Broad Agency Announcement
Integrated Photonic Delay (iPhoD)

DARPA/MTO

DARPA-BAA-08-33

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Table of Contents:

Part I: Overview Information……..…3
Part II: Full Text of Announcement
Sec. I. Funding Opportunity Description……4
Sec. II. Award Information…….10
Sec. III. Eligibility Information……..….11
1. Eligible Applicants
2. Cost Sharing and Matching
Sec. IV. Application and Submission Information……13
1. Address to Request Application Package
2. Content and Form of Application Submission
3. Submission Dates and Times
4. Funding Restrictions
5. Other Submission Requirements
Sec. V. Application Review Information……...23
1. Criteria
2. Review and Selection Process
Sec. VI. Award Administration Information……..…26
1. Award Notices
2. Administrative and National Policy Requirements
3. Reporting Requirements
Sec. VII. Agency Contacts……..…30
Sec. VIII. Other Information……..….31

Part One: Overview Information

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Microsystems Technology Office (MTO)
- **Funding Opportunity Title –** Integrated Photonic Delay (iPhoD)
- **Announcement Type –** Initial announcement
- **Funding Opportunity Number – DARPA**-BAA-08-33
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – 12.910 Research and Technology Development
- **Dates**
  - Proposal Due Date: January 5, 2009 (4:00 PM EST)

- **Concise description of the funding opportunity -** DARPA is soliciting innovative research and development proposals in the area of integrated photonics. The goal of this program is to develop a chip-scale, integrated photonic platform with "fiber-like" losses for optical delay applications.
- **Anticipated individual awards** – Multiple awards are anticipated.
- **Types of instruments that may be awarded** – Procurement contract, grant, cooperative agreement or other transaction.
- **Agency contact**
  - Dr. Ronald Esman
    The BAA Coordinator for this effort can be reached at, fax: (703) 696-2206, electronic mail: BAA08-33@darpa.mil
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    ATTN: BAA 08-33
    3701 North Fairfax Drive
    Arlington, VA 22203-1714
    FAX (703) 696-2206
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Part Two: Full Text of Announcement

I. FUNDING OPPORTUNITY DESCRIPTION

The Defense Advanced Research Projects Agency often selects its research efforts through the Broad Agency Announcement (BAA) process. The BAA will appear first on the FedBizOpps website, http://www.fedbizopps.gov/, and the Grants.gov website at http://www.grants.gov/, and shortly afterwards on the DARPA/MTO Solicitation Page at http://www.darpa.mil/mto/solicitations/index.html. The following information is for those wishing to respond to the BAA.

DARPA is soliciting innovative research and development (R&D) proposals in the area of integrated photonics. The goal of this program is to develop a chip-scale, integrated photonic platform with "fiber-like" losses for optical delay applications. Proposed research should investigate innovative approaches that enable revolutionary advances in science, device design, fabrication and/or systems. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

The ability to generate long optical delays with low intrinsic loss is useful for a wide range of high precision military applications and systems including: high time-bandwidth product analog optical signal processors and delay lines for wideband RF systems, optical buffers for all-optical routing networks, and ultra-stable optical interferometers for sensing applications, e.g. rotation sensors. In general, the performance needed for these and other optical delay applications can be met by commercially available, single-mode, polarization-maintaining, low-loss, optical-fiber-based technologies due to the large time-bandwidth product attainable with glass optical fibers. However, fiber-based optical delay solutions can lack the compactness, environmental robustness, manufacturing scalability and precision needed for desired performance and complexity levels. For instance, many multi-tap delay line applications (e.g. finite impulse response filters) can require the precision splitting and combining of hundreds of high resolution time delays which cannot be easily implemented in fiber-based architectures. Concurrently, these high resolution wideband signal processing applications demand high throughput efficiency to be most useful. For these RF filtering applications as well as for RF/digital signal storage/buffering and many other interferrometric optical sensing applications, microsecond range time delays and beyond is highly desirable. To date, low loss optical fiber is the only guided-wave delay medium capable of providing these long delays with acceptable unamplified transmission loss. For reference, current single-mode polarization-maintaining optical fiber possesses a spooled transmission loss of ~1 dB/km which translates to a loss/delay ratio of ~0.2 dB/μs, well suited for these demanding processing applications requiring long signal delay or storage. However, size constraints, precise differential time delay control requirements and on-chip/off-chip optical signal routing complexity and management are some of the factors that will continue to preclude fiber delay line processors from being more pervasive in military systems.

In contrast to optical fiber, lithographically defined chip-scale, integrated photonic circuit technologies offer the scalability and precision needed for implementing complex optical delay applications but have limited optical delay performance due to large propagation losses in integrated photonic waveguides. The best reported losses achieved to date in integrated photonic waveguides is on the order of 1 dB/m, which translates to a delay/loss ratio of ~0.2 dB/ns (~200 dB/μs). These best integrated waveguide transmission losses are more than three orders of magnitude worse than optical fiber transmission. As a reference, 250 ns of integrated photonic waveguide signal delay or storage incurs at best 50 dB loss, unacceptable in most analog applications where signal-to-noise (S/N) ratio and dynamic range are critical. In general, optical amplification to overcome losses comes at a severe on-chip power, as well as S/N ratio and perhaps optical bandwidth penalty. The ability to realize "fiber-like" losses in a compact chip-scale, integrated photonic platform that can be readily integrated with passive optical, nonlinear optical, and active opto-electronic components is the objective of this program. If successful, iPhoD will enable unprecedented integrated optical delay performance and complexity, thereby furthering the technological precision of our military. The iPhoD program will build the framework of a scalable integrated photonic platform technology that provides for the handling and manipulation of photons with throughput efficiency and precision approaching that of electrons within electronic integrated circuits.

