Microsystems Technology Office
Broad Agency Announcement
Atomic Magnetometer for Biological Imaging In Earth's Native Terrain (AMBIIENT)
HR001117S0025
March 29, 2017

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PART I: OVERVIEW INFORMATION

- **Federal Agency Name**: Defense Advanced Research Projects Agency (DARPA), Microsystems Technology Office (MTO)
- **Funding Opportunity Title:** Atomic Magnetometer for Biological Imaging In Earth's Native Terrain (AMBIIENT)
- **Announcement Type:** Initial Announcement
- **Funding Opportunity Number:** HR001117S0025
- **Catalog of Federal Domestic Assistance Numbers (CFDA):** 12.910 Research and Technology Development
- **Dates** (All times listed herein are Eastern Time):
  - Posting Date: March 29, 2017
  - Proposers Day: April 3, 2017
  - FAQ Submission Deadline: May 18, 2017 at 5:00 PM
  - Proposal Due Date: June 1, 2017 at 5:00 PM
  - Estimated period of performance start: October 2017
- **Concise description of the funding opportunity:** The DARPA Microsystems Technology Office is soliciting research proposals for the development of magnetic gradiometers with sufficient resolution to enable imaging of biological activity in unshielded environments.
- **Anticipated Funding Available for Award:** $30M
- **Anticipated individual awards:** Multiple awards are anticipated.
- **Anticipated funding type:** 6.2
- **Types of instruments that may be awarded:** Procurement contract or other transaction
- **Agency contact**

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

PART II: FULL TEXT OF ANNOUNCEMENT

I. Funding Opportunity Description

The Defense Advanced Research Projects Agency (DARPA) often selects its research efforts through the Broad Agency Announcement (BAA) process. This BAA is being issued, and any resultant selection will be made, using the procedures under Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016 and 2 C.F.R. § 200.203. Any negotiations and/or awards will use procedures under FAR 15.4, Contract Pricing. Proposals received as a result of this BAA shall be evaluated in accordance with evaluation criteria specified herein through a scientific review process.

DARPA BAAs are posted on the Federal Business Opportunities (FedBizOpps) website, http://www.fbo.gov/. The following information is for those wishing to respond to the BAA.

The Microsystems Technology Office at DARPA seeks innovative proposals for the development of magnetic gradiometers with sensitivity exceeding 1 femtoTesla/cm/√Hz for application to biological imaging outside of shielded environments. Proposed research should investigate novel physical mechanisms or architectures that directly measure field gradient. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice, particularly the development of individual high-performance scalar sensors arranged in a gradiometric configuration.

A. Background

Magnetic sensing of sub-surface electrical currents offers a unique capability for dynamic imaging of biological processes with extensive applications in both biomedical research and clinical diagnosis, including magnetoencephalography (MEG)[1], magnetocardiography (MCG)[2], and fetal magnetocardiography (fMCG) [3]. Recent studies have demonstrated emerging applications in spinal signal detection[4], diagnosis of mild Traumatic Brain Injury (mTBI)[5], and in Brain-Machine Interfaces (BMI) [6].

To date, magnetic imaging (MI) research has generally employed cryogenic Superconducting Quantum Interference Device (SQUID) magnetic sensors, which offer ~ 1 femtoTesla (fT) sensitivity[7] but require liquid helium cooling and are therefore expensive to purchase and operate. Recent technology based on Spin-Exchange Relaxation Free (SERF) atomic magnetometry[8] has demonstrated potential for increased sensitivity through improved proximity of the sensing element to the patient. SERF's design simplicity and lack of cryogenic cooling

[1] See, for example, Nevalainen, et. al., Front. Hum. Neurosci. 2014; 8: 158
[2] See, for example, Stroink, in Frontiers in Neuroscience 4:1-8
[3] Wyllie et. al., Optics letters **37**, 2247-2249 (2012).
[4] Fujii et. l., Front. Neurosci. Conference Abstract: Biomag 2010 - 17th International Conference on Biomagnetism
[5] Huang et. al., NeuroImage, 61, 1067-1082.
[6] Hochberg et. al., *Nature*, **485**, 372 (2012); Shih et. Al, Mayo Clin Proc. 2012 Mar; 87(3): 268–279
[7] Review of Scientific Instruments **77**, 101101 (2006)
[8] Alfred, et. Al., Physical Review Letters, 89, 130801.

requirements also enable a lower cost of ownership. A large body of academic research employing both SQUID and SERF-atomic magnetometry has been published in recent years. However, as discussed below, widespread application of magnetic sensing to clinical or field diagnosis has heretofore been limited by high instrumentation costs and highly shielded facilities that are required to sense very small biological signals, typically ranging from 10 fT to 10 picoTesla (pT) at the measurement location for MEG and MCG, respectively.

Both SQUID and SERF-atomic sensors provide sensitivity approaching 1 fT/√Hz, which is sufficient to address a wide range of biological applications. However, both technologies suffer from limited dynamic range and each, for differing reasons, is essentially non-functional in ambient fields exceeding 100 nT. Because Earth's ambient field has a mean value of approximately 50 μT, it is therefore necessary to perform these experiments in a specialized facility, typically a room constructed of multi-layer high-permeability "mu-metal." The additional cost of building and maintaining such a facility is a further barrier to widespread deployment of MI technology.

Outside of shielded facilities, a wide range of magnetic sensing technologies are available, ranging from low-cost Hall probes to high-performance atomic sensors, which address a wide range of applications from mechanical proximity sensing, to magnetic north-finding, to geophysical research and exploration. Such ambient sensors can be customized for optimum sensing of particular phenomena but all have a fixed dynamic range of approximately 1 ppm that is limited by practical considerations of signal-to-noise ratio (SNR) and signal recovery electronics. As such, state-of-the-art magnetic sensing in Earth's ambient field is limited to about 10 pT/√Hz, an impressive dynamic range (DR) of 0.01 ppm (160 dB), yet still insufficient for biological MI.

The time and spatial variation of Earth's ambient field poses a significant challenge to deployment of high-sensitivity magnetometry outside of shielded facilities. In the relevant bandwidths for biological MI, 1-100 Hz, background noise on Earth's ambient field ranges from 1-100 pT, up to 80 dB higher than the signals of interest. To overcome this limitation, applications such as geophysical exploration and unexploded ordnance detection typically assemble two magnetometers in a so-called "gradient" configuration where one sensor is held close to the test area and the second, some baseline distance away, is employed to measure the background fluctuations. In this differential configuration, a high degree of common-mode rejection (CMR) may be achieved, with achievable sensitivity, in (pT/cm)/√Hz, limited by the performance of the sensors (in pT/√Hz) and by the baseline separation between them (in cm). For a particular sensor, gradient sensitivity may be arbitrarily improved by increasing the baseline. However, CMR is correspondingly degraded due to spatial variation of the ambient background, typically on the order of 1 pT/m, as well as variation of the background noise. For this reason, recent development of high-performance atomic magnetometers has focused on improving dynamic range and noise floor, in order to perform gradiometry over shorter baselines. Nonetheless, the dynamic range necessary for biological sensing (100 μT/1 fT = 220 dB) remains far beyond what is technically feasible.

B. Program Description

The Atomic Magnetometer for Biological Imaging In Earth's Native Terrain (AMBIIENT) program seeks to develop next-generation sensors that directly measure magnetic field gradient over short distances rather than subtracting the signals from two separate total field magnetometers. AMBIIENT sensors will produce a signal that is directly proportional to the magnetic field gradient, thereby providing high CMR without requiring extraordinarily high DR in each sensor. The success of AMBIIENT requires invention and development of novel physics techniques and sensor architectures that directly measure magnetic field gradient rather than total field. While the AMBIIENT program objectives and metrics are derived from the application to biological imaging, it is expected that successful proposals will develop a standalone gradiometric magnetometer with applicability to a wide variety of magnetic sensing applications.

A number of candidate technologies and architectures have been proposed for magnetic gradiometry, though DARPA is unaware of any published demonstrations of suitable performance for biological imaging in unshielded environments. Conventional approaches, such as those based on improving the performance of separated scalar sensors, will be considered non-responsive to this BAA.

Because two- or three-dimensional imaging requires sensor arrays, ranging from a minimum of 3x3=9 for simple MCG to 16x16=256 for high-end MEG, each individual sensor must be of relatively small size, weight, and power (SWaP), as indicated in the program goals in Table 1. While widespread deployment for diagnostic applications will eventually require low-cost sensors, cost considerations are premature at this early stage of research and development and is therefore not included in the program metrics. Note that while AMBIIENT program goals are derived from the MCG and MEG application requirements, the development and testing of MCG or MEG imaging systems and software is outside of the scope of AMBIIENT.

C. Program Structure

The AMBIIENT program consists of a single technical area with the objective of developing a magnetic gradiometer demonstrating the performance, SWaP, and environmental requirements of Table 1. All successful proposals will provide measureable, quantitative milestones at the conclusion of each phase. Proposals should provide technical rationale for meeting or exceeding each milestone and a clear trajectory to achieving the program metrics in each phase. Proposals must address all phases.

DARPA expects to fund investigation of a variety of architectures in Phase 1 and continue funding the most promising candidate technologies for further development in subsequent phases. While this BAA specifically calls out "atomic" magnetometry, alternative sensing technologies will be considered, insofar as the proposal substantiates their capability to meet all of the program objectives.

D. Program Schedule

The program consists of three phases including proof of concept, physics integration, and complete device integration. Phases 1 and 2 will focus on sensor development, with resources expended on electronics only insofar as necessary to support test and verification of sensor performance. In Phase 3, performers will develop a complete sensor system, including compact low-power control electronics. Where necessary for risk reduction, and if technically substantiated, advance development of specific electronic components may be considered prior to Phase 3.

Phase 1: Base Period (18 months)

AMBIIENT Phase 1 will demonstrate sensor functionality and performance in a laboratory setting meeting the performance metrics as indicated in Table 1. The sensor volume requirements are relaxed in Phase 1 to allow independent development of components and/or use of COTS components for initial proof of concept. The power metric reflects the total consumption of all sensor components ($P=\Sigma Vi*Ii$), including all vacuum and photonic components, as well as any necessary thermal control. Power conditioning and controlling electronics are not included in the power consumption metric of this phase.

Phase 2: Option 1 (12 months)

AMBIIENT Phase 2 will develop and demonstrate an integrated sensor head meeting the performance and SWaP metrics of Table 1, and including all vacuum, photonic, and thermal control components. The sensor volume assumes a rectangular parallelepiped or cylindrical geometry. The sensor will be sufficiently rugged and compact to allow for temperature testing as indicated in Table 1. The performer will support transportation to and test of one sensor, along with suitably portable control electronics, at a government testing facility as directed by DARPA, two months prior to the conclusion of Phase 2.

Phase 3: Option 2 (12 months)

AMBIIENT Phase 3 will demonstrate a fully integrated gradiometer comprising all control electronics, power conditioning, and packaging, meeting all performance metrics of Table 1. Phase 3 prototype gradiometers should require only a single external power source and will provide digital output of total field and gradient at data rates as indicated in Table 1. Power consumption will be determined by $P = V * I$ of the power input and volume will be separately computed for the sensor and control modules. Five complete prototype gradiometers will be delivered to a government testing facility, as directed by DARPA, at the conclusion of Phase 3.

E. Program Metrics and Milestones

AMBIIENT program metrics are presented in Table 1. Additional notes below the table provide detail describing the metrics. All proposals should provide compelling justification for their ability to meet each metric in each phase of the proposed programs.

	Phase 1 Proof-of-concept (1)	**Phase 2** Integrated Sensor (2)	**Phase 3** Complete Gradiometer (3)	**Note**
Power Consumption	150 mW	50 mW	100 mW	(4)
Sensor Volume	3 x 3 x 10 cm	1 x 1 x 7 cm	1 x 1 x 7 cm	(5)
Control Electronics Volume	N/A	N/A	< 20 cm^3	(5)
Ambient Magnetic Field	±100 μT	±100 μT	±100 μT	(6)
Ambient Operating Temperature	N/A	0°C to +50°C	0°C to +50°C	(7)
Gradient Full-scale Range	1 nT/cm	1 nT/cm	1 nT/cm	
Gradient Sensitivity	10 fT/cm/√Hz	3 fT/cm/√Hz	1 fT/cm/√Hz	
Gradient Accuracy	100 fT/cm	30 fT/cm	10 fT/cm	(8)
Total Field Range	100 μT	100 μT	100 μT	
Total Field Sensitivity	100 pT/√Hz	50 pT/√Hz	10 pT/√Hz	
Total Field Accuracy	1 nT	500 pT	100 pT	(9)
Data Rate	100 /s	200 /s	500 /s	(10)
3-dB Bandwidth	200 Hz	400 Hz	1000 Hz	(11)

Table 1: AMBIIENT Program Metrics

Notes:

1) In Phase 1, detailed analysis and modeling of the proposed AMBIIENT sensor will be performed. A prototype sensor will be fabricated and tested in a laboratory environment for compliance with Phase 1 metrics. At the conclusion of Phase 1, the contractor will present a detailed analysis, based on simulation and modeling as well as Phase 1 test data, demonstrating that the technology is capable of achieving the Phase 3 program objectives.
2) In Phase 2, an integrated sensor head will be developed and tested for compliance with Phase 2 metrics. A combination of laboratory and brassboard electronics may be used for operation and evaluation of the sensor head, though it is expected that the sensor itself will be in near-final configuration. It is expected that the contractor will provide one prototype sensor head, along with any necessary control electronics, to the government for evaluation no later than two months prior to the conclusion of Phase 2.
3) In Phase 3, the contractor will continue to iterate and refine performance of the sensor head and develop compact low-power control electronics, operating from a single DC power supply and providing digital data output. The complete gradiometer, including both the sensor and control electronics, will be evaluated for compliance with Phase 3 program metrics. It is expected that the contractor will deliver five (5) complete gradiometer systems at the conclusion of Phase 3 for government evaluation.
4) Power consumption is determined as the sum of the current and voltage requirements of all components, i.e. $\Sigma V_i * I_i$, including any active photonic components, e.g. lasers, attenuators, or modulators, as well as any necessary temperature stabilization, bias fields, etc. In Phase 1 and 2, this applies to all components of the sensor. In Phase 3, power is measured at the DC input to the gradiometer system.

5) It is assumed that the final gradiometer comprises a sensor head, connected via umbilical to a control electronics package. The sensor volume requirements refer to the sensor head only. The control volume requirements refer to the outer parallelepiped dimensions of the fully packaged control module. In the case where physical sensor components, such as lasers or detectors, are remotely located in the control module, rather than the sensor head, metric volume may be proportionately moved between the two subassemblies.
6) The gradiometer is expected to meet all sensitivity and accuracy requirements, regardless of orientation, in a ±100 □T uniform ambient field.
7) In Phase 2, the sensor head shall meet all requirements, including operating power, sensitivity, and accuracy over the operating temperature range. In Phase 3, the performance requirements apply to the complete gradiometer, including control electronics.
8) Calibrated accuracy of the gradiometer, including turn-on to turn-on repeatability, aging over time, and over the full range of ambient temperature and magnetic field.
9) The sensor shall provide an output of the total scalar field (non-gradiometric) at a specified location in the sensor head. Accuracy of the total field output includes turn-on to turn-on repeatability, aging over time, and over the full range of ambient temperature and magnetic field and field gradient.
10) The gradiometer shall provide digital output of the field gradient and total field at the specified data rate.
11) The amplitude of the gradient and total field signal detected shall not decrease to below 71% of its DC value at the frequency indicated.

F. Deliverables

At the conclusion of Phase 2, the performer will be responsible for delivering the prototype, along with any necessary control electronics to a test facility as determined by DARPA. Following the evaluation, the prototype and electronics will be returned to performers to support Phase 3 development. At the conclusion of Phase 3, all performers will deliver five (5) complete gradiometer assemblies, including control electronics, to locations as determined by DARPA. Phase 3 deliverables will become government property upon delivery.

In addition to the hardware deliverables described above, all performers shall deliver monthly financial and quarterly technical reports. All performers shall prepare and submit briefing materials and participate in quarterly technical reviews, either via telecon or at the contractor's site at the discretion of DARPA. All performers shall travel to and support semi-annual program-wide reviews at locations TBD in the CONUS.

G. Government Furnished Equipment/Property/Information

No GFE is explicitly offered as part of the BAA. If GFE is requested, it should be identified in the proposal, along with source description and need-by date.

II. Award Information

A. General Award Information

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

The Government reserves the right to select for negotiation all, some, one, or none of the proposals received in response to this solicitation, and to make awards without discussions with proposers. The Government also reserves the right to conduct discussions if it is later determined to be necessary. If warranted, portions of resulting awards may be segregated into pre-priced options. Additionally, DARPA reserves the right to accept proposals in their entirety or to select only portions of proposals for award. In the event that DARPA desires to award only portions of a proposal, negotiations may be opened with that proposer. The Government reserves the right to fund proposals in phases with options for continued work at the end of one or more of the phases, as applicable.

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. 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 (see Section VI.B.4., "Representations and Certifications"). The Government reserves the right to remove proposers from award consideration should the parties fail to reach agreement on award terms, conditions and cost/price within a reasonable time or the proposer fails to timely provide requested additional information. Proposals identified for negotiation may result in a procurement contract or other transaction, depending upon the nature of the work proposed, the required degree of interaction between parties, whether or not the research is classified as Fundamental Research, and other factors.

Proposers looking for innovative, commercial-like contractual arrangements are encouraged to consider requesting Other Transactions. To understand the flexibility and options associated with Other Transactions, consult www.darpa.mil/work-with-us/contract-management#OtherTransactions.

In all cases, the Government contracting officer shall have sole discretion to select award instrument type, regardless of instrument type proposed, and to negotiate all instrument terms and conditions with selectees. DARPA will apply publication or other restrictions, as necessary, if it determines that the research resulting from the proposed effort 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. For more information on publication restrictions, see the section below on Fundamental Research.

B. Fundamental Research

It is DoD policy that the publication of products of fundamental research will remain unrestricted to the maximum extent possible. National Security Decision Directive (NSDD) 189 defines fundamental research as follows:

> 'Fundamental research' means 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.

As of the date of publication of this BAA, the Government expects that program goals as described herein may be met by proposers intending to perform fundamental research and proposers not intending to perform fundamental research or the proposed research may present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Based on the nature of the performer and the nature of the work, the Government anticipates that some awards will include restrictions on the resultant research that will require the awardee to seek DARPA permission before publishing any information or results relative to the program.

Proposers should indicate in their proposal whether they believe the scope of the research included in their proposal is fundamental or not. While proposers should clearly explain the intended results of their research, the Government shall have sole discretion to select award instrument type and to negotiate all instrument terms and conditions with selectees. Appropriate clauses will be included in resultant awards for non-fundamental research to prescribe publication requirements and other restrictions, as appropriate. This clause can be found at www.darpa.mil/work-with-us/additional-baa.

For certain research projects, it may be possible that although the research being performed by the awardee is restricted research, a subawardee may be conducting fundamental research. In those cases, it is the awardee's responsibility to explain in their proposal why its subawardee's effort is fundamental research

III. Eligibility Information

All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA.

A. Eligible Applicants

1. Federally Funded Research and Development Centers (FFRDCs) and Government Entities

a) FFRDCs

FFRDCs are subject to applicable direct competition limitations and cannot propose to this BAA in any capacity unless they meet the following conditions: (1) FFRDCs must clearly demonstrate that the proposed work is not otherwise available from the private sector. (2) FFRDCs must provide a letter on official letterhead from their sponsoring organization citing the specific authority establishing their eligibility to propose to Government solicitations and compete with industry, and their compliance with the associated FFRDC sponsor agreement's terms and conditions. This information is required for FFRDCs proposing to be awardees or subawardees.

b) Government Entities

Government Entities (e.g., Government/National laboratories, military educational institutions, etc.) are subject to applicable direct competition limitations. Government entities must clearly demonstrate that the work is not otherwise available from the private sector and provide written documentation citing the specific statutory authority and contractual authority, if relevant, establishing their ability to propose to Government solicitations.

c) Authority and Eligibility

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 FFRDC and Government entity eligibility submissions on a case-by-case basis; however, the burden to prove eligibility for all team members rests solely with the proposer.

2. Non-U.S. Organizations and/or Individuals

Non-U.S. organizations and/or individuals may participate to the extent that such participants comply with any necessary nondisclosure agreements, security regulations, export control laws, and other governing statutes applicable under the circumstances.

B. Organizational Conflicts of Interest

FAR 9.5 Requirements

In accordance with FAR 9.5, proposers are required to identify and disclose all facts relevant to potential OCIs involving the proposer's organization and *any* proposed team member (subawardee, consultant). Under this Section, the proposer is responsible for providing this disclosure with each proposal submitted to the BAA. The disclosure must include the proposer's, and as applicable, proposed team member's OCI mitigation plan. The OCI mitigation plan must include a description of the actions the proposer has taken, or intends to take, to prevent the existence of conflicting roles that might bias the proposer's judgment and to

prevent the proposer from having unfair competitive advantage. The OCI mitigation plan will specifically discuss the disclosed OCI in the context of each of the OCI limitations outlined in FAR 9.505-1 through FAR 9.505-4.

Agency Supplemental OCI Policy

In addition, DARPA has a supplemental OCI policy that prohibits contractors/performers from concurrently providing Scientific Engineering Technical Assistance (SETA), Advisory and Assistance Services (A&AS) or similar support services and being a technical performer. Therefore, as part of the FAR 9.5 disclosure requirement above, a proposer must affirm whether the proposer or *any* proposed team member (subawardee, consultant) is providing SETA, A&AS, or similar support to any DARPA office(s) under: (a) a current award or subaward; or (b) a past award or subaward that ended within one calendar year prior to the proposal's submission date.

If SETA, A&AS, or similar support is being or was provided to any DARPA office(s), the proposal must include:

- The name of the DARPA office receiving the support;
- The prime contract number;
- Identification of proposed team member (subawardee, consultant) providing the support; and
- An OCI mitigation plan in accordance with FAR 9.5.

Government Procedures

In accordance with FAR 9.503, 9.504 and 9.506, the Government will evaluate OCI mitigation plans to avoid, neutralize or mitigate potential OCI issues before award and to determine whether it is in the Government's interest to grant a waiver. The Government will only evaluate OCI mitigation plans for proposals that are determined selectable under the BAA evaluation criteria and funding availability.

The Government may require proposers to provide additional information to assist the Government in evaluating the proposer's OCI mitigation plan.

If the Government determines that a proposer failed to fully disclose an OCI; or failed to provide the affirmation of DARPA support as described above; or failed to reasonably provide additional information requested by the Government to assist in evaluating the proposer's OCI mitigation plan, the Government may reject the proposal and withdraw it from consideration for award.

C. Cost Sharing/Matching

Cost sharing is not required; however, it will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument. Cost sharing is encouraged where

there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

For more information on potential cost sharing requirements for Other Transactions for Prototype, see http://www.darpa.mil/work-with-us/contract-management#OtherTransactions.

D. Other Eligibility Criteria

1. Collaborative Efforts

Collaborative efforts/teaming are encouraged.

IV. Application and Submission Information

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

A. Address to Request Application Package

This announcement, any attachments, and any references to external websites herein constitute the total solicitation. If proposers cannot access the referenced material posted in the announcement found at www.darpa.mil, contact the administrative contact listed herein.

B. Content and Form of Application Submission

1. Full Proposal Format

All full proposals must be in the format given below. Proposals shall consist of two volumes: Volume I – Technical and Management Proposal (3 sections), and Volume II – Cost Proposal (4 sections). The submission of other supporting materials along with the proposals is strongly discouraged and will not be considered for review. 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. **Section II of Volume I, Technical and Management Proposal, shall not exceed 20 pages.** There is no page limit for Volume II, Cost Proposal. All full proposals must be written in English.

A summary slide of the proposed effort, in editable PowerPoint format, should be submitted with the proposal. A template slide is provided as Attachment 2 to the BAA. Submit this PowerPoint file in addition to Volumes I and II of your full proposal. This summary slide does not count towards the total page count.

a. Volume I, Technical and Management Proposal

Section I. Administrative

A. Cover sheet to include:

1) BAA number (HR001117S0025);
2) Lead Organization submitting proposal;
3) Type of organization, selected from the following categories:
   Large Organization, Small Disadvantaged Organization, Other Small Organization, HBCU, MI, Other Educational, Other Nonprofit;
4) Proposer's internal reference number (if any);
5) Other team members (if applicable) and type of organization for each;
6) Proposal title;
7) Technical point of contact to include:
   Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail;
8) Administrative point of contact to include:
   Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail;
9) Total funds requested from DARPA, and the amount of cost share (if any); AND
10) Date proposal was submitted.

B. Official transmittal letter.

The transmittal letter should identify the BAA number, the proposal by name, and the organization's proposal reference number (if any), and should be signed by an individual who is authorized to submit proposals to the Government.

Section II. Detailed Proposal Information

A. Statement of Work (SOW)

In plain English, clearly define the technical tasks/subtasks to be performed, their durations, and dependencies among them. The SOW page length will depend on the amount of effort. For each task/subtask, provide:

1. A general description of the objective (for each defined task/activity);
2. A detailed description of the approach to be taken to accomplish each defined task/activity;
3. Identification of the primary organization responsible for task execution (prime, sub, team member, by name, etc.);
4. The completion criteria for each task/activity - a product, event or milestone that defines its completion;
5. Define all deliverables (reporting, data, reports, software, etc.) to be provided to the Government in support of the proposed research tasks/activities; See Section I.F.
6. Identify whether government-furnished equipment is requested (see I.G) and, if so, the required quantity and delivery schedule;

7. Clearly identify any Risk Reduction tasks (see II.D, below); AND
8. Clearly identify any tasks/subtasks (prime or subcontracted) that will be accomplished on-campus at a university.

Note: Each program phase must be separately defined in the SOW. Include a SOW for each subcontractor and/or consultant in the Cost Proposal Volume. Do not include any proprietary information in the SOW(s).

B. Innovative Claims

Succinctly describe the uniqueness and benefits of the proposed approach relative to current state-of-art alternate approaches.

C. Detailed Technical Approach

This is the centerpiece of the proposal and should provide a detailed description of the proposed technology, including analysis and modeling where available, to substantiate the innovative claims of Section II.B. This section must include a proposed milestone table and performance objectives, by phase, similar to Table 1 of this BAA. Proposals should clearly explain the technical approach that will be employed to meet or exceed each program metric and provide ample justification as to why the approach is feasible. Where applicable, analysis should include concise performance budget tables, e.g. for contributory error or power budget elements.

D. Risk Analysis and Mitigation Plan

Identify the major technical and programmatic risks in the program. Include a risk matrix. For each risk, assign a probability of occurrence on a scale of 1-10, where 10 indicates a high likelihood that the risk will impact program success, as well as an assessment of impact, also on a scale of 1-10, where 10 indicates that this risk would maximally limit the program from delivering prototypes on schedule or meeting performance objectives. For each item with total risk (likelihood × impact) exceeding 40, include a plan for mitigating the risk and assessing risk reduction.

Where necessary, parallel risk reduction tasks may be proposed, e.g. concurrent development of redundant techniques or components. The proposal must differentiate the primary technical path from risk reduction tasks, which should be uniquely identified in the SOW and separately costed as optional tasks in Volume II.

E. Schedule and Milestones

Include a high-level Gantt chart outlining major technical tasks and measureable milestones by phase. At a minimum, the schedule should include each SOW task of Volume 1, Section II.A. Where risk reduction tasks are proposed, the schedule should include a milestone for assessment and removal of redundant tasks.

F. Test Plan

Describe how compliance with the proposed metrics and milestones will be demonstrated in each phase of the program. The test plan should be structured so that compliant performance can be verified prior to delivery of hardware for government test and evaluation.

G. Results and Technology Transfer

Description of the results, products, transferable technology, and expected technology transfer. This should also address mitigation of life-cycle and sustainment risks associated with transitioning intellectual property for U.S. military applications, if applicable. See also Section IV.B.10, "Intellectual Property."

H. Ongoing Research

Comparison with other ongoing research indicating advantages and disadvantages of the proposed effort.

I. Proposer Accomplishments

Discussion of proposer's previous accomplishments and work in closely related research areas. In this section, also include any ongoing research projects or pending proposal activity that technically overlaps with the proposed effort, including funding source, administrative point of contact, and the program management plan for combining and de-conflicting the efforts.

J. Facilities

Description of the facilities that will be used for the proposed effort.

K. Teaming

Description of the formal teaming agreements that are required to execute this program. Describe the programmatic relationship between investigators and the rationale for choosing this teaming strategy. Present a coherent organization chart and integrated management strategy for the program team. For each person, indicate: (1) name, (2) affiliation, (3) abbreviated listing of all technical area tasks they will work on with roles, responsibilities, and percent time indicated, (4) discussion of the proposers' previous accomplishments, relevant expertise and/or unique capabilities.

Section III. Additional Information

Information in this section may include 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 may be included in the submission.

b. Volume II, Cost Proposal

All proposers, including FFRDCs and Government Labs, must submit the following:

Section I. Administrative

Cover sheet to include:

(1) BAA number (HR001117S0025);
(2) Lead Organization submitting proposal;
(3) Type of organization, selected among the following categories:
Large Organization, Small Disadvantaged Organization, Other Small Organization, HBCU, MI, Other Educational, Other Nonprofit;
(4) Proposer's internal reference number (if any);
(5) Other team members (if applicable) and type of organization for each;
(6) Proposal title;
(7) Technical point of contact to include:
Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail (if available);
(8) Administrative point of contact to include:
Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), and electronic mail (if available);
(9) Award instrument requested:
Cost-Plus-Fixed Fee (CPFF), Cost-contract—no fee, cost sharing contract—no fee, or other type of procurement contract (*specify*) or Other Transaction;
(10) Place(s) and period(s) of performance;
(11) Total proposed cost separated by basic award and option(s), if any, by calendar year and by government fiscal year;
(12) Name, address, and telephone number of the proposer's cognizant Defense Contract Management Agency (DCMA) administration office (*if known)*;
(13) Name, address, and telephone number of the proposer's cognizant Defense Contract Audit Agency (DCAA) audit office (*if known*);
(14) Date proposal was prepared;
(15) DUNS number;
(16) TIN number;
(17) CAGE Code;
(18) Subcontractor Information;
(19) Proposal validity period (120 days is recommended); AND
(20) Any Forward Pricing Rate Agreement, other such approved rate information, or such documentation that may assist in expediting negotiations (if available).

Attachment 1, the Cost Volume Proposer Checklist, must be included with the coversheet of the Cost Proposal.

Section II. Detailed Cost Information (Prime and Subcontractors)

The proposer's (to include FFRDCs and Government Labs) cost volume shall provide cost and pricing information, or other than cost or pricing information if the total price is under the referenced threshold (See Note 1), in sufficient detail to substantiate the program price proposed (e.g., realism and reasonableness). In doing so, the proposer shall provide, **for both the prime and each subcontractor**, a "Summary Cost Breakdown" by phase and performer fiscal year, and a "Detailed Cost Breakdown" by phase, technical task/sub-task, and month. The breakdown/s shall include, at a minimum, the following major cost item along with associated backup documentation:

Total program cost broken down by major cost items:

A. Direct Labor

A breakout clearly identifying the individual labor categories with associated labor hours and direct labor rates, as well as a detailed Basis-of-Estimate (BOE) narrative description of the methods used to estimate labor costs;

B. Indirect Costs

Including Fringe Benefits, Overhead, General and Administrative Expense, Cost of Money, Fee, etc. (must show base amount and rate);

C. Travel

Provide the purpose of the trip, number of trips, number of days per trip, departure and arrival destinations, number of people, etc. See Section IV.B.13 for travel funding restrictions;

D. Other Direct Costs

Itemized with costs; back-up documentation is to be submitted to support proposed costs;

E. Material/Equipment

(i) For IT and equipment purchases, include a letter stating why the proposer cannot provide the requested resources from its own funding.
(ii) A priced Bill of Material (BOM) clearly identifying, for each item proposed, the quantity, unit price, the source of the unit price (i.e., vendor quote, engineering estimate, etc.), the type of property (i.e., material, equipment, special test equipment, information technology, etc.), and a cross-reference to the Statement of Work (SOW) task/s that require the item/s. At time of proposal submission, any item with a unit price that exceeds $1,000 must be supported with basis-of-estimate (BOE) documentation such as a copy of catalog price lists, vendor quotes or a detailed written engineering estimate (additional documentation may be required during negotiations, if selected).

(iii) 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. In accordance with FAR 35.014, "Government property and title," it is the Government's intent that title to all equipment purchased with funds available for research under any resulting contract will vest in the acquiring nonprofit institution (e.g., Nonprofit Institutions of Higher Education and Nonprofit Organizations whose primary purpose is the conduct of scientific research) upon acquisition without further obligation to the Government. Any such equipment shall be used for the conduct of basic and applied scientific research. The above transfer of title to all equipment purchased with funds available for research under any resulting contract is not allowable when the acquiring entity is a for-profit organization; however, such organizations can, in accordance with FAR 52.245-1(j), be given priority to acquire such property at its full acquisition cost.

F. Consultants

If consultants are to be used, proposer must provide a copy of the consultant's proposed SOW as well as a signed consultant agreement or other document which verifies the proposed loaded daily / hourly rate and any other proposed consultant costs (e.g. travel);

G. Subcontracts

Itemization of all subcontracts. Additionally, the prime contractor is responsible for compiling and providing, as part of its proposal submission to the Government, subcontractor proposals prepared at the same level of detail as that required by the prime. Subcontractor proposals include Interdivisional Work Transfer Agreements (ITWA) or similar arrangements. If seeking a procurement contract, the prime contractor shall provide a cost reasonableness analysis of all proposed subcontractor costs/prices. Such analysis shall indicate the extent to which the prime contractor has negotiated subcontract costs/prices and whether any such subcontracts are to be placed on a sole-source basis.

All proprietary subcontractor proposal documentation (fully disclosed subcontract proposal), prepared at the same level of detail as that required of the prime, which cannot be uploaded to the DARPA BAA website (https://baa.darpa.mil, BAAT) as part of the proposer's submission, shall be made immediately available to the Government, upon request, under separate cover (i.e., mail, electronic/email, etc.), either by the proposer or by the subcontractor organization. This does not relieve the proposer from the requirement to include, as part of their submission (via BAAT), subcontract proposals that do not include proprietary pricing information (rates, factors, etc.).

A Rough Order of Magnitude (ROM), or similar budgetary estimate, is not considered a fully qualified subcontract cost proposal submission. Inclusion of a ROM, or similar budgetary estimate, may result in the full proposal being deemed non-compliant or evaluation ratings may be lowered;

H. Cost-Sharing

The amount of any industry cost-sharing (the source and nature of any proposed cost-sharing should be discussed in the narrative portion of the cost volume); AND

I. Fundamental Research

Written justification required per Section II.B, "Fundamental Research," pertaining to prime and/or subcontracted effort being considered Contracted Fundamental Research.

Note 1:
(a) "Cost or Pricing Data" as defined in FAR 15.403-4 shall be required if the proposer is seeking a procurement contract per the referenced threshold, unless the proposer requests and is granted an exception from the requirement to submit cost or pricing data. Per DFARS 215.408(5), DFARS 252.215-7009, Proposal Adequacy Checklist, applies to all proposers/proposals seeking a FAR-based award (contract).

(b) In accordance with DFARS 15.403-1(4)(D), DoD has waived cost or pricing data requirements for nonprofit organizations (including educational institutions) on cost-reimbursement-no-fee contracts. In such instances where the waiver stipulated at DFARs 15.403-1(4)(D) applies, proposers shall submit information other than cost or pricing data to the extent necessary for the Government to determine price reasonableness and cost realism; and cost or pricing data from subcontractors that are not nonprofit organizations when the subcontractor's proposal exceeds the cost and pricing data threshold at FAR 15.403-4(a)(1).

(c) Per Section 873 of the FY2016 National Defense Authorization Act (Pub L. 114-92), "Pilot Program For Streamlining Awards For Innovative Technology Projects," small businesses and nontraditional defense contractors (as defined therein) are alleviated from submission of certified cost and pricing data for new contract awards valued at less than $7,500,000. In such instances where this "waiver" applies, proposers seeking a FAR-based contract shall submit information other than certified cost or pricing data to the extent necessary for the Government to determine price reasonableness and cost realism; and certified cost or pricing data from subcontractors that are not small businesses or nontraditional defense contractors when such subcontract proposals exceed the cost and pricing data threshold at FAR 15.403-4(a)(1).

(d) "Cost or pricing data" are not required if the proposer proposes an award instrument other than a procurement contract (i.e., other transaction).

Note 2:
Proposers are **required** to provide the aforementioned cost breakdown as an editable MS Excel spreadsheet, inclusive of calculations formulae, with tabs (material, travel, ODC's) provided as necessary. The Government also requests and recommends that the Cost Proposal include MS Excel file(s) that provide traceability between the Bases of Estimate (BOEs) and the proposed costs across all elements and phases. This includes the calculations and adjustments that are utilized to generate the Summary Costs from the source labor hours, labor costs, material costs, etc. input data. It is requested that the costs and Subcontractor proposals be readily traceable to

the Prime Cost Proposal in the provided MS Excel file(s) – although this is not a requirement, providing information in this manner will assist the Government in understanding what is being proposed both technically and in terms of cost realism. NOTE: If the PDF submission differs from the Excel submission, the PDF will take precedence.

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

Section III. Other Transaction Request, if applicable

All proposers requesting an OT award must include a detailed list of milestones. Each milestone must include the following:

- Milestone description
- Completion criteria
- Due date
- Payment/funding schedule (to include, if cost share is proposes, awardee and Government share amounts)

It is noted that, at a minimum, milestones should relate directly to accomplishment of program technical metrics as defined in the BAA and/or the proposer's proposal. Agreement type, expenditure or fixed-price based, will be subject to negotiation by the Agreements Officer. Do not include proprietary data.

Section IV. Other Cost 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.

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

The proposer should include supporting cost and pricing information in sufficient detail to substantiate the summary cost estimates and should include a description of the method used to estimate costs and supporting documentation.
Cost proposals submitted by FFRDC's (prime or subcontractor) will be forwarded, if selected for negotiation, to their sponsoring organization contracting officer for review to confirm that all required forward pricing rates and factors have been used.

2. Proprietary Information

Proposers are responsible for clearly identifying proprietary information. Submissions containing proprietary information must have the cover page and each page containing such

information clearly marked with a label such as "Proprietary" or "Company Proprietary." Note, "Confidential" is a classification marking used to control the dissemination of U.S. Government National Security Information as dictated in Executive Order 13526 and should not be used to identify proprietary business information.

3. Security Information

a. Unclassified Submissions

DARPA anticipates that submissions received under this BAA will be unclassified. However, should a proposer wish to submit classified information, an *unclassified* email must be sent to the BAA mailbox notifying the Technical Office PSO of the submission and the below guidance must be followed.

Security classification guidance and direction via a Security Classification Guide (SCG) and/or DD Form 254, "DoD Contract Security Classification Specification," will not be provided at this time. If a determination is made that the award instrument may result in access to classified information, a SCG and/or DD Form 254 will be issued by DARPA and attached as part of the award.

b. Classified Submissions

Classified submissions shall be transmitted in accordance with the following guidance. Additional information on the subjects discussed in this section may be found at http://www.dss.mil/.

If a submission contains Classified National Security Information as defined by Executive Order 13526, the information must be appropriately and conspicuously marked with the proposed classification level and declassification date. Similarly, when the classification of a submission is in question, the submission must 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).*"

NOTE: Classified submissions must indicate the classification level of not only the submitted materials, but also the classification level of the anticipated award.

Proposers submitting classified information must have, or be able to obtain prior to contract award, cognizant security agency approved facilities, information systems, and appropriately cleared/eligible personnel to perform at the classification level proposed. All proposer personnel performing Information Assurance (IA)/Cybersecurity related duties on classified Information Systems shall meet the requirements set forth in DoD Manual 8570.01-M (Information Assurance Workforce Improvement Program).

When a proposal includes a classified portion, and when able according to security guidelines, we ask that proposers send an e-mail to HR001117S0025@darpa.mil as notification that there is a classified portion to the proposal. When sending the classified portion via mail according to the instructions, proposers should submit six (6) hard copies of the classified portion of their proposal and two (2) CD-ROMs containing the classified portion of the proposal as a single searchable Adobe PDF file. Please ensure that all CDs are well-marked. Each copy of the classified portion must be clearly labeled with HR001117S0025, proposer organization, proposal title (short title recommended), and Copy _ of _.

Proposers choosing to submit classified information from other collateral classified sources (i.e., sources other than DARPA) must ensure (1) they have permission from an authorized individual at the cognizant Government agency (e.g., Contracting Officer, Program Manager); (2) the proposal is marked in accordance with the source Security Classification Guide (SCG) from which the material is derived; and (3) the source SCG is submitted along with the proposal.

Confidential and Secret Information

Use transmission, classification, handling, and marking guidance provided by previously issued SCGs, the DoD Information Security Manual (DoDM 5200.01, Volumes 1 - 4), and the National Industrial Security Program Operating Manual, including the Supplement Revision 1, (DoD 5220.22-M and DoD 5200.22-M Sup. 1) when submitting Confidential and/or Secret classified information.

Confidential and Secret classified information may be submitted via ONE of the two following methods:

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

  OR

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

  The inner envelope shall be addressed to:

  Defense Advanced Research Projects Agency
  ATTN: Program Security Officer, MTO
  Reference: HR001117S0025
  675 North Randolph Street
  Arlington, VA 22203-2114

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

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

Top Secret Information

Use classification, handling, and marking guidance provided by previously issued SCGs, the DoD Information Security Manual (DoDM 5200.01, Volumes 1 - 4), and the National Industrial Security Program Operating Manual, including the Supplement Revision 1, (DoD 5220.22-M and DoD 5200.22-M Sup. 1). Top Secret information must be hand-carried by an appropriately cleared and authorized courier to the DARPA CDR. Prior to traveling, the courier shall contact the DARPA CDR at 703-526-4052 to coordinate arrival and delivery.

Sensitive Compartmented Information (SCI)

SCI must be marked, managed and transmitted in accordance with DoDM 5105.21 Volumes 1 - 3. Questions regarding the transmission of SCI may be sent to the DARPA Technical Office PSO via the BAA mailbox or by contacting the DARPA Special Security Officer (SSO) at 703-812-1970.
Successful proposers may be sponsored by DARPA for access to SCI. Sponsorship must be aligned to an existing DD Form 254 where SCI has been authorized. Questions regarding SCI sponsorship should be directed to the DARPA Personnel Security Office at 703-526-4543.

Special Access Program (SAP) Information

SAP information must be marked in accordance with DoDM 5205.07 Volume 4 and transmitted by specifically approved methods which will be provided by the Technical Office PSO or their staff.

Proposers choosing to submit SAP information from an agency other than DARPA are required to provide the DARPA Technical Office Program Security Officer (PSO) written permission from the source material's cognizant Special Access Program Control Officer (SAPCO) or designated representative. For clarification regarding this process, contact the DARPA Technical Office PSO via the BAA mailbox or the DARPA SAPCO at 703-526-4102.

Additional SAP security requirements regarding facility accreditations, information security, personnel security, physical security, operations security, test security, classified transportation plans, and program protection planning may be specified in the DD Form 254.

NOTE: prior to drafting the submission, if use of SAP Information Systems is to be proposed, proposers must first obtain an Authorization-to-Operate from the DARPA Technical Office PSO (or other applicable DARPA Authorization Official) using the Risk Management

Framework (RMF) process outlined in the Joint Special Access Program (SAP) Implementation Guide (JSIG), Revision 3, dated October 9, 2013 (or successor document).

4. Human Research Subjects/Animal Use

Proposers that anticipate involving Human Research Subjects or Animal Use must comply with the approval procedures detailed at www.darpa.mil/work-with-us/additional-baa.

5. Disclosure of Information and Compliance with Safeguarding Covered Defense Information Controls

Unless a proposer is performing strictly fundamental research, all proposers receiving FAR-based Procurement Contracts under this BAA shall be compliant with the following:

DFARS 252.204-7000, "Disclosure of Information"

DFARS 252.204-7008, "Compliance with Safeguarding Covered Defense Information Controls"

DFARS 252.204-7012, "Safeguarding Covered Defense Information and Cyber Incident Reporting"

The full text of the above solicitation provision and contract clauses can be found at http://www.darpa.mil/work-with-us/additional-baa#NPRPAC.

Compliance with the above requirements includes the mandate for proposers to implement the security requirements specified by National Institute of Standards and Technology (NIST) Special Publication (SP) 800-171, "Protecting Controlled Unclassified Information in Nonfederal Information Systems and Organizations" (see https://doi.org/10.6028/NIST.SP.800-171r1) that are in effect at the time the BAA is issued, or as authorized by the Contracting Officer, not later than December 31, 2017.

6. Approved Cost Accounting System Documentation

Proposers that do not have a Cost Accounting Standards (CAS) complaint accounting system considered adequate for determining accurate costs that are negotiating a cost- type procurement contract must complete an SF 1408. For more information on CAS compliance, see http://www.dcaa.mil/cas.html. To facilitate this process, proposers should complete the SF 1408 found at http://www.gsa.gov/portal/forms/download/115778 and submit the completed form with the proposal. To complete the form, check the boxes on the second page, then provide a narrative explanation of your accounting system to supplement the checklist on page one. For more information, see (http://www.dcaa.mil/preaward_accounting_system_adequacy_checklist.html).

7. Section 508 of the Rehabilitation Act (29 U.S.C. § 749d)/FAR 39.2

All electronic and information technology acquired or created through this BAA must satisfy the accessibility requirements of Section 508 of the Rehabilitation Act (29 U.S.C § 794d)/FAR 39.2.

8. Small Business Subcontracting Plan

Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. § 637(d)) and FAR 19.702(a)(1), each proposer who submits a contract proposal and includes subcontractors might be required to submit a subcontracting plan with their proposal. The plan format is outlined in FAR 19.704.

9. Intellectual Property

All proposers must provide a good faith representation that the proposer either owns or possesses the appropriate licensing rights to all intellectual property that will be utilized under the proposed effort.

a. For Procurement Contracts

Proposers responding to this BAA requesting procurement contracts will need to complete the certifications at DFARS 252.227-7017. See www.darpa.mil/work-with-us/additional-baa for further information. If no restrictions are intended, the proposer should state "none." The table below captures the requested information:

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. For All Non-Procurement Contracts

Proposers responding to this BAA requesting a Technology Investment Agreement or Other Transaction for Prototypes 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 the award instrument in question. This includes both Noncommercial Items and Commercial Items. Proposers are encouraged use a format similar to that described in Paragraph a. above. If no restrictions are intended, then the proposer should state "NONE."

10. 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.

11. System for Award Management (SAM) and Universal Identifier Requirements

All proposers must be registered in SAM unless exempt per FAR 4.1102. FAR 52.204-7, "System for Award Management" and FAR 52.204-13, "System for Award Management Maintenance" are incorporated into this BAA. See www.darpa.mil/work-with-us/additional-baa for further information.

12. Funding Restrictions

There will be limitations on direct costs such as equipment purchases or foreign travel. Laboratory equipment and machinery budgets should include only specialized equipment and tooling specific to the proposed program. Where equipment purchases are proposed, the proposal must include a narrative description of the application requirements, the selection process, and the disposition plan for the proposed equipment (see Section IV(B)(4)(b) regarding compliance with FAR Part 45.102). Travel budgets should include allocation for the Principal Investigator and all Co-Principal Investigators to attend a program kick-off meeting and semi-annual Program Reviews. For budgetary purposes assume that the Program Reviews will alternate between Washington, DC and San Diego, CA. When additional travel to support collaboration and program management between team members and vendors is requested, the proposal must include a narrative description of the program requirement and reference relevant SOW tasks. In the case where the Prime Contractor is an academic institution, the proposal may include travel budget to present research results at one domestic conference annually.

Preaward costs will not be reimbursed unless a preaward cost agreement is negotiated prior to award.

C. Submission Information

DARPA will acknowledge receipt of all submissions and assign an identifying control number that should be used in all further correspondence regarding the submission. DARPA intends to use electronic mail correspondence regarding HR001117S0025. Submissions may not be submitted by fax or e-mail; any so sent will be disregarded.

Submissions will not be returned. An electronic copy of each submission 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 by DARPA within 5 days after notification that a proposal was not selected.

All administrative correspondence and questions on this solicitation, including requests for clarifying information on how to submit an abstract or full proposal to this BAA should be directed to HR001117S0025@darpa.mil. DARPA intends to use electronic mail for correspondence regarding HR001117S0025. Proposals and 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.

1. Submission Dates and Times

a. Full Proposal Date

Full proposals must be submitted to DARPA/MTO on or before 5:00 PM, Eastern Time, June 1, 2017, in order to be considered during the single round of selections. Proposals received after this deadline will not be reviewed.

2. Frequently Asked Questions (FAQ)

DARPA will post a consolidated Question and Answer (FAQ) document on a regular basis. To access the posting go to: http://www.darpa.mil/work-with-us/opportunities. Under the HR001117S0025 summary will be a link to the FAQ. Submit your question/s by e-mail to HR001117S0025@darpa.mil. In order to receive a response sufficiently in advance of the proposal due date, send your question/s on or before 5:00 PM, Eastern Time, May 18, 2017.

3. Proposal Submission Information

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

Proposers requesting contracts or other transaction agreements must submit proposals via DARPA's BAA Website (https://baa.darpa.mil). Note: If an account has already been created for the DARPA BAA Website, this account may be reused. If no account currently exists for the DARPA BAA Website, visit the website to complete the two-step registration process. Submitters will need to register for an Extranet account (via the form at the URL listed above) and wait for two separate e-mails containing a username and temporary password. After accessing the Extranet, submitters may then create an account for the DARPA BAA website (via the "Register your Organization" link along the left side of the homepage), view submission instructions, and upload/finalize the proposal. Proposers using the DARPA BAA Website may encounter heavy traffic on the submission deadline date; it is highly advised that submission process be started as early as possible.

All unclassified full proposals submitted electronically through the DARPA BAA website must be uploaded as zip files (.zip or .zipx extension). The final zip file should not exceed 50 MB in size. Only one zip file will be accepted per submission and submissions not uploaded as zip files will be rejected by DARPA.

NOTE: YOU MUST CLICK THE 'FINALIZE FULL PROPOSAL' BUTTON AT THE BOTTOM OF THE CREATE FULL PROPOSAL PAGE. FAILURE TO DO SO WILL RESULT IN YOUR PROPOSAL NOT BEING OFFICIALLY SUBMITTED TO THIS BAA AND THEREFORE NOT BEING REVIEWED.

Classified submissions should NOT be submitted through DARPA's BAA Website (https://baa.darpa.mil), though proposers will likely still need to visit https://baa.darpa.mil to register their organization (or verify an existing registration) to ensure the BAA office can verify and finalize their submission.

Please note that the DoD-issued certificate associated with the BAA website is not recognized by all commercial certificate authorities, resulting in untrusted connection errors/messages. You can either bypass the warning (possibly by adding https://baa.darpa.mil to your listed of trusted sites, or darpa.mil as a trusted domain), or visit DISA's site to download the Root Certificate Authority (CA): http://dodpki.c3pki.chamb.disa.mil/rootca.html.

Technical support for DARPA's BAA Website may be reached at BAAT_Support@darpa.mil, and is typically available during regular business hours (9:00 AM - 5:00 PM EST, Monday - Friday).

a. Classified Submission Information

See Section IV.B.4, "Security Information," for guidance on submitting classified proposals.

4. Other Submission Requirements

Not applicable.

V. Application Review Information

A. Evaluation Criteria

Proposals will be evaluated using the following criteria, listed in descending order of importance:

1. Overall Scientific and Technical Merit

The proposed technical approach is innovative, feasible, achievable, and complete.
Task descriptions and associated technical elements provided are complete and in a logical sequence with all proposed deliverables clearly defined such that a final outcome that achieves the goal can be expected as a result of award. The proposal identifies major technical risks and planned mitigation efforts are clearly defined and feasible.

2. Potential Contribution and Relevance to the DARPA Mission

The potential contributions of the proposed effort are relevant to the national technology base. Specifically, DARPA's mission is to make pivotal early technology investments that create or prevent strategic surprise for U.S. National Security.

3. Cost Realism

The proposed costs are realistic for the technical and management approach and accurately reflect the technical goals and objectives of the solicitation. The proposed costs are consistent with the proposer's Statement of Work and reflect a sufficient understanding of the costs and level of effort needed to successfully accomplish the proposed technical approach. The costs for the prime proposer and proposed subawardees are substantiated by the details provided in the proposal (e.g., the type and number of labor hours proposed per task, the types and quantities of materials, equipment and fabrication costs, travel and any other applicable costs and the basis for the estimates).

It is expected that the effort will leverage all available relevant prior research in order to obtain the maximum benefit from the available funding. For efforts with a likelihood of commercial application, appropriate direct cost sharing may be a positive factor in the evaluation. DARPA recognizes that undue emphasis on cost may motivate proposers to offer low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. DARPA discourages such cost strategies.

4. Realism of Proposed Schedule

The proposed schedule aggressively pursues performance metrics in the shortest timeframe and accurately accounts for that timeframe. The proposed schedule identifies and mitigates any potential schedule risk.

5. Proposer's Capabilities and/or Related Experience

The proposer's prior experience in similar efforts clearly demonstrates 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.

6. Plans and Capability to Accomplish Technology Transition

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

B. Review and Selection Process

1. Review Process

It is the policy of DARPA to ensure impartial, equitable, comprehensive proposal evaluations based on the evaluation criteria listed in Section V.A, and to select the source (or sources) whose offer meets the Government's technical, policy, and programmatic goals.

DARPA will conduct a scientific/technical review of each conforming proposal. Conforming proposals comply with all requirements detailed in this BAA; proposals that fail to do so may be deemed non-conforming and may be removed from consideration. Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons

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

It is the policy of DARPA to ensure impartial, equitable, comprehensive proposal evaluations based on the evaluation criteria listed above 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.

2. Handling of Source Selection Information

DARPA policy is to treat all submissions as source selection information (see FAR 2.101 and 3.104), and to disclose their contents only for the purpose of evaluation. Restrictive notices notwithstanding, during the evaluation process, submissions may be handled by support contractors for administrative purposes and/or to assist with technical evaluation. All DARPA support contractors performing this role are expressly prohibited from performing DARPA-sponsored technical research and are bound by appropriate nondisclosure agreements.

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.

3. Federal Awardee Performance and Integrity Information (FAPIIS)

Per 41 U.S.C. 2313, as implemented by FAR 9.103 and 2 CFR § 200.205, prior to making an award above the simplified acquisition threshold, DARPA is required to review and consider any information available through the designated integrity and performance system (currently

FAPIIS). Awardees have the opportunity to comment on any information about themselves entered in the database, and DARPA will consider any comments, along with other information in FAPIIS or other systems prior to making an award.

VI. Award Administration Information

A. Selection Notices

1. Proposals

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, in whole or in part, or (2) the proposal has not been selected. These official notifications will be sent via email to the Technical POC identified on the proposal coversheet.

B. Administrative and National Policy Requirements

1. Meeting and Travel Requirements

All key participants are required to attend the program kickoff meeting. Performers should also anticipate regular program-wide PI Meetings and periodic site visits at the Program Manager's discretion.

2. FAR and DFARS Clauses

Solicitation clauses in the FAR and DFARS relevant to procurement contracts and FAR and DFARS clauses that may be included in any resultant procurement contