Broad Agency Announcement

Information Tethered Micro Automated Rotary Stages (ITMARS)

Microsystems Technology Office

DARPA-BAA-08-74

December 5, 2008
(As amended January 26, 2009)

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Part One: Overview Information

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Microsystems Technology Office (MTO)
- **Funding Opportunity Title –** Information Tethered Micro Automated Rotary Stages (ITMARS)
- **Announcement Type –** Initial Broad Agency Announcement (BAA)
- **Funding Opportunity Number –** DARPA-BAA-08-74
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – 12.910 Research and Technology Development
- **Dates**
  - Posting Date- Thursday, December 5, 2008
  - Proposal Abstract Due Date- 12:00 PM Eastern Time, Monday, February 9, 2009
  - Proposal Due Date- 12:00 PM Eastern Time, Wednesday, March 25, 2009
- **Anticipated individual awards** – Multiple awards are anticipated.
- **Types of instruments that may be awarded** – Procurement contract, grant, cooperative agreement , or Other Transaction (OT) Agreement
- **Agency contact**
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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 Grants.gov website at http://www.grants.gov. The following information is for those wishing to respond to the BAA.

DARPA is soliciting research proposals in the area of Information Tethered Micro Automated Rotary Stages (ITMARS). Proposed research should investigate innovative approaches that enable revolutionary advances in science, devices, or systems. Specifically excluded is research that primarily results in evolutionary improvement to the existing state-of-practice.

Early MEMS work demonstrated multiple avenues for realizing rotating micromotors. This initial success was largely responsible for encouraging engineers and scientists to dream and innovate in MEMS. The micromachining techniques used to fabricate micromotors have been tremendously successful in helping to realize numerous micro-electro-mechanical systems and components, which have enabled high performance at very low size, weight and power, in defense and commercial systems.

With the remarkable progress of MEMS, one might conclude that the use of micro rotating stages is widespread. However, the rotating micromotor has not been utilized to its full extent because of several issues that ITMARS will address. In other words, the unique capability to precisely rotate micromachined structures in a controllable manner has been under-utilized. Although the use of micromotors for optical and mechanical switches has been demonstrated, most applications have used structures fabricated into the rotary stage without the availability of active electrical power, limiting the application space. One of the key hypotheses of this BAA is that providing electrical power on the rotating stage, while allowing full stage rotation and precise position control, will enable microsystems with much higher performance and functionality. Therefore, the goal of the ITMARS program is to demonstrate a MEMS-fabricated rotary stage that broadly enables a degree of freedom to MEMS systems: free rotation with coupled power and signal transfer. This would launch the implementation of micro rotational sensing and device operations on a micro stage with position-measuring accuracies as good as, or better, than those obtained by large instrumented optical rotary stages.

In addition to adding power to the rotating stage, ITMARS will address other shortcomings of rotary stages along with many other developments that have taken place since the advent of micromotors. For example, microscale force feedback techniques in MEMS actuators could enable nanometer to Angstrom level control of stage position. Nanoscale engineering has investigated the creation of strong forces from electrostatic forces generated across nanoscale gaps, perhaps with fluidic dielectrics, to increase the force for force-feedback stabilization against large inertial instabilities due to asymmetric stage mass placement. Nanoscale contact physics has also been investigated and some results suggest reliable sliding solid-solid conducting contacts. Liquid conductive interconnects made from liquid metals (e.g. mercury)

have been realized that could enable liquid slip-rings. Microscale ball-bearings have been integrated in rotating structures to reduce friction and predictable motion. Ultrasonic motors that have run for months without contact damage have also been demonstrated. MEMS resonators have demonstrated the potential of low power local communication links for stage-substrate communications. CMOS integrated MEMS have also demonstrated the power of feedback techniques using high bandwidth deep-submicron CMOS technology. ITMARS will also require the placing of CMOS, or other components, onto the rotating stages for diverse functionality. Recent success in transferring MEMS devices onto different substrates through the use of surface forces and wafer-to-wafer transfer techniques, as well as fast microscale pick-and-place techniques, might be useful for realizing ITMARS goals.

Applications of ITMARS are many: (1) one can rotate micro inertial sensors to implement an in-situ calibration of accelerometers and gyros for drift removal, (2) rotate magnetic sensors to enable real time calibration of compasses, (3) antennas that can be rotated for increased signal reception, (4) microphone arrays for directional acoustic detection, (5) directional radiation detectors of X-rays, (6) directional optical data collection and interconnects, etc. However, for the purposes of choosing a challenging application that will guide ITMARS development and that will most likely produce rotating stages useful for most other applications, ITMARS will focus on directional optical information gathering and data transmission.

In light of the focus on optical information processing, the focus of the ITMARS program will be to develop two types of powered rotary stage components (Figure 1). The first stage will carry a rotating imaging chip, perhaps with an integrated soft polymer lens for wide angle view, placed on the rotating stage and the image data from the stage is transmitted to off-stage electronics. The second stage will be an optical transmission stage that transmits the acquired image from the camera chip, using an optical beam, to an arbitrary direction using stage-integrated light sources and optics.

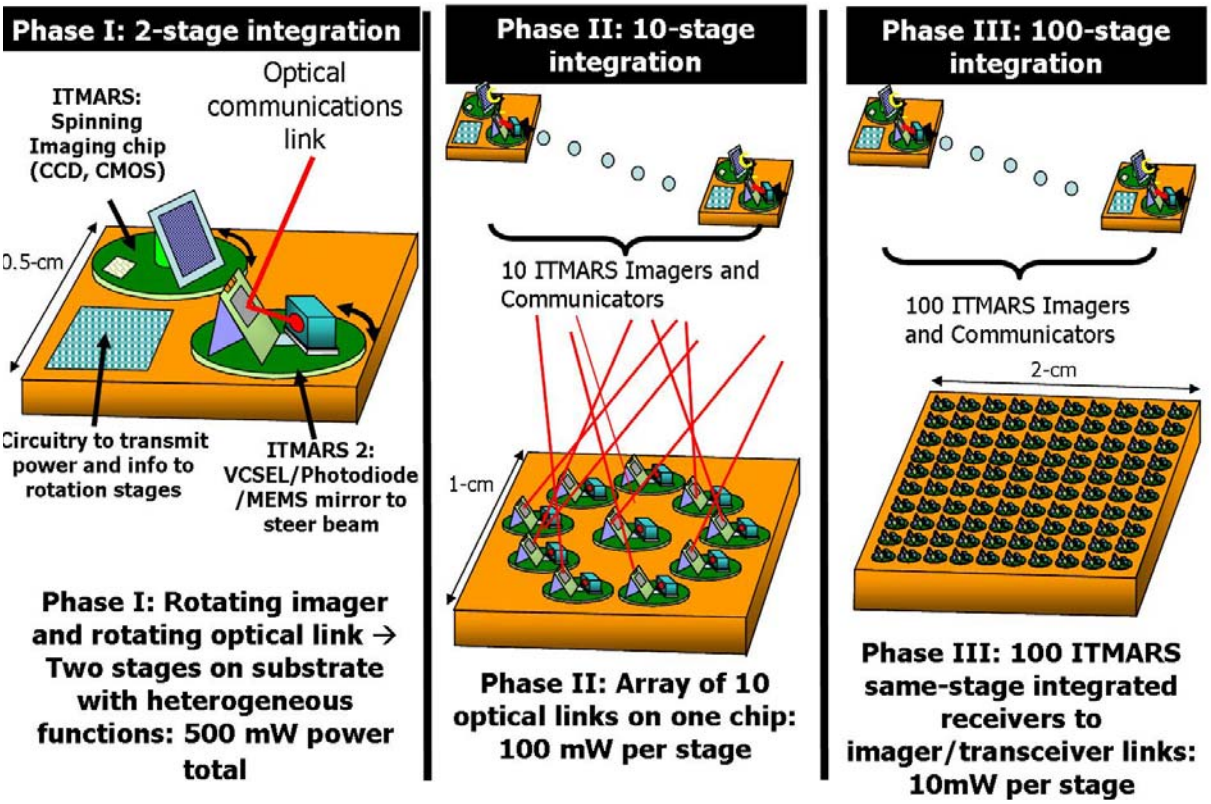

Figure 1. Notional development of ITMARS program. Note that these sketches are only to guide proposal development. Proposers are encouraged to think of novel ways to implement the goals outlined in the sketches.

The combination of the image acquisition and transmission may serve to enable optically connected ad-hoc sensor networks, or enable free space optical interconnects between computers. In each case, issues with power transfer to stage, transfer of components to be rotated on the stages, and thermal management are going to be key technical challenges. The power transmitted to the stage is likely to be enabled by solid or liquid slip-rings, optical, inductive, or capacitive energy transfer and rectification, and modification of MEMS processes to incorporate these links are likely to be developed in ITMARS. Although highly flexible interconnects to the rotating stages are a possible method to transfer power to the rotating stage, it is unlikely that such methods would yield general rotating stages. Each stage is assumed to be 1-2 mm in diameter to enable a 2x2 mm area per ST-chip in the final phase of the program.

1. The optical imaging stage: It is anticipated that a MEMS rotary stage can be implemented such that a separately fabricated CMOS imaging chip, with at least VGA resolution, can be placed on the rotary stage with micro transfer techniques. The chip is most likely to be assembled at an angle such that, when the stage is rotated, it can acquire images in all directions. The ITMARS stage will provide power, perhaps a few milliwatts, and transfer images at video rate to off-stage CMOS. Since the transmission of acquired data is likely to occur over distances of 1-100 microns, the power to receive and transmit data is anticipated to be small, perhaps enabled by capacitive or inductive links.

2. The optical beam link stage: In a separate stage, we anticipate the development of an optical source and beam directing optics for communicating the information. A good candidate for

the optical source might be a VCSEL that is small enough to be transferred onto the rotating stage. Electrostatic, thermal, or piezo-electrically actuated microactuators on the rotating stages could redirect the light from the VCSEL into any direction. The rotating stage would provide bearing or azimuth control, and optics would provide the zenith or polar control of beam direction.

The successful proposals will address how the proposed work will lead to developing components that meet the metrics described in Table 1. The development is listed so that the final Phase III unit has a very small size, weight, and power such that, small nano and micro air vehicles, battery powered sensor nodes, and locations, such as the top of war-fighters helmets, can be ITMARS equipped.

In Phase I, the focus will be to develop the technology to demonstrate a chip with two rotating stages, one with imaging chip, and another with data link. This stage combination can be called a ST-chip (Sense and Transmit stage combo chip). The independent direction control of image acquisition and data transmission will yield a powerful capability for DOD and commercial sensor nodes and free-space data links, in addition to many other applications. In Phase II, further electronics integration and optimization will yield smaller ITMARS such that 10 ST-chips will communicate with one communication-only central data chip that has 10 data-link stages. This central transceiver chip should be able to communicate to the 10 ST-chips placed in arbitrary locations. The communication between the central transceiver and the ST-chips should occur over at least 10 meters or more, although distances over 1-km are ultimately desired. The data rates for the link should be commensurate with video-rate data transmission, and is expected to be at least 100 MHz. In Phase II, the stage size, weight, and power will be further reduced, with a scaling of fabrication so that 100 ST-chips can be realized and communicate with a central transceiver with 100 data-link ITMARS.

Microsystem volume and stage area: This stage volume consists of the imaging and rotating stages, which are expected to be integrated onto chip areas that are continually reduced. The rest of the volume is expected to be occupied by supporting electronics and packaging materials, excluding the power source. It is expected that only a few wires for power are entering the 10cc (in Phase I) volume, as the system acquires images in all directions and transmits them optically. In follow-on phases, the volume for the duo-stage is continuously reduced as electronics are integrated onto single chips and volume required by wiring and discrete electronics is eliminated.

Power consumption off-rotor: This quantity dictates the power required to rotate each of the stages and maintain stage position to increasing precision. This also includes the power consumed to transmit and receive information and power to each rotating stage-integrated component (imager, optics, and optical sources). This does NOT include the power transmitted to the stage and used to transmit information. Since the typical power consumed on each stage is expected to be in the few to tens of milliwatts, the Phase III metric of 10mWatt per stage assumes approximately 50% partition between the powers consumed on and off stage in ITMARS systems. In Phases II and III, resource and function sharing between the various stages on the central transceiver chip is expected to lower the overall power consumption.

Angular position accuracy: Angular precision will determine the usefulness of the optical link to transceive data from a source without extensive spatial searching. For example, with the Phase III requirement of 1 milli-degree, a source can be located within 17mm over 1km distance. Since the ITMARS final stage volume is anticipated to be 1cc, this accuracy would allow one to target a single stage surrounded by many other stages close by. Although stage-integrated inertial sensors are not the principal application of ITMARS program, high precision would enable highly accurate calibration of inertial sensors.

Wobble and vibration: The wobble during stage rotation is likely to produce image aberration in the imager. If the wobble is small enough, the image captured will not have any visually observable dither, eliminating the need for digital image processing. The Phase III metric is equivalent to the requirement imposed on state-of-the-art macro scale optical rotary stages and would enable precision optical systems if implemented at microscale.

Rotation rate: The Phase III requirement is 360 degrees per second or one rotation per second. This rate is high enough to obtain a panoramic view with the rotating imager fast enough for real time data analysis. It is anticipated that the ITMARS could rotate at much faster rotation rates, but those systems might consume more power as the feedback control circuits to stabilize the rotating stages consume more power as they operate at higher control bandwidths.

Reliability: Mean Time Between Failure (MTBF) is the continuous time of stage rotation required before one or more parts of the system fail to function. For example, major challenges in continuous operation are friction forces and surface abrasive forces during contact. Although it is unlikely that ITMARS stages would operate continuously, the testing requirements would give enough data to assess reliability over extreme operating environments. The proposer is expected to provide testing methodology for MTBF measurements, as the exact method of stage rotation is likely to determine failure modes.

Table 1. ITMARS Milestones

Metric	SOA*	Phase I (Powered Rotating Stage Development – single stage)	Phase II (Power Optimization and Integration)	Phase III (Increase Density and Efficiency)
Volume for imager and optical link stage module, stage real-estate area/stage	**1600 cc – macro, 135-micro**	**10cc, 5mm^2 for stage**	**5 cc, 3mm^2 for stage**	**1cc, 1mm^2 for stage**
Power consumption off-rotor for actuation + position/stage	**15 Watts macro, 8 Watts micro**	**500 mW**	**100 mW/stage**	**10 mW/stage**

Angular Position Measurement Absolute Accuracy	**1-milli degrees at macro, 1-degree micro**	**50 milli-degrees**	**10 milli-degrees**	**1 milli-degree**
Wobble: reduce vibration in image acquisition	**10 m-radians at macro, 100 micro**	**40 micro-radians**	**20 micro-radians**	**10 micro-radians**
Stage payload: To transmit optical image	**5kg macro, 10 micro-grams (mite)-micro**	**Imager (VGA: 600X400) + 100MHz data link @ < 25mm^2 area**	**Array of 10 data links+10 imagers @ < 10mm^2/stage**	**Array of 100 data links + 100 imagers – with area < 4mm^2/stage**
Rotation rate	**100 deg/sec - macro**	**10 deg/sec**	**100 deg/sec**	**360 deg/sec**
Reliability: Run time of rotor: MTBF	**2000 hrs macro, 400hrs micro**	**100hrs**	**1000hrs**	**10000hrs**

*Macroscale state-of-the-art metric refers to those for state-of-the-art macroscale optical table precision rotary stages. Microscale value corresponds to those measured for micromachined rotary actuators.

DARPA strongly encourages well-coordinated interdisciplinary research and development activities that take into consideration all significant and relevant engineering tradeoffs and optimizations. Teaming among academic, industrial and/or government partners is encouraged, and it is anticipated that the contributions of the team members are complementary as well as essential to the critical path of the research plan and technology insertion/transition plan.

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. If the proposed effort is inherently divisible and nothing is gained from the aggregation, proposers should consider submitting it as multiple independent efforts. The Government reserves the right to fund proposals in phases with options for continued work at the end of 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.

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.) Once the proposals have been received and prior to the start of proposal evaluations, the Government will assess whether any potential conflict of interest exists in regards to the DARPA Program Manager, as well as those individuals chosen to evaluate proposals received under this BAA. The Program Manager is required to review and evaluate all proposals received under this BAA and to manage all selected efforts. The Program Manager for this BAA, Dr. Amil Lal, is a detailee to DARPA under the Intergovernmental Personnel Act (IPA) from Cornell University, and, as such, is highly likely to have a conflict of interest with respect to proposals utilizing that institution as a performer. 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 to obtain 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. Such notification may be provided in the proposal abstract

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 BAA08-74@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 teaming website http://teaming.sysplan.com/BAA-08-74/ 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

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 (MTO)
Reference: DARPA-BAA-08-74
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. Abstract and Proposal Information

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

DARPA will respond to proposal abstracts with a statement as to whether DARPA is interested in the idea. DARPA will attempt to reply to proposal abstracts within thirty (30) calendar days of receipt. Proposal abstracts will be reviewed in the order they are received. Early submissions of proposal abstracts and full proposals are strongly encouraged because selections may be made at any time during the period of solicitation. Regardless of DARPA's response to a proposal abstract, proposers may submit a full proposal. DARPA will review all full proposals submitted using the published evaluation criteria and without regard to any comments resulting from the review of a proposal abstract.

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.

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 proposed 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.

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 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 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; applicants can not be submitted in part to Grants.gov and in part as a hard-copy.

All administrative correspondence and questions on this solicitation, including requests for information on how to submit a proposal abstract or full proposal to this BAA, should be directed to BAA08-74@darpa.mil. DARPA intends to use electronic mail for correspondence regarding DARPA-BAA-08-74. Proposals and proposal abstracts 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.

Proposals sent in response to DARPA-BAA-08-74 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 by means of an Electronic Business Application Tool or proposal submission web site (not including Grants.gov) 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 BAA08-74@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. Proposal Abstract Format

Proposal abstracts are encouraged in advance of full proposals in order to provide potential proposers with a rapid response to minimize unnecessary effort. Proposal abstracts should follow the same general format as described for Volume I under PROPOSAL FORMAT (see below), but include ONLY Sections I and II. The cover sheet should be clearly marked "PROPOSAL ABSTRACT" and the total length should not exceed 15 pages, excluding cover page and official transmittal letter. 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 proposal abstracts includes all figures, tables, and charts. No formal transmittal letter is required. All proposal abstracts must be written in English.

3. 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. Except for the attached bibliography and Section I, Volume I shall not exceed 50 pages. Maximum page lengths for each section are shown in braces { } below. All full proposals must be written in English.

4. Volume I, Technical and Management Proposal

Section I. Administrative

A. Cover sheet to include:
(1) BAA number
(2) Technical area
(3) Lead Organization submitting proposal
(4) Type of business, selected among the following categories: "LARGE BUSINESS", "SMALL 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. Official transmittal letter.

Section II. Summary of Proposal

A. {2} 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. {2} 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. {2} Cost, schedule and payable 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. Milestone measurement, as suggested by Table 1, should enable and support a go/no go decision for the next part of the effort. Do not include proprietary information with the milestones. Additional interim non-critical management and technical milestones are also highly encouraged at a regular interval, especially for phases that are longer than 1-year in duration.
D. {5}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. {2}General discussion of other research in this area.

F. {2} 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

A. {10} Technical Rationale and Approach. Detailed technical rationale and approach enhancing that of Section II. A concise section outlining the scientific and technical challenges, unique approaches, and potential anticipated technical solutions to the challenges that will be addressed. 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. Additionally, comparison with other ongoing research shall be provided indicating advantages and disadvantages of the proposed effort.

B. {5} Program Plan & Risk Assessment. Detailed program plan and risk assessment enhancing that of Section II. A narrative explaining the explicit timelines, milestone achievements, and quantitative program metrics (to include proposer defined metrics, if applicable) by which progress toward the goals can be evaluated. The proposed period of performance of the overall program, and each program phase, should be clearly stated. The narrative plan should include a specific test plan detailing how all program metrics will be accurately measured. All program metrics must be associated with demonstrable, quantitative measures of performance, and should be summarized in a single table. 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. 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. **All program metrics should be described/discussed in detail so reviewers can assess risks associated with meeting them. Measurable critical milestones should occur at the end of every phase.** These critical technical milestones should enable and support a go/no go decision for the next part of the effort. Additional interim non-critical technical milestones are also highly encouraged at regular intervals.

C. {7} Statement of Work (SOW) - In plain English, clearly define the technical tasks/subtasks to be performed, their durations, and dependencies among them. The SOW **must not** include proprietary information. The SOW **must** be developed so that each phase of the program is separately defined. 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, hardware, software, etc.) to be provided to the Government in support of the proposed research tasks/activities.

D. {5} Teaming and Management Plan. A clearly defined organization chart for the program team which includes the programmatic relationship and a summary of each member's roles and responsibilities. Additionally, a narrative discussing (1) the proposers teaming strategy/rationale; (2) the specific roles and responsibilities of the team members; (3) the unique capabilities of the team members; and (4) the proposers team management approach.

E. {2} Capabilities. A section describing relevant prior work, the background, qualifications and relevant experience of team member organizations (prime and sub) and 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.

F. {3} Technology Transition & Business Plan. A description of the results, products, transferable technology, and expected technology transfer path enhancing that of Section II. B. See also VI (B)(2) "Intellectual Property."

G. {2} Cost schedules and Payable Milestones, if proposed, for the proposed research including estimates of cost for each task in each phase and year of the effort delineated by the primes and major subcontractors, total cost, and any company cost share. Payable milestones (descriptions, exit criteria, etc.), if proposed, must not include proprietary information. 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.

H. {1} Summary Slide. PowerPoint-type slide (i.e., landscape formatted for presentation) that succinctly highlights the major aspects of the proposal, including all program metrics (including proposer defined metrics, if applicable), in a manner suitable for presentation to DARPA management.

Section IV. Additional Information

A brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas upon which the proposal is based. Copies of not more than three (3) relevant papers can be included in the submission.

5. 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 proposer's cognizant Defense Contract Management Agency (DCMA) administration office (*if known)*;
(14) Name, address, and telephone number of the proposer'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

[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

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 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, all 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 Defense Appropriations Act caps indirect cost rates for any procurement contract, grant or agreement using 6.1 Basic Research 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

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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."

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.

C. Submission Dates and Times

1. Proposal Abstract Date

The proposal abstract (original and designated number of hard and electronic copies) must be submitted to DARPA/MTO, 3701 Fairfax Drive, Arlington, VA 22203-1714 (Attn.: DARPA-BAA-08-74) on or before 12:00 p.m. (noon), Eastern Time, Monday, February 9, 2009. Proposal abstracts received after this time and date may not be reviewed.

2. Full Proposal Date

The full proposal must be submitted to DARPA on or before 12:00 p.m. (noon), Eastern time, Wednesday, March 25, 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 or due date otherwise specified by DARPA after review of proposal abstracts may be selected contingent upon the availability of funds.

DARPA will post a consolidated Question and Answer response after March 4, 2009, before final full proposals are due. In order to receive a response to your question, submit your question by February 28, 2009 to BAA08-74@darpa.mil.

The full proposal must be submitted in time to reach DARPA by March 25, 2009 in order to be considered during the initial evaluation phase; however, DARPA-BAA-08-74 will remain open until December 4, 2009. Proposals may be submitted at any time from issuance of this announcement through December 4, 2009; however, proposers are warned that the likelihood of funding is greatly reduced for proposals submitted after the initial closing date deadline.

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.

D. Intergovernmental Review

Not Applicable

E. 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) Overall Scientific and Technical Merit; (c) Potential Contribution and Relevance to the DARPA Mission; (d) Realism of Proposed Schedule; (e) Proposer's Capabilities and/or Related Experience; (f) Plans and Capability to Accomplish Technology Transition; 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

Regarding the Government defined 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. Regarding the proposer defined metrics (those proposed in addition to the Government's defined go/no-go metrics), the proposed approach establishes clear and well defined secondary performance metrics expected to be met by the end of each phase consistent with achieving the Government's program go/no-go metrics. 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) 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.

(c) 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.

(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) 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.

(f) 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.

(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 Recommendation Process

It is the policy of DARPA to ensure impartial, equitable, comprehensive proposal evaluations and to select the source (or sources) whose offer meets the Government's technical, policy, and programmatic goals. 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. Upon completion of the source selection process, the original of each proposal received will be retained at DARPA and all other copies will be destroyed.

VI. AWARD ADMINISTRATION INFORMATION

A. Award Notices

As soon as the evaluation of a proposal is complete, the proposer will be notified that 1) the proposal has been selected for funding pending 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 and contract review meetings 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 quarterly financial status reports. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed on before award. Reports and briefing material will also be required as appropriate to document progress in accomplishing program metrics. A Final Report that summarizes the project and tasks will be required at the conclusion of the performance period for the award, notwithstanding the fact that the research may be continued under a follow-on vehicle.

D. Electronic Systems

1. Central Contractor Registration (CCR)

Selected proposers not already registered in the Central Contractor Registry (CCR) will be required to register in CCR prior to any award under this 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

Preferred method of communication is electronic mail.

Administrative, technical or contractual questions should be sent via e-mail to BAA08-74@darpa.mil. If e-mail is not available, fax questions to (703)696-2206, Attention: DARPA-BAA-08-74. 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. Amit Lal
FAX: (703)696-2206
PHONE: (571)218-4682
EMAIL: Amit.Lal@darpa.mil
DARPA/MTO
ATTN: BAA 08-74
3701 North Fairfax Drive
Arlington, VA 22203-1714

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)

2. 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."

3. 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.

4. 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.