The iPhoD program is aimed at developing and validating a robust ultra-low loss (< 2 dB/μs), single mode, single polarization, compact integrated photonic waveguide technology with accompanying coupler, splitter, and optical via technologies. The envisioned three phase program will demonstrate an ultra-low loss integrated photonic platform capable of scaling to as high as μs-order delays in a small area footprint, and will culminate in a relevant, to-be-proposed, optical delay application demonstration.

Background and Description

The sensitivity and stability of most optical delay applications of interest require both low loss and single polarization. At present, the transmission loss in state-of-the-art planar optical waveguides and integrated circuits is currently ~1000 times greater than that found in commercial-grade, silica-based, polarization maintaining optical fibers at telecommunications wavelengths. Hence, the resulting time-bandwidth product available, using any current integrated optical waveguide platform, is orders of magnitude smaller than in fiber. If single channel optical delay lines were all that were desired, fiber delay line processors would probably be satisfactory for most applications. However, many applications require many high precision parallel fixed or variable delay lines which are not practical with fiber-based solutions. Fiber-based devices and arrays are manufactured in a serial process which does not scale to the complex signal processing architectures required for the most compelling applications. Correspondingly, many of the benefits of wideband signal processing that are possible with optical techniques have been largely unrealized.

Highly scalable parallel processing of multiple waveguides in a variety of geometries with precise lengths (delays) is highly desirable. As an example, the ability to generate

optical delays up to a microsecond or beyond are required for high resolution (<10 MHz e.g.) RF filtering and frequency processors. High resolution microwave and millimeter wave filtering using a low loss planar photonic waveguide technology promises increased operating bandwidths, with reduced filter weight and size, while adding fast tuning capability (μs to ns) at speeds that cannot be achieved with conventional electronic techniques. This program will realize high time-bandwidth products in planar optical waveguide technologies, thereby enabling for example, compact, low power, high dynamic range frequency domain processors. Just as importantly, tunable optical delay, buffering and storage of large amounts of information and data using compact, power efficient on-chip delay architectures can also be realized with ultra low loss integrated waveguide technologies. Today, these capabilities do not exist due primarily to the lack of an adequate integrated optical waveguide technology. These and other compelling military application needs will be addressed in iPhoD.

The optical losses in state-of-the-art planar waveguides range from 0.1-1 dB/cm for semiconductor materials, less than 0.1 dB/cm for hollow-core waveguides, and as low as 0.005 dB/cm for flame hydrolysis deposited silica waveguides. While these losses have proved adequate for many commercial digital telecommunications applications, they do not support high spectral resolution optical signal processing simultaneous with high dynamic range signal detection. Recent advances in material fabrication and processing compatible with optical waveguides indicate that 100x to 1,000x reductions in loss are achievable. iPhoD plans to capitalize and build upon these recent technology advances enabling a whole new class of applications amenable to on-chip solutions.

A number of candidate fabrication approaches show promise for achieving low loss planar photonic waveguides (<0.001 dB/cm). These approaches include (1) optimizing flame hydrolysis deposition of silica materials as well as optimizing waveguide design for reduced silica waveguide loss, (2) developing advanced plasma deposition-based fabrication techniques to realize low-loss, high-index, nanocomposite materials which can be formed into waveguides with an etch-free process, and (3) optimizing a unique, chip-based hollow core waveguide technology (where light is guided in air) for low loss. These and other novel waveguide fabrication techniques will be leveraged to realize an ultra-low-loss planar photonic waveguide technology which can accommodate 500 ns of delay within a 10 cm^2 footprint. The program structure will be divided into three principal low-loss thrust areas spanning three phases of development: polarization-maintaining waveguides, input/output/device coupling, and passive three-dimensional photonic routing. The measurement capability and techniques to validate these extremely aggressive on-chip transmission loss targets is also required.

DARPA is interested in all aspects of this technology. The technical challenges to be addressed in this program include developing the science and technology necessary to fully understand and overcome the important loss contributions in today's integrated optical waveguides. DARPA solicits the most compelling approaches capable of bridging the gap between optical fiber and integrated optic waveguide transmission losses. Highly flexible efficient input/output optical coupling techniques must be developed that are easily adapted to a variety of coupled devices and mode sizes. It is

anticipated that multilayer 3D routing techniques, utilizing passive optical vias in combination with several layers of planar waveguides, must be developed to achieve the small footprints that are targeted. Small footprints are a must and have many obvious advantages and some not so obvious advantages including the reduced difficulty of temperature control. This program seeks a combined analytical and experimental approach, leading to the validation of a comprehensive photonic platform technology suitable for the most demanding military signal routing, processing and storage applications.

Program Objectives and Structure

DARPA is seeking innovative research proposals for integrated photonic delay technologies that will lead to the ability to fabricate dense, high performance, cost-effective optical delay processors. Proposers are strongly encouraged to address all areas of interest in a comprehensive proposal. The areas of interest are as follows:

Technical Area One – Ultra-Low-loss Waveguide Design, Fabrication & Testing:
Development of compact, low-loss, polarization-maintaining optical waveguides at telecommunication wavelengths. Low-loss waveguides with straight and curved (i.e. smooth or abrupt waveguide direction transitions) sections must be designed, developed and demonstrated that can handle moderate to high optical power levels. Polarization properties must be fully analyzed and assessed. Development of engineering tools and techniques to assist in the accurate measurement of extremely low on-chip transmission losses is also of interest.

Technical Area Two – High Efficiency Input/Output Coupling & 3D Layer-to-Layer Coupling:
Research into optimal input/output coupling processes necessary for achieving high transmission throughput is required. Robust mode matching techniques that can be adapted to address many device architectures and topologies must be developed and implemented. Severe size restrictions coupled with the desire for long delays demands multi-layer waveguide topologies. Efficient layer-to-layer power transfer is imperative and techniques to achieve this must be developed if overall input-output losses are to be minimized. Fabrication and performance repeatability are essential if complex optical delay topologies are to be realized and should be addressed in any offered proposal.

Technical Area Three – High Precision On-Chip Optical Splitting/Combining & Trimming:
Both amplitude and phase precision is required for many filtering applications and the ability to accurately set tap weights through optical splitting and combining networks is important. Successful bidders will fully address this issue and propose approaches to accurately fabricate waveguide devices with 50/50 on-chip splitting and combining power ratios. Techniques for trimming and tuning the coupling ratios (amplitude) and delay times (phase) are of high interest.

Technical Area Four – Optical Delay Application Demonstration:
Scale-up of basic waveguides and devices into array processors for a filtering, buffering, or sensing application is required. The scope of the demonstration should be consistent with demonstrating and testing the processor performance commensurate with a realistic military environment. The need and utility of low-loss waveguides must be central to the selection of the demonstration. Only the most compelling applications will be considered.

The iPhoD Program is structured into three phases with Phase I primarily focusing on Technical Area One; Phase II focusing on Technical Areas One/Two/Three; and Phase III focusing on Technical Area Four with associated stretch performance goals covering all Technical Areas. As is evident from the program structure, all proposals must fully address Technical Area One for Phase I funding consideration.

Program Scope

iPhoD is a multi-phase program consisting of three development phases. The length of each phase should be proposed by the proposer based on the approach and effort required. The most compelling proposals will have technical approaches that support:

- Polarization-maintaining or single polarization waveguide operation over wide optical bandwidth, with a minimum of 10 nm somewhere in the 1.0-1.6 μm wavelength region
- Operation over wide RF/digital signal bandwidth, with a minimum of 10 GHz
- High delay time accuracy and thermal stability
- High power handling capability
- Minimized volume or footprint
- Materials compatibility with other telecommunications band optoelectronic device technologies

The focus of each phase is described below:

Phase I. Low-loss Waveguide Materials and Fabrication Processes:
In this phase, performers are expected to develop and demonstrate their overall approach concept. Emphasis in this phase is on developing and demonstrating waveguide materials and fabrication techniques required for dramatic transmission loss reduction. Proposers will validate their proposal assertions for waveguide propagation loss in both straight and curved (i.e. smooth or abrupt waveguide direction transitions) sections. A minimum time delay of 100 ns delay will be demonstrated in this phase and optical power handling will be assessed. With this BAA, DARPA gives strong preference to optical delay technologies capable of handling high optical power levels. Power handling will be gauged in two ways; both excess loss and phase variation. First, the optical waveguide loss in Phase I is to be tested at 20 mW input coupled power thereby limiting acceptable nonlinear losses. Second, power-dependent optical phase change over the length of the waveguide should be negligible ($< \pi/20$) over a 10 dB coupled input power range from 2 mW to 20 mW. Technology paths to meeting iPhoD program goals

concerning polarization extinction ratio, input/output fiber coupling efficiency, 3D layer-to-layer coupling, and footprint will be substantiated by analysis in Phase I. An initial design of the proposer's candidate Phase III demonstration circuit consistent with the iPhoD Program performance goals shall be provided at the end of Phase I for Government evaluation.

Phase II. Low-loss Coupling & 3D Routing:
In this phase, the waveguide materials, fabrication, and coupling approaches from Phase I will be refined with emphasis on footprint reduction and coupling efficiency and accuracy improvements. A minimum time delay of 250 ns delay and a 25 dB polarization extinction ratio, in both straight and curved sections, will be demonstrated in this phase. Power handling will be assessed from 5 mW to 50 mW coupled power in Phase II in a similar manner as in Phase I. A 20 cm^2 footprint for the optical chip must be maintained in Phase II potentially requiring an efficient 3D coupling approach. A precise fiber input/output coupling technology must also be demonstrated in this phase. A refined design of the proposer's candidate Phase III demonstration circuit based on Phase II findings shall be provided at the end of Phase II for further evaluation.

