the proposed classification level and declassification date. Submissions requiring DARPA to make a final classification determination shall be marked as follows:

CLASSIFICATION DETERMINATION PENDING. Protect as though classified (insert the recommended classification level: (e.g., Top Secret, Secret or Confidential)

Classified submissions shall be in accordance with the following guidance:

**Confidential and Secret Collateral Information:** Use classification and marking guidance provided by previously issued security classification guides, the DoD Information Security Manual (DoDM 5200.01, Volumes 1 - 4) and the National Industrial Security Program Operating Manual (DoD 5220.22-M) when marking and transmitting information previously classified by another Original Classification Authority. Classified information at the Confidential and Secret level may be submitted via ONE of the two following methods:

1. Hand-carried by an appropriately cleared and authorized courier to the DARPA CDR. Prior to traveling, the courier shall contact the DARPA CDR at 703-526-4052 to coordinate arrival and delivery.

OR

2. Mailed via appropriate U.S. Postal Service methods (e.g., (USPS) Registered Mail or USPS Express Mail). All classified information will be enclosed in opaque inner and outer covers and double wrapped. The inner envelope shall be sealed and plainly marked with the assigned classification and addresses of both sender and addressee.

The inner envelope shall be addressed to:

Defense Advanced Research Projects Agency  
ATTN: Microsystems Technology Office  
Reference: (DARPA-BAA-12-53)  
675 North Randolph Street  
Arlington, VA 22203-2114

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

Defense Advanced Research Projects Agency  
Security & Intelligence Directorate, Attn: CDR  
675 North Randolph Street  
Arlington, VA 22203-2114

**All Top Secret materials:** Top Secret information should be hand carried by an appropriately cleared and authorized courier to the DARPA CDR. Prior to traveling, the courier shall contact the DARPA CDR at 703-526-4052 to coordinate arrival and delivery.

**Special Access Program (SAP) Information:** SAP information must be transmitted via approved methods. Prior to transmitting SAP information, contact the DARPA SAPCO at 703-526-4052 for instructions.

**Sensitive Compartmented Information (SCI):** SCI must be transmitted via approved methods. Prior to transmitting SCI, contact the DARPA Special Security Office (SSO) at 703-526-4052 for instructions.

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

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

## **2. Proposal Submission Information**

Proposers are required to submit proposals by the time and date specified in the BAA in order to be considered during the single round of selections. Proposals received after the time and date specified in the BAA will be considered late and as such, will not be evaluated.

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

Restrictive notices notwithstanding, proposals may be handled, for administrative purposes only, by a support contractor. This support contractor is prohibited from competition in DARPA

technical research and is bound by appropriate nondisclosure requirements. Proposals and abstracts may not be submitted by fax or e-mail; any so sent will be disregarded.

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

### **3. For Proposers Requesting an Assistance Instrument:**

Grant or cooperative agreement proposals may only be submitted to DARPA through Grants.gov or in hard-copy. Grant or cooperative agreement proposals may not be submitted through any other means (including T-FIMS and other comparable systems). If proposers intend to use Grants.gov as their means of submission, then they must submit their entire proposal through Grants.gov; applications cannot be submitted in part to Grants.gov and in part as a hard-copy. Proposers using the Grants.gov APPLY do not submit paper proposals in addition to the Grants.gov APPLY electronic submission.

Proposers must complete the following steps in the order listed below 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/ccr/default.aspx>
- 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.

Once Grants.gov has received a proposal submission, Grants.gov will send two email messages to advise proposers as to whether or not their proposals have been validated or rejected by the system; IT MAY TAKE UP TO TWO DAYS TO RECEIVE THESE EMAILS. The first email will confirm receipt of the proposal by the Grants.gov system; this email only confirms receipt, not acceptance, of the proposal. The second will indicate that the application has been successfully validated by the system prior to transmission to the grantor agency or has been rejected due to errors. If the proposal is validated, then the proposer has successfully submitted their proposal. If the proposal is rejected, the proposer will have to resubmit their proposal. Once the proposal is retrieved by DARPA, the proposer will receive a third email from Grants.gov. To avoid missing deadlines, proposers should submit their proposals in advance of the final proposal due date with sufficient time to receive confirmations and correct any errors in the submission process through Grants.gov. For more information on submitting proposals to Grants.gov, visit the Grants.gov submissions page at: [http://grants.gov/applicants/apply\\_for\\_grants.jsp](http://grants.gov/applicants/apply_for_grants.jsp)

Proposers electing to submit grant or cooperative agreement proposals via grants.gov must complete the SF 424 R&R form (Application for Federal Assistance, Research and Related) and the SF-LLL (if required). Please use the Attachments Form and upload, as two separate documents, Volume I, Technical and Management Proposal and Volume II, the Cost Proposal, as well as any other documents require by the BAA (i.e., subcontract proposals). No other

Grants.gov forms are required. Please note that Grants.gov does not accept zipped or encrypted documents uploaded as attachments. Please follow the document made available on grants.gov as part of the solicitation entitled “Instructions for Using Grants.gov to Apply for a Grant or Agreement from DARPA (Short Form),” dated 20 October 2011, for more information.

If submitting hard-copy, an original and (4) copies of the proposal and (4) electronic copies of the proposal on a CD-ROM shall be submitted to DARPA/MTO, via 675 North Randolph Street, Arlington VA 22203-2114 (Attn: DARPA-BAA-12-53), no later than time and date specified in Section IV.B.6 Submission Dates and Times.

Technical support for Grants.gov submissions may be reached at 1-800-518-4726 or [support@grants.gov](mailto:support@grants.gov).

#### **4. For Proposers Requesting a Contract or Other Transaction Award Instrument:**

Proposals not requesting a grant or cooperative agreement sent in response to DARPA-BAA-12-53 must be submitted through T-FIMS. See <https://baat.darpa.mil> for more information on how to request an account, upload proposals, and use the T-FIMS tool. Because proposers using T-FIMS may encounter heavy traffic on the web server, and T-FIMS requires a registration and certificate installation for all proposers, proposers should not wait until the day the proposal is due to create an account in T-FIMS and submit the proposal.

#### **5. For All Proposers:**

All administrative correspondence and questions on this solicitation should be directed to [DARPA-BAA-12-53@darpa.mil](mailto:DARPA-BAA-12-53@darpa.mil). DARPA intends to use electronic mail for correspondence regarding DARPA-BAA-12-53. Proposals may not be submitted by fax or e-mail; any so sent will be disregarded. DARPA encourages use of the Internet for retrieving the BAA and any other related information that may subsequently be provided.

### **C. 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 bibliography of relevant technical papers or research notes (published and unpublished) which document the technical ideas and approach upon which the proposal is based. Copies of not more than three (3) relevant papers can be included with the submission. The bibliography and attached papers are not included in the page counts given below. The submission of other supporting materials along with the proposals is strongly discouraged and will not be considered for review. All full proposals must be written in English.

**a. Volume I, Technical and Management Proposal**

Section I. Administrative

A. Cover sheet to include:

- (1) BAA number
- (2) Lead Organization submitting proposal
- (3) Type of business, selected among the following categories: "LARGE BUSINESS", "SMALL DISADVANTAGED BUSINESS", "OTHER SMALL BUSINESS", "HBCU", "MI", "OTHER EDUCATIONAL", OR "OTHER NONPROFIT"
- (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
- (8) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail
- (9) Total funds requested from DARPA, and the amount of cost share (if any) AND
- (10) Date proposal was submitted.

B. Official transmittal letter.

Section II. Summary of Proposal

This section provides an overview of the proposed work as well as an introduction to the associated technical and management issues. **This section should not exceed 6 pages.**

- A. Summary of innovative claims for the proposed research. This section is the centerpiece of the proposal and should succinctly describe the uniqueness and benefits of the proposed approach relative to the current state-of-art alternate approaches.
- B. Deliverables associated with the proposed research and the plans and capability to accomplish technology transition and commercialization. Include in this section all proprietary claims to the results, prototypes, intellectual property, or systems supporting and/or necessary for the use of the research, results, and/or prototype. If there are not proprietary claims, this should be stated. For forms to be completed regarding intellectual property, see Section VIII. There will be no page limit for the listed forms.
- C. Cost, schedule and measurable milestones for the proposed research, including estimates of cost for each task in each year of the effort delineated by the prime and major subcontractors, total cost and company cost share, if applicable. (Note: Measurable milestones should capture key development points in tasks and should be clearly articulated and defined in time relative to start of effort.)
- D. Technical rationale, technical approach, and constructive plan for accomplishment of technical goals in support of innovative claims and deliverable production. (In the full proposal, this section should be supplemented by a more detailed plan in Section III.)
- E. General discussion of other research in this area.

- F. A clearly defined organization chart for the program team which includes, as applicable: (1) the programmatic relationship of team member; (2) the unique capabilities of team members; (3) the task of responsibilities of team members; (4) the teaming strategy among the team members; and (5) the key personnel along with the amount of effort to be expended by each person during each year.

### Section III. Detailed Proposal Information

This section provides the detail of the proposed approach, **and should not exceed 54 pages**.

- A. **Innovative Claims, Technical Rationale and Approach.** This section is the centerpiece of the proposal and should succinctly describe the uniqueness and benefits of the proposed approach relative to the current state-of-art alternate approaches. This section should demonstrate that the proposer has a clear understanding of the state-of-the-art and should provide sufficient technical details so as to permit complete evaluation of the feasibility of the idea. The feasibility of the proposed approach(es) should be justified. All program metrics (both Government-defined and Proposer-defined) must be associated with demonstrable, quantitative measures of performance and should be summarized in a single table (values for the metrics should be given that are anticipated at the program's conclusion and at intermediate milestones).

Proposers should succinctly respond to the following:

- (1) State clearly what you propose to do without using any jargon.
- (2) Thoroughly and quantitatively describe, compare, and contrast all prior work related to the three task areas (i.e., proposers must demonstrate a clear understanding of the present state-of-the-art).
- (3) Include all data/information requested within the Information for Proposers section (as applicable).

- B. **Program Plan & Risk Assessment.** Clearly describe a detailed plan for accomplishing the goals of the BAA using the innovative approach(es) described in Section II. The program plan must: (1) provide a specific plan for benchmarking, which includes a thorough description of performance metrics and assessment parameters and how performance of each will be accurately demonstrated and measured, (2) identify all milestones, and (3) identify major technical risk elements specific to the proposed approach. Estimate the risk magnitude for each such element, and describe specific plans to mitigate those risks. Risk elements should not simply be restatements of program metrics.

- C. **Statement of Work (SOW)** - In this section of the proposal, the respondents must clearly define, in plain English and without proprietary information, all technical tasks and subtasks to be performed. The SOW must include, for each phase, a table defining the program metrics to be achieved (both Government-defined and Proposer-defined). There should be a direct correspondence between the structure and organization of the SOW and the proposed program schedule/plan defined at Section B. The following must be provided for each task/subtask defined in the SOW:

- A general description of the objective (for each defined task/subtask/activity);

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

*Note: It is recommended that the SOW should be developed so that each Phase of the program is separately defined.*

- D. Teaming and Management Plan.** Present a coherent organization chart and integrated management strategy for the program team. For each person, indicate: (1) name, (2) affiliation, (3) abbreviated listing of all technical area tasks they will work on with roles, responsibilities, and percent time indicated, (4) keywords identifying relevant expertise and/or unique capabilities. Additionally, describe the programmatic relationship between investigators and the rationale for choosing this teaming strategy.
- E. Capabilities** – Identify the facilities and equipment required to achieve the proposed goals. Clearly identify which tools and facilities are presently available to the team. For each, if it is presently available to the team, identify its location, which investigator or facility is providing it, and describe its specifications and/or qualifications. If the tool or facility is not available to the team, justify why this is the case and provide the expected cost of acquisition.
- F. Cost, Schedule, and Measurable Milestones** – For the proposed research, provide estimates of cost for each task in each year of the effort delineated by the primes and major subcontractors, total cost, and any company cost share. (Note: Measurable milestones should capture key development points in tasks and should be clearly articulated and defined in time relative to start of effort.) Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each. Additionally, proposals should clearly explain the technical approach(es) that will be employed to meet or exceed each program metric and provide ample justification as to why the approach(es) is/are feasible. The milestones must not include proprietary information.
- G. Description of the results, products, transferable technology, and expected technology transfer path** – This description should enhance that given in Section II. B. Proposers should describe the products and transferable technologies that will result from their program. Specify expected technology transfer paths. See also Section VIII. “Intellectual Property.”



**For proposers without a DCAA-approved cost accounting system who are proposing negotiation of a cost-type contract,** Attachment 2 (SF 1408) must be completed and submitted with your proposal in order for your submission to be deemed conforming to this solicitation. Note that nonconforming proposals may be rejected without review.

For all proposers, including eligible FFRDCs, the cost volume shall provide cost and pricing information (See Note 1), or other than cost or pricing information, if the total price is under \$700,000, in sufficient detail to substantiate the program price proposed (e.g., realism and reasonableness). In doing so, the proposer shall provide a summary cost breakdown by technical area and a detailed cost breakdown by Phase (if multiple Phases are proposed), technical task/sub-task, and month for each technical area proposed to. The breakdown shall include, at a minimum, the following major cost item along with associated backup documentation:

Total program cost broken down by major cost items:

- a. **Direct Labor** – a breakout clearly identifying the individual labor categories with associated labor hours and direct labor rates, as well as a detailed Basis-of-Estimate (BOE) narrative description of the methods used to estimate labor costs;
- b. **Indirect Costs** – Including Fringe Benefits, Overhead, General and Administrative Expense, Cost of Money, Fee, etc. (must show base amount and rate);
- c. **Travel** – Provide the purpose of the trip, number of trips, number of days per trip, departure and arrival destinations, number of people, etc.;
- d. **Other Direct Costs** – Itemized with costs; Back-up documentation is to be submitted to support proposed costs;
- e. **Material/Equipment** – A priced Bill-of-Material (BOM) clearly identifying, for each item proposed, the quantity, unit price, the source of the unit price (i.e., vendor quote, engineering estimate, etc.), the type of property (i.e., material, equipment, special test equipment, information technology, etc.), and a cross-reference to the Statement of Work (SOW) task/s that require the item/s. At time of proposal submission, any item that exceeds \$1,000 must be supported with basis-of-estimate (BOE) documentation such as a copy of catalog price lists, vendor quotes or a written engineering estimate (additional documentation may be required during negotiations, if selected). If seeking a procurement contract and items of Contractor Acquired Property are proposed, exclusive of material, the proposer shall clearly demonstrate that the inclusion of such items as Government Property is in keeping with the requirements of FAR Part 45.102.
- f. **Consultants** – If consultants are to be used, proposer must provide a copy of the consultant’s proposed SOW as well as a signed consultant agreement or other document which verifies the proposed loaded daily / hourly rate and any other proposed consultant costs (e.g. travel);
- g. **Subcontracts** – Itemization of all subcontracts. Additionally, 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 by the prime. Subcontractor proposals include Interdivisional Work Transfer Agreements (ITWA) or similar arrangements. If seeking a procurement contract, the prime contractor shall provide a cost reasonableness analysis of all proposed subcontractor costs/prices. Such analysis shall indicate the extent to which the prime contractor has negotiated subcontract costs/prices and whether any such subcontracts are to be placed on a sole-

source basis. All proprietary subcontractor proposal documentation which cannot be uploaded to TFIMS or Grants.gov as part of the proposer's submission, shall be made immediately available to the Government, upon request, under separate cover (i.e., mail, electronic/email, etc.), either by the proposer or by the subcontractor organization – this does not relieve the proposer from the requirement to include, as part of their submission (via TFIMS, Grants.gov or Hardcopy, as applicable), subcontract proposals that do not include proprietary pricing information (rates, factors, etc.);

h. **Cost-Sharing** - The source, nature, and amount of any industry cost-sharing; and

i. Written justification required per Section VI(B)(4) pertaining to subcontracted effort being considered Contracted Fundamental Research.

Proposers are encouraged to provide the aforementioned cost breakdown as an editable MS Excel spreadsheet, inclusive of calculations formulae, with tabs (material, travel, ODC's) provided as necessary. The Government also requests and recommends that the Cost Proposal include MS Excel file(s) that provide traceability between the Bases of Estimate (BOEs) and the proposed costs across all elements and Phases. This includes the calculations and adjustments that are utilized to generate the Summary Costs from the source labor hours, labor costs, material costs, etc. input data. It is requested that the costs and Subcontractor proposals be readily traceable to the Prime Cost Proposal in the provided MS Excel file(s); however, this is not a requirement.

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

The cost proposal should include identification of pricing assumptions of which may require incorporation into the resulting award instrument (i.e., use of Government Furnished Property/Facilities/Information, access to Government Subject Matter Experts, etc.).

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 1: "Cost or Pricing Data" as defined in FAR Subpart 15.4 shall be required if the proposer is seeking a procurement contract award of \$700,000 or greater unless the proposer requests an exception from the requirement to submit cost or pricing data. In accordance with DFARS 15.403-1(4)(D), DoD has waived cost or pricing data requirements for nonprofit organizations (including educational institutions) on cost-reimbursement-no-fee contracts. In such instances where the waiver stipulated at DFARS 15.403-1(4)(D) applies, proposers shall submit information other than cost or pricing data to the extent necessary for the Government to determine price reasonableness and cost realism; and cost or pricing data from subcontractors that are not nonprofit organizations when the subcontractor's proposal exceeds the cost and pricing data threshold at FAR 15.403-4(a)(1). "Cost or pricing data" are not required if the proposer proposes an award instrument other than a procurement contract.

**PLEASE NOTE, PROPOSERS ARE CAUTIONED THAT EVALUATION RATINGS MAY BE LOWERED AND/OR PROPOSALS REJECTED IF PROPOSAL PREPARATION (PROPOSAL FORMAT, CONTENT, ETC.) AND/OR SUBMITTAL INSTRUCTIONS ARE NOT FOLLOWED.**

#### **D. Submission Dates and Times**

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

The full proposal must be submitted to DARPA/MTO on or before **5:00 PM, Eastern Time, 12 October 2012**, in order to be considered during the single round of selections. Proposals received after this deadline will not be reviewed.

DARPA will post on a regular basis a consolidated question and answer document (FAQ) at [http://www.darpa.mil/Opportunities/Solicitations/MTO\\_Solicitations.aspx](http://www.darpa.mil/Opportunities/Solicitations/MTO_Solicitations.aspx). All questions must be submitted by e-mail to [DARPA-BAA-12-53@darpa.mil](mailto:DARPA-BAA-12-53@darpa.mil). In order to receive a timely response to your question/s, submit your question/s by no later than 28 September 2012.

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

##### **2. Intergovernmental Review**

Not Applicable.

##### **3. Funding Restrictions**

To the extent permitted by the DoD Grants and Agreements Regulations (DoDGARS), assistance instrument awards (grants and cooperative agreements) will allow reimbursement of pre award costs.

##### **4. Other Submission Requirements**

Not Applicable.

#### **Sec. V: APPLICATION REVIEW INFORMATION**

##### **A. Evaluation Criteria**

Proposals will be evaluated using the following criteria, listed in descending order of importance: (a) Overall Scientific and Technical Merit; (b) Potential Contribution and Relevance to the DARPA Mission; (c) Proposer's Capabilities and/or Related Experience; (d) Realism of

Proposed Schedule; (e) Cost Realism; and (f) Plans and Capabilities to Accomplish Technology Transition.

**(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 outcome 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 application.

**(c) 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.

**(d) 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.

**(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. The proposal will be reviewed to determine if the costs proposed are based on realistic assumptions, reflect a sufficient understanding of the technical goals and objectives of the BAA, and are consistent with the proposer's technical approach (to include the proposed Statement of Work). At a minimum, this will involve review, at the prime and subcontract level, of the type and number of labor hours proposed per task as well as the types and kinds of materials, equipment and fabrication costs proposed. It is expected that the effort will leverage all available relevant prior research in order to obtain the maximum benefit from the available funding. For efforts with a likelihood of commercial application, appropriate direct cost sharing may be a positive factor in the evaluation. The evaluation criterion recognizes that undue emphasis on cost may motivate proposers to offer low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. DARPA discourages such cost strategies.

#### **(f) Plans and Capability to Accomplish Technology Transition**

The proposer will be evaluated on their capability to transition the technology to the research, industrial, and/or operational military communities in such a way as to enhance U.S. defense. In addition, the evaluation will take into consideration the extent to which the proposed intellectual property (IP) rights will potentially impact the Government's ability to transition the technology.

#### **B. Review and Selection Process**

Evaluation of proposals will be accomplished through a scientific/technical review of each proposal. 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.

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. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons.

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. Pursuant to FAR 35.016, 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. 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), 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.

## Sec. VI: AWARD ADMINISTRATION INFORMATION

### A. Selection 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 contract 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. Performers should also anticipate regular program-wide PI Meetings and periodic site visits at the Program Manager's discretion.

#### 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.access.gpo.gov/nara/cfr/waisidx\\_07/32cfr219\\_07.html](http://www.access.gpo.gov/nara/cfr/waisidx_07/32cfr219_07.html)) 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/pdf/321602p.pdf>).

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-www.army.mil/index.cfm?pageid=Research\\_Protections.acuro&rn=1](https://mrmc-www.army.mil/index.cfm?pageid=Research_Protections.acuro&rn=1).

### **4. Publication Approval**

It is the policy of the Department of Defense that the publication of products of fundamental research will remain unrestricted to the maximum extent possible. The definition of Contracted Fundamental Research is:

“Contracted Fundamental Research includes [research performed under] grants and contracts that are (a) funded by budget category 6.1 (Basic Research), whether performed by universities or industry or (b) funded by budget category 6.2 (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.” Such research is referred to by DARPA as “Restricted Research.”

Pursuant to DoD policy, research performed under grants and contracts that are (a) funded by budget category 6.2 (Applied Research) and NOT performed on-campus at a university or (b) funded by budget category 6.3 (Advanced Research) does not meet the definition of fundamental research. Publication restrictions will be placed on all such research.

**It is anticipated that awards for Fundamental Research may be made as a result of this BAA.** Appropriate clauses will be included in resultant awards for Non-fundamental Research to prescribe publication requirements and other restrictions, as appropriate. DARPA does not anticipate applying publication restrictions of any kind to Fundamental Research to each individual award that may result from this BAA.

Proposers are advised if they propose grants or cooperative agreements, DARPA may elect to award other award instruments due to the need to apply publication or other restrictions. 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 and will be considered Restricted Research.

For certain research projects, it may be possible that although the research being performed by the Prime Contractor is Restricted Research, a subcontractor may be conducting Contracted Fundamental Research. In those cases, it is the Prime Contractor’s responsibility to explain in their proposal why its subcontractor’s effort is Contracted Fundamental Research.

The following same or similar provision will be incorporated into any resultant Restricted Research or 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 DARPA’s Public Release Center (DARPA/PRC). 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. With regard to subcontractor proposals for Contracted Fundamental Research, 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 PRC 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 [prc@darpa.mil](mailto:prc@darpa.mil) or via 675 North Randolph Street, Arlington VA 22203-2114, telephone (571) 218-4235. Refer to [http://www.darpa.mil/NewsEvents/Public\\_Release\\_Center/Public\\_Release\\_Center.aspx](http://www.darpa.mil/NewsEvents/Public_Release_Center/Public_Release_Center.aspx) for information about DARPA's public release process.

## 5. Export Control

The following clause will be included in all procurement contracts, and may be included in Other Transactions as deemed appropriate:

(a) *Definition.* “Export-controlled items,” as used in this clause, means items subject to the Export Administration Regulations (EAR) (15 CFR Parts 730-774) or the International Traffic in Arms Regulations (ITAR) (22 CFR Parts 120-130). The term includes:

1) “Defense items,” defined in the Arms Export Control Act, 22 U.S.C. 2778(j)(4)(A), as defense articles, defense services, and related technical data, and further defined in the ITAR, 22 CFR Part 120.

2) “Items,” defined in the EAR as “commodities”, “software”, and “technology,” terms that are also defined in the EAR, 15 CFR 772.1.

(b) The Contractor shall comply with all applicable laws and regulations regarding export-controlled items, including, but not limited to, the requirement for contractors to register with the Department of State in accordance with the ITAR. The Contractor shall consult with the Department of State regarding any questions relating to compliance with the ITAR and shall consult with the Department of Commerce regarding any questions relating to compliance with the EAR.

(c) The Contractor's responsibility to comply with all applicable laws and regulations regarding export-controlled items exists independent of, and is not established or limited by, the information provided by this clause.

(d) Nothing in the terms of this contract adds, changes, supersedes, or waives any of the requirements of applicable Federal laws, Executive orders, and regulations, including but not limited to—

(1) The Export Administration Act of 1979, as amended (50 U.S.C. App. 2401, *et seq.*);

(2) The Arms Export Control Act (22 U.S.C. 2751, *et seq.*);

(3) The International Emergency Economic Powers Act (50 U.S.C. 1701, *et seq.*);

(4) The Export Administration Regulations (15 CFR Parts 730-774);

(5) The International Traffic in Arms Regulations (22 CFR Parts 120-130); and

- (6) Executive Order 13222, as extended;
- (e) The Contractor shall include the substance of this clause, including this paragraph (e), in all subcontracts.

## **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.

## **7. Electronic and Information Technology**

All electronic and information technology acquired through this solicitation must satisfy the accessibility requirements of Section 508 of the Rehabilitation Act (29 U.S.C. 794d) and FAR Subpart 39.2. Each proposer who submits a proposal involving the creation or inclusion of electronic and information technology must ensure that Federal employees with disabilities will have access to and use of information that is comparable to the access and use by Federal employees who are not individuals with disabilities and members of the public with disabilities seeking information or services from DARPA will have access to and use of information and data that is comparable to the access and use of information and data by members of the public who are not individuals with disabilities.

## **8. Employment Eligibility Verification**

As per FAR 22.1802, recipients of FAR-based procurement contracts must enroll as Federal Contractors in E-verify and use E-Verify to verify employment eligibility of all employees assigned to the award. All resultant contracts from this solicitation will include FAR 52.222-54, "Employment Eligibility Verification." This clause will not be included in grants, cooperative agreements, or Other Transactions.

## **9. Additional Requirement and Responsibilities relating to Alleged Crimes by or against Contractor Personnel in Iraq and Afghanistan**

Not applicable.

## **10. Central Contractor Registration (CCR) and Universal Identifier Requirements**

Unless the proposer is exempt from this requirement, as per FAR 4.1102 or 2 CFR 25.110 as applicable, all proposers must be registered in the Central Contractor Registration (CCR) and have a valid Data Universal Numbering System (DUNS) number prior to submitting a proposal. Information on CCR registration is available at <http://www.ccr.gov>. All proposers must maintain an active CCR registration with current information at all times during which they have an active Federal award or proposal under consideration by DARPA. All proposers must provide the DUNS number in each proposal they submit.

DARPA cannot make an assistance award to a proposer until the proposer has provided a valid DUNS number and has maintained an active CCR registration with current information.

## **11. Reporting Executive Compensation and First-Tier Subcontract Awards**

The FAR clause 52.204-10, "Reporting Executive Compensation and First-Tier Subcontract Awards," will be used in all procurement contracts valued at \$25,000 or more. A similar award term will be used in all grants and cooperative agreements.

## **12. Updates of Information Regarding Responsibility Matters**

FAR clause 52.209-9, Updates of Publicly Available Information Regarding Responsibility Matter, will be included in all contracts valued at \$500,000 where the contractor has current active Federal contracts and grants with total value greater than \$10,000,000.

## **13. Representation by Corporations Regarding Unpaid Delinquent Tax Liability or a Felony Conviction Under Any Federal Law**

*Each proposer must complete and return the representations in paragraph (b) below with their proposal submission.*

(a) In accordance with sections 8124 and 8125 of Division A of the Consolidated Appropriations Act, 2012 (Pub. L. 112-74) none of the funds made available by that Act may be used to enter into a contract with any corporation that –

(1) Has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability, unless the agency has considered suspension or debarment of the corporation and made a determination that this further action is not necessary to protect the interests of the Government.

(2) Was convicted of a felony criminal violation under any Federal law within the preceding 24 months, where the awarding agency is aware of the conviction, unless the agency has considered suspension or debarment of the corporation and made a determination that this action is not necessary to protect the interests of the Government.

(b) The Offeror represents that –

(1) It is  is not  a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability,

(2) It is  is not  a corporation that was convicted of a felony criminal violated under Federal law within the preceding 24 months.

#### **14. Cost Accounting Standards Notices and Certification Deviation 2012-00003 (Jan 2012)**

As per FAR 52.230-2, amended by Deviation 2012-00003 (JAN 2012), any procurement contract in excess of \$700,000 resulting from this solicitation will be subject to the requirements of the Cost Accounting Standards Board (48 CFR Chapter 99), except those contracts which are exempt as specified in 48 CFR 9903.201-1. Any offeror submitting a proposal which, if accepted, will result in a cost accounting standards (CAS) compliant contract, must submit representations and a Disclosure Statement as required by 48 CFR 9903.202 detailed in FAR 52.230-2.

#### **15. Controlled Unclassified Information on Non-DoD Information Systems**

Controlled Unclassified Information (CUI) refers to unclassified information that does not meet the standards for National Security Classification but is pertinent to the national interests of the United States or to the important interests of entities outside the Federal Government and under law or policy requires protection from unauthorized disclosure, special handling safeguards, or prescribed limits on exchange or dissemination. All non-DoD entities doing business with DARPA are expected to adhere to the following procedural safeguards, in addition to any other relevant Federal or DoD specific procedures, for submission of any proposals to DARPA and any potential business with DARPA:

- Do not process DARPA CUI on publicly available computers or post DARPA CUI to publicly available webpages or websites that have access limited only by domain or Internet protocol restriction.
- Ensure that all DARPA CUI is protected by a physical or electronic barrier when not under direct individual control of an authorized user and limit the transfer or DARPA

CUI to subcontractors or teaming partners with a need to know and commitment to this level of protection.

- Ensure that DARPA CUI on mobile computing devices is identified and encrypted and all communications on mobile devices or through wireless connections are protected and encrypted.
- Overwrite media that has been used to process DARPA CUI before external release or disposal.

### **C. Reporting**

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. Representations and Certifications**

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

#### **2. Wide Area Work Flow (WAWF)**

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

#### **3. i-Edison**

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

**Sec. VII: AGENCY CONTACTS**

Administrative, technical or contractual questions should be sent via e-mail to DARPA-BAA-12-53@darpa.mil. All requests must include the name, email address, and phone number of a point of contact.

The technical POC for this effort is:

Dr. Dan Hammerstrom  
DARPA/MTO  
ATTN: DARPA-BAA-12-53  
675 North Randolph Street  
Arlington, VA 22203-2114

**Sec. VIII: OTHER INFORMATION**

**A. Intellectual Property Procurement Contract Proposers**

**1. 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 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.” It is noted an assertion of “NONE” indicates that the Government has “unlimited rights” to all noncommercial technical

data and noncommercial computer software delivered under the award instrument, in accordance with the DFARS provisions cited above. Failure to provide full information may result in a determination that the proposal is not compliant with the BAA – resulting in nonselectability of the proposal.

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

| NONCOMMERCIAL   |   |                        |                                |   |
|---|---|------------------------|--------------------------------|---|
| Technical Data<br>Computer Software<br>To be Furnished<br>With Restrictions | Summary of Intended Use in<br>the Conduct of the Research | Basis for<br>Assertion | Asserted<br>Rights<br>Category | Name of Person<br>Asserting<br>Restrictions |
| (LIST)  | (NARRATIVE)   | (LIST)                 | (LIST)                         | (LIST)                                      |

## 2. 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 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.” Failure to provide full information may result in a determination that the proposal is not compliant with the BAA – resulting in nonselectability of the proposal.

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

| COMMERCIAL  |   |                        |                                |   |
|---|---|------------------------|--------------------------------|---|
| Technical Data<br>Computer Software<br>To be Furnished<br>With Restrictions | Summary of Intended Use in<br>the Conduct of the Research | Basis for<br>Assertion | Asserted<br>Rights<br>Category | Name of Person<br>Asserting<br>Restrictions |
| (LIST)  | (NARRATIVE)   | (LIST)                 | (LIST)                         | (LIST)                                      |

## B. 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 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." Failure to provide full information may result in a determination that the proposal is not compliant with the BAA – resulting in nonselectability of the proposal.

### **C. All Proposers – Patents**

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**

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.

### **E. Other Transactions (OTs):**

DARPA is able to obtain its research support through a variety of legal instruments and flexible arrangements, to include use of Other Transaction Agreements (OTAs). OTAs are potentially applicable to a wide variety of DARPA programs. They are likely to be particularly applicable to support dual-use technologies (those with commercial nonmilitary potential as well as potential military applications), consortia or multi-party agreements, and work supported by multiple funding sources. Because OTAs are not traditional procurement contracts, DARPA is not required to include the traditional FAR and DFARS clauses in these agreements, but is free to negotiate provisions that are mutually agreeable to both the Government and the consortium of companies entering into the agreement. Proposals may, but need not, state that an OTA rather than a contract or grant is desired. Furthermore, DARPA does not enter into OTAs when a contract or grant is feasible or appropriate. See FAR 35.003 for Government-wide policy on use of contracts for research and development.

There are two types of commonly used OTAs awarded pursuant to 10 U.S.C. 2371: Other Transactions for Research and Other Transactions for Prototype Projects (a.k.a. “845s”). Of these two types of OTAs, the one most pertinent to this BAA is referred to as a Technology Investment Agreement (TIA) and is issued in accordance with Part 37 of the Department of Defense Grant and Agreement Regulations (DoDGARs) (<http://www.dtic.mil/whs/directives/corres/html/321006r.htm>). TIAs are assistance instruments used to stimulate or support research designed to: (a) reduce barriers to commercial firm’s participation in defense research, to give the Department of Defense (DoD) access to the broadest possible technology and industrial base; (b) promote new relationships among performers in both the defense and commercial sectors of that technology and industrial base; and (c) stimulate performers to develop, use, and disseminate improved practices. As a matter of DoD policy, a TIA may be awarded only when one or more for-profit firms are to be involved either in the (1) performance of the research project; or (2) the commercial application of the research results (e.g. commercial transition partner). Also of importance is the requirement that, to the maximum extent practicable, the non-Federal parties carrying out a research project under a TIA are to provide at least half of the costs of the project – this being a statutory condition for any TIA, or Other Transaction Agreement in general, issued under the authority of 10 U.S.C. 2371. Such instruments can involve a single performer or multiple performers participating as a consortium (which are not required to operate as a separate legal entity) and the Generally Accepted Accounting Principle (GAAP) applies rather than the FAR or DFARS cost principles.

For information on 845 Other Transaction Authority for Prototypes (OTA) agreements, refer to [http://www.darpa.mil/cmo/other\\_trans.html](http://www.darpa.mil/cmo/other_trans.html). All proposers requesting an 845 Other Transaction Authority for Prototypes (OTA) agreement must include a detailed list of milestones. Each such milestone must include the following: milestone description, completion criteria, due date, payment/funding schedule (to include, if cost share is proposed, contractor and Government share amounts). It is noted that, at a minimum, such milestones should relate directly to accomplishment of program technical metrics as defined in the BAA and/or the proposer’s proposal. Agreement type, fixed price or expenditure based, will be subject to negotiation by the Agreements Officer; however, it is noted that the Government prefers use of fixed price milestones with a payment/funding schedule to the maximum extent possible. Do not include proprietary data. If the proposer requests award of an 845 OTA agreement as a nontraditional defense contractor, as so defined in the OSD guide entitled “Other Transactions (OT) Guide For Prototype Projects” dated January 2001 (as amended) (<http://www.acq.osd.mil/dpap/Docs/otguide.doc>), information must be included in the cost proposal to support the claim. Additionally, if the proposer plans requests award of an 845 OTA agreement, without the required one-third (1/3) cost share, information must be included in the cost proposal supporting that there is at least one non-traditional defense contractor participating to a significant extent in the proposed prototype project.

## **F. Proposer’s Day**

DARPA will host a Proposer’s Day on September 10, 2012 in support of the UPSIDE Program at the DARPA Conference Center in Arlington, VA. The purpose of the Proposer’s Day is to provide potential proposers information on the UPSIDE BAA, promote additional discussion on this topic, address questions, provide a forum to present their capabilities, and to encourage team

formation. Interested proposers are not required to attend the Proposer's Day in order to respond to the UPSIDE BAA. DARPA reserves the right to limit the number of attendees from each organization. DARPA will not provide cost reimbursement for interested proposers in attendance at the Proposer's Day.

To view details and register for the UPSIDE Proposer's Day, please visit the following site:  
<http://events.SignUp4.com/DARPAUPSIDEProposersDay>

There will be no onsite registration. The Proposer's Day will be open to members of the public who have registered in advance for the workshop. All foreign nationals, including permanent residents, must complete and submit a DARPA Form 60 "Foreign National Visit Request" which will be included in the registration materials. Members of the press are not permitted to attend the Proposer's Day.

Proposer's Day Point of Contact: [DARPA-BAA-12-53@darpa.mil](mailto:DARPA-BAA-12-53@darpa.mil).