Phase III. Optical Delay Line Processor Development & Demonstration:
In this phase, the refined waveguide materials, processes, and devices from Phase II will be scaled up and improved for implementation in a prototype technology demonstration. This phase is expected to result in fabrication of an array processor with at least 500 ns of on-chip optical delay for the longest path. Power handling will be assessed from 10 mW to 100 mW coupled power in Phase III. A 10 cm^2 footprint for a 500 ns delay path should be demonstrated. Full end-of-program performance is expected to be demonstrated and showcased in a demonstration of the bidder's choice. The optical delay processor should be capable of operation across a relevant temperature range and environment. Preferred approaches will address the required time delay precision and any optical phase trimming technologies needed for the proposed system demonstration in this phase. Additional or modified iPhoD program metrics will be considered depending on the nature of the bidder-proposed application and should be proposed if necessary.

<u>Program Metrics</u>

The following metrics shown in Table 1 relate to optical waveguide components and are of prime interest for tracking progress in this program. All proposers should consider and address this set at a minimum with their approach. Offerors are encouraged to include additional relevant metrics based on their individual approaches, but these basic parameters should be addressed within the proposal and relate directly back to the first evaluation criterion.

Table 1. Minimum list of iPhoD program metrics.

Metric	Phase I Loss Reduction	Phase II Device/Module Optimization	Phase III System/Module Demonstration Stretch Performance Goals
Waveguide Loss (dB/μs) (measured at max. power handling required for each Phase)	**20** (~ 0.1 dB/m)	**5** (~ 0.025 dB/m)	**< 2** (~ 0.01 dB/m)
Time Delay (ns)	**100**	**250**	**500**
Power Handling (mW) (optical power coupled into waveguide)	**20**	**50**	**100**
Power Dependent Optical Phase Variation (measured over a 10 dB coupled input power range up to max. power handling required for each phase)	**π/20**	**π/20**	**π/20**
Footprint (cm^2)	**-**	**20**	**10**
Vertical Layer Coupler Loss (dB)	**-**	**0.5**	**0.2**
Polarization Extinction Ratio (dB)	**-**	**- 25**	**- 30**
Split Ratio Precision (50/50)	**-**	**± 1%**	**± 0.1%** (w/Trimming)
Time Delay Precision	**-**	**-**	**To Be Proposed** (application dependent)
To Be Proposed: Operating Wavelength, Polarization, Input Couplers, System Demonstration			

Phase I metrics focus on waveguide loss reduction and measurement verification. Phase II metrics include size reduction and input/output throughput efficiency. Phase III will focus on a technology demonstration as well as achieving the stretch performance goals outlined in Table I. All phases assume optical wavelengths compatible with telecommunications, which for the purposes of this BAA, range from 1.0-1.6 μm. In addition, all teams will be required to submit a test article to the government for loss validation and verification for all phases.

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 offerors. The Government also reserves the right to conduct discussions if the Source Selection Authority later determines them to be necessary. If warranted, portions of resulting awards may be segregated into pre-priced options. Additionally, DARPA reserves the right to accept proposals in their entirety or to select only portions of proposals for award. In the event that DARPA desires to award only portions of a proposal, negotiations may be opened with that offeror. If the proposed effort is inherently divisible and nothing is gained from the aggregation, offerors should consider submitting it as multiple independent efforts. The Government reserves the right to fund proposals in phases with options for continued work at the end of one or more of the phases.

Awards under this BAA will be made to offerors 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.

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 and applied research 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. In all cases, the contracting officer shall have sole discretion to select award instrument type and to negotiate all instrument provisions with selectees.

III. ELIGIBILITY INFORMATION

A. Eligible Applicants

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 can clearly demonstrate the work is not otherwise available from the private sector AND they also provide written documentation citing the specific statutory authority (as well as, where relevant, contractual authority) establishing their eligibility 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.

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

Applicants considering classified submissions (or requiring access to classified information during the life-cycle of the program) shall ensure all industrial, personnel, and information system processing security requirements are in place and at the appropriate level (e.g., Facility Clearance (FCL), Personnel Security Clearance (PCL), certification and accreditation (C&A)) and any Foreign Ownership Control and Influence (FOCI) issues are mitigated prior to such submission or access. Additional information on these subjects can be found at: www.dss.mil.

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

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

All Proposers and proposed subcontractors must affirm whether they are providing scientific, engineering, and technical assistance (SETA) or similar support to any DARPA technical office(s) through an active contract or subcontract. All affirmations must state which office(s) the Proposer supports and identify the prime contract numbers. Affirmations shall be furnished at the time of proposal submission. All facts relevant to the existence or potential existence of organizational conflicts of interest (FAR 9.5) must be disclosed. The disclosure shall include a description of the action the Proposer has taken or proposes to take to avoid, neutralize, or mitigate such conflict. In accordance with FAR 9.503 and without prior approval or a waiver from the DARPA Director, a Contractor cannot simultaneously be a SETA and Performer. Proposals that fail to fully disclose potential conflicts of interests and/or do not have plans to mitigate this conflict will be rejected without technical evaluation and withdrawn from further consideration for award.

DARPA plans one or more of its proposal evaluators or subject matter experts from other Federal agencies (primarily from the Department of Defense (DoD). In order to avoid potential conflicts of interest, proposers should, as indicated below, contact DARPA prior

to submission of their proposal if use of a Federal agency (i.e., NIST, NRL, AFRL, ARL, etc.) as a team member is anticipated.

If a prospective Proposer believes that any conflict of interest exists or may exist (whether organizational or otherwise), the Proposer should promptly raise the issue with DARPA by sending Proposer's contact information and a summary of the potential conflict by email to the mailbox address for this BAA at BAA08-33@darpa.mil, before time and effort are expended in preparing a proposal and mitigation plan. If, in the sole opinion of the Government after full consideration of the circumstances, any conflict situation cannot be effectively mitigated, the proposal may be rejected without technical evaluation and withdrawn from further consideration for award under this BAA.

B. 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.

C. Other Eligibility Criteria

1. Collaborative Efforts

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

IV. APPLICATION AND SUBMISSION INFORMATION

A. Address to Request Application Package

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

B. Content and Form of Application Submission

1. 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 12958 as amended, 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.

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 Information Security Regulation (DoD 5200.1-R), and the National Industrial Security Program Operating Manual (DoD 5220.22-M) when marking and transmitting information previously classified by another Original Classification Authority. Classified information at the Confidential and Secret level may be 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 address to:

Defense Advanced Research Projects Agency
ATTN: Microsystems Technology Office
Reference: DARPA-BAA-08-33
3701 North Fairfax Drive
Arlington, VA 22203-1714

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

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

All Top Secret materials: 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 571 218-4842 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 703-248-7213 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.

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

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 Information

Proposers are required to submit full proposals by the time and date specified in the BAA in order to be considered during the initial round of selections. DARPA may evaluate proposals received after this date for a period up to one year from date of posting on FedBizOpps and Grants.gov. Ability to review late submissions remains contingent on availability of funds.

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. The iPhoD Program is structured into three phases with Phase I primarily focusing on Technical Area One; Phase II focusing on Technical Areas One/Two/Three; and Phase III focusing on Technical Area Four with associated stretch performance goals covering all Technical Areas. As is evident from the program structure, all proposals must fully address Technical Area One for Phase I funding consideration.

Restrictive notices notwithstanding, proposals may be handled, for administrative purposes only, by a support contractor. This support contractor is prohibited from competition in DARPA technical research and is bound by appropriate nondisclosure requirements. Proposals may not be submitted by fax or e-mail; any so sent will be disregarded.

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

For Proposers Posting to Grants.Gov:

Proposers may elect to use the Grants.gov APPLY function if the applicant is seeking a grant or cooperative agreement. The APPLY function replaces the proposal submission process that other proposers follow. The APPLY function does not affect the proposal content or format. The APPLY function is electronic; proposers do not submit paper proposals in addition to the Grants.gov APPLY electronic submission.

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

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

Grant or cooperative agreement proposals, in their entirety, may only be submitted to DARPA through Grants.gov. Grant or cooperative agreement proposals may not be submitted through any other means, including T-FIMS or other comparable systems.

For All:

All administrative correspondence and questions on this solicitation, including requests for information on how to submit a full proposal to this BAA, should be directed to one of the administrative addresses below; e-mail is preferred (BAA08-33@darpa.mil). DARPA intends to use electronic mail and fax for correspondence regarding BAA 08-33.

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.

For Proposers Submitting proposals through T-FIMS

Proposals sent in response to BAA 08-33 must be submitted through T-FIMS. See https://www.tfims.darpa.mil/baa/ 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. All proposers using T-FIMS must also encrypt the proposal, as per the instructions below.

All proposals submitted electronically through T-FIMS must be encrypted using Winzip or PKZip with 256-bit AES encryption. Only one zipped/encrypted file will be accepted per proposal and proposals not zipped/encrypted will be rejected by DARPA. An encryption password form must be completed and emailed to BAA08-33@darpa.mil at the time of proposal submission. See https://www.tfims.darpa.mil/baa/ for the encryption password form.

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

2. Full Proposal Format

All full proposals must be in the format given below. Nonconforming proposals may be rejected without review. Proposals shall consist of two volumes. All pages shall be printed on 8-1/2 by 11 inch paper with type not smaller than 12 point. 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. Excluding Section I and Section IV, Volume I shall not exceed {67}pages. Maximum page lengths for each section are shown in braces { } below. All full proposals must be written in English.

3. Volume I, Technical and Management Proposal

Section I. Administrative

A.{1} Cover sheet to include:

(1) BAA number
(2) Technical area
(3) Lead Organization Submitting proposal
(4) Type of business, selected among the following categories: "LARGE BUSINESS", "SMALL DISADVANTAGED BUSINESS", "OTHER SMALL BUSINESS", "HBCU", "MI", "OTHER EDUCATIONAL", OR "OTHER NONPROFIT"
(5) Contractor's reference number (if any)
(6) Other team members (if applicable) and type of business for each
(7) Proposal title
(8) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available)
(9) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available), total funds requested from DARPA, and the amount of cost share (if any) and
(10) Date proposal was submitted.

B.{1}Official transmittal letter.

Section II. Summary of Proposal

A. {10} Executive Summary. This should clearly and concisely summarize the following:
- A description of the innovative approaches and technical solutions proposed.
- The quantitative end-of-program performance goals and the milestones associated with each Phase of the development effort. The milestones and performance goals should be listed in a single table (see above for an example table).
- An explanation of how the above goals and milestones compare to what has already been demonstrated.
- 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 no proprietary claims, this should be stated.
- Approximate cost and schedule for the proposed research.

Section III. Detailed Proposal Information

A. {20} Technical Rationale & Approach. A concise section outlining the scientific and technical challenges, unique approaches, and potential anticipated technical solutions to meet or exceed each program metric. 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. Comparison with other ongoing research indicating advantages and disadvantages of the proposed effort should be included.

B. {10} Technology Transition & Business Plan. A description outlining how the technology to be developed in this program will be commercialized and made available to DoD and its contractors to meet DoD needs. Specific detail on results, products, transferable technology, and expected transfer path should be included. This description should highlight specific classes of systems expected to benefit from the technology developments and the advantages that will be afforded from their use. Provide examples of past performance on technology transition, and details on past start-up companies or new corporate divisions and their current status, especially as they relate to benefitting DoD. Discuss how your corporate funding, if available, will assist with transition to meet DoD needs. See also "Intellectual Property."

C. {8} Program Plan & Cost Schedules. A narrative explaining the explicit timelines, milestone achievements, and quantitative metrics by which progress toward the goals can be evaluated. This plan should include a specific and detailed test plan detailing how performance of milestones, particularly the program metrics, will be measured. This section should also include 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. Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each. The proposed period of performance of the overall program and specifically of each program phase and demonstration should be clearly stated. This section should also identify major technical risk elements specific to the proposed approach, estimate the risk magnitude for each such element, and describe specific plans to mitigate risk.

D. {5} Capabilities. A section describing relevant prior work, the background, qualifications and relevant experience of key individuals to be assigned to the program and the facilities and equipment to be utilized. Please do not attach supporting material (CDs, movies, etc.) to the proposal, except as noted in Section IV below.

E. {2} Teaming & Management Plan. A clearly defined organization chart for the program team which includes, as applicable: (1) the programmatic relationship of team members; (2) the unique capabilities of team members; (3) the task of responsibilities of team members; and (4) the teaming strategy among the team members.

F. {5} Slide Summary. PowerPoint-type slides (i.e., landscape formatted for presentation) that succinctly highlight the major aspects of the proposal, including proposer-defined measurable metrics, in a manner suitable for presentation to DARPA management.

G. {7} Statement of Work (SOW). A document written in plain English, outlining the scope of the effort (by Phase) and citing specific tasks to be performed, contractor requirements, and data and/or material deliverables. For each task/subtask, provide:

- A general description of the objective (for each defined task/activity);
- A detailed description of the approach to be taken to accomplish each defined task/activity;

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

Note: It is recommended that the SOW should be developed so that each Phase of the program is separately defined. **Do not include any proprietary information in the SOW.**

Section IV. Additional Information {Optional}

A. A brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas upon which the proposal is based may be provided. Copies of not more than three (3) relevant papers can be included in the submission. This Section does not count towards the overall page limit for Volume I.

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

Cover sheet to include:

(1) BAA number;
(2) Technical area;
(3) Lead Organization Submitting proposal;
(4) Type of business, selected among the following categories: "LARGE BUSINESS", "SMALL DISADVANTAGED BUSINESS", "OTHER SMALL BUSINESS", "HBCU", "MI", "OTHER EDUCATIONAL", OR "OTHER NONPROFIT";
(5) Contractor's reference number (if any);
(6) Other team members (if applicable) and type of business for each;
(7) Proposal title;
(8) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available);
(9) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), and electronic mail (if available);
(10) Award instrument requested: cost-plus-fixed-free (CPFF), cost-contract—no fee, cost sharing contract – no fee, or other type of procurement contract (*specify*), grant, cooperative agreement, or other transaction;
(11) Place(s) and period(s) of performance;
(12) Total proposed cost separated by basic award and option(s) (if any);
(13) Name, address, and telephone number of the offeror's cognizant Defense Contract Management Agency (DCMA) administration office (*if known)*;
(14) Name, address, and telephone number of the offeror's cognizant Defense Contract Audit Agency (DCAA) audit office (*if known*);
(15) Date proposal was prepared;

(16) DUNS number;
(17) TIN number; and
(18) Cage Code;
(19) Subcontractor Information; and
(20) Proposal validity period.

The proposers cost volume shall provide cost and pricing information, or other than cost or pricing information if the total price is under $650,000, in sufficient detail to substantiate the program price proposed (e.g., realism and reasonableness). In doing so, the proposer shall provide a detailed cost breakdown by phase, task and month. The breakdown shall include, at a minimum, the following major cost items: direct labor (labor categories and labor hours per category); subcontracts (by subcontractor); material/equipment; other direct costs (travel, computer usage fee's, etc.), and indirect charges (rates and factors such as Overhead, G&A, Fringe Benefits, etc.). Proposers are encouraged to provide the aforementioned cost breakdown as an editable MS Excel spreadsheet with tabs (material, travel, ODC's) provided as necessary. Additionally, the proposer shall provide (1) a summary of total program costs by phase and task, (2) an itemization of major subcontracts, (3) a priced Bill-of-Materials (BOM) clearly identifying, for each item proposed, the source of the unit price (i.e., vendor quote, engineering estimate, etc.) and the type of property (i.e., material, equipment, special test equipment, plant equipment, information technology (IT)[1], etc.); (4) the source, nature, and amount of any industry cost-sharing; and (5) identification of pricing assumptions of which may require incorporation into the resulting award instrument (e.g., use of Government Furnished Property/Facilities/Information, access to Government Subject Matter Expert/s, etc.). Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each.

The proposer shall provide a detailed description of the methods used to estimate costs, to include, at a minimum: 1) substantiation of all rates and factors, and 2) labor and material estimates supported by a narrative basis-of-estimate (BOE) providing sufficient detail to

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

substantiate cost estimates. The prime contractor is responsible for compiling and providing, as part of its proposal submission to the Government, subcontractor proposals prepared at the same level of detail as that required of the prime. Subcontractor proposals include Interdivisional Work Transfer Agreements (ITWA) or similar arrangements. If seeking a procurement contract, the prime contractor shall provide a cost reasonableness analysis of proposed subcontractor prices. Such analysis shall indicate the extent to which the prime contractor has negotiated subcontract prices. All proprietary subcontractor proposal documentation which cannot be uploaded to TFIMS as part of the proposers 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 TFIMS submission, subcontract proposals that do not include proprietary pricing information (rates, factors, etc.).

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. For IT purchases, <u>all</u> proposers shall include a letter stating why the proposer cannot provide the requested resources from its own funding.

NOTE: "cost or pricing data" as defined in FAR Subpart 15.4 shall be required if the proposer is seeking a procurement contract award of $650,000 or greater unless the proposer requests an exception from the requirement to submit cost or pricing data. "Cost or pricing data" are not required if the proposer proposes an award instrument other than a procurement contract (e.g., a grant, cooperative agreement, or other transaction.) Those proposing a grant or cooperative agreement may follow/use the application instructions/form templates (i.e., DARPA BAA Form Package) provided as part of the BAA posting to grants.gov; however, the costing details requested above should be provided to the maximum extent possible.

The FY2008 Defense Appropriations Act caps indirect cost rates for any procurement contract, grant or agreement using 6.1 Basic Research FY08 Funding at 35% of the total cost of the award. Total costs include all bottom line costs. For grants/agreement awardees subjection to cost principles in 2 CFR part 220 (Educational Institutions), indirect costs are all costs of a prime award that are Facilities and Administration costs. For grant/agreement awardees subject to the cost principles in 2 CFR part 225 (State, Local, and Indian Tribal Governments), 2 CFR par 230 (Non-profit Organizations) or 48 CFR part 23 (Federal Acquisition Regulation), indirect costs refer to any cost not directly identified with a single final cost objective, but identified with two or more final cost objectives or with at least one intermediate cost objective. The cost limitations do not flow down to subcontractors.

All proposers requesting an 845 Other Transaction Authority for Prototypes (OTA) agreement must include a detailed list of payment milestones. Each such payment milestone must include the following: milestone description, exit criteria, due date, milestone payment amount (to include, if cost share is proposed, contractor and

Government share amounts). It is noted that, at a minimum, such payable milestones should relate directly to accomplishment of program technical go/no-go criteria 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 payable milestones 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.

B. Submission Dates and Times

1. Full Proposal Date

The full proposal must be submitted to DARPA/MTO on or before 4:00 p.m., local time, January 5, 2009 in order to be considered during the initial round of selections; however, proposals received after this deadline may be received and evaluated up to one year from date of posting on FedBizOpps. Full proposals submitted after the due date specified in the BAA may be selected contingent upon the availability of funds.

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

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

C. Intergovernmental Review (if applicable)

Not Applicable

D. Funding Restrictions

Not Applicable

V. APPLICATION REVIEW INFORMATION

A. Evaluation Criteria

Evaluation of proposals will be accomplished through a scientific/technical review of each proposal using the following criteria, in order of descending importance: (a) Ability to meet Program Go/No-Go Metrics; (b) Plans and Capability to Accomplish Technology Transition; (c) Overall Scientific and Technical Merit; (d) Potential Contribution and

Relevance to the DARPA Mission; (e) Realism of Proposed Schedule; (f) Proposer's Capabilities and/or Related Experience; and (g) Cost Realism. Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. The following are descriptions of the above listed criteria:

(a) Ability to meet program Go/No-Go Metrics

The feasibility and likelihood of the proposed approach for satisfying the program go/no-go metrics are explicitly described and clearly substantiated. The proposal reflects a mature and quantitative understanding of the program go/no-go metrics, the statistical confidence with which they may be measured, and their relationship to the concept of operations that will result from successful performance in the program.

(b) Plans and Capability to Accomplish Technology Transition

The capability to transition the technology to the research, industrial, and operational military communities in such a way as to enhance U.S. defense, and the extent to which intellectual property rights limitations creates a barrier to technology transition.

(c) Overall Scientific and Technical Merit

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

(d) Potential Contribution and Relevance to the DARPA Mission

The potential contributions of the proposed effort with relevance to the national technology base will be evaluated. Specifically, DARPA's mission is to maintain the technological superiority of the U.S. military and prevent technological surprise from harming our national security by sponsoring revolutionary, high-payoff research that bridges the gap between fundamental discoveries and their military use.

(e) 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.

(f) 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.

(g) Cost Realism

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

After selection and before award the contracting officer will negotiate cost/price reasonableness.

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

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

B. Review and Selection Process

It is the policy of DARPA to ensure impartial, equitable, comprehensive proposal evaluations and to select the source (or sources) whose offer meets the Government's technical, policy, and programmatic goals. 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. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. For evaluation purposes, a proposal is the document described in "Proposal Information", Section IV.B. Other supporting or background materials submitted with the proposal will be considered for the reviewer's convenience only and not considered as part of the proposal.

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

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

It is the policy of DARPA to treat all proposals as competitive information and to disclose their contents only for the purpose of evaluation. No proposals will be returned. After proposals have been evaluated and selections made, the original of each proposal received will be retained at DARPA and all other copies will be destroyed.

VI. AWARD ADMINISTRATION INFORMATION

A. Award Notices

As soon as the evaluation of a proposal is complete, the offeror 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 electronic mail 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 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.dtic.mil/biosys/downloads/32cfr219.pdf), and DoD Directive 3216.02, *Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research* (http://www.dtic.mil/whs/directives/corres/html2/d32162x.htm).

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

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

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

The amount of time required to complete the IRB review/approval process may vary depending on the complexity of the research and/or the level of risk to study participants. Ample time should be allotted to complete the approval process. The IRB approval process can last between one to three months, followed by a DoD review that could last between three to six months. No DoD/DARPA funding can be used towards human subjects research until ALL approvals are granted.

3. Animal Use

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

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

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

4. Publication Approval

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

> Includes research performed under grants and contracts that are (a) Basic Research"), whether performed by universities or industry or (b) applies research and performed on-campus at a university. The research shall not be considered fundamental in those rare and exception circumstances where the applied research effort presents a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense, and where agreement on restrictions have been recorded in the contract or grant.

It is anticipated that the performance of research resulting from the BAA is expected to be fundamental research.

Proposers are advised if they propose grants or cooperative agreements, DARPA may elect to award other award instruments. DARPA will make this election if it determines that the research resulting from the proposed program will present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Any award resulting from such a determination will include a requirement for DARPA permission before publishing any information or results on the program.

The following provision will be incorporated into any resultant non-fundamental research procurement contract or other transaction:

> There shall be no dissemination or publication, except within and between the Contractor and any subcontractors, of information developed under this contract or contained in the reports to be furnished pursuant to this contract without prior written approval of the DARPA Technical Information Officer (DARPA/TIO). All technical reports will be given proper review by appropriate authority to determine which Distribution Statement is to be applied prior to the initial distribution of these reports by the Contractor. Papers resulting from unclassified contracted fundamental research are exempt from prepublication controls and this review requirement, pursuant to DoD Instruction 5230.27 dated October 6, 1987.
>
> When submitting material for written approval for open publication, the Contractor/Awardee must submit a request for public release to the DARPA TIO and include the following information: 1) Document Information: document title, document author, short plain-language description of technology discussed in the material (approx. 30 words), number of pages (or minutes of video) and document type (briefing, report, abstract, article, or paper); 2) Event Information: event type (conference, principle investigator meeting, article or paper), event

date, desired date for DARPA's approval; 3) DARPA Sponsor: DARPA Program Manager, DARPA office, and contract number; and 4) Contractor/Awardee's Information: POC name, e-mail and phone. Allow four weeks for processing; due dates under four weeks require a justification. Unusual electronic file formats may require additional processing time. Requests can be sent either via e-mail to tio@darpa.mil or via 3701 North Fairfax Drive, Arlington VA 22203-1714, telephone (571) 218-4235. Refer to www.darpa.mil/tio for information about DARPA's public release process.

5. Export Control

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

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

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

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

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

6. Subcontracting

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

C. Reporting

The number and types of reports will be specified in the award document, but will include as a minimum monthly financial status reports. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed on before award. Reports and briefing material will also be required as appropriate to document progress in accomplishing program metrics. A Final Report that summarizes the project and tasks will be required at the conclusion of the performance period for the award, notwithstanding the fact that the research may be continued under a follow-on vehicle.

D. Electronic Systems

1. Central Contractor Registration (CCR)

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

2. Representations and Certifications

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

3. Wide Area Work Flow (WAWF)

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

4. i-Edison

The award document for each proposal selected and 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) .

VII. AGENCY CONTACTS

The preferred method of communication is email to BAA08-33@darpa.mil.

Administrative, technical or contractual questions should be sent via e-mail to BAA08-33@darpa.mil. If e-mail is not available, fax questions to (703) 696-2206, Attention: BAA 08-33, All requests must include the name, email address, and phone number of a point of contact.

Points of Contact

The technical POC for this effort is: Dr. Ronald Esman
DARPA/MTO
ATTN: BAA 08-33
3701 North Fairfax Drive
Arlington, VA 22203-1714
FAX (703) 696-2206
PHONE (571) 218-4691
EMAIL BAA08-33@darpa.mil (preferred way to initiate communications)

VIII. OTHER INFORMATION

A. Intellectual Property

1. Procurement Contract Proposers

a. 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."

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

NONCOMMERCIAL

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

b. 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."

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

COMMERCIAL				
Technical Data Computer Software To be Furnished With Restrictions	Summary of Intended Use in the Conduct of the Research	Basis for Assertion	Asserted Rights Category	Name of Person Asserting 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."

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.

1. 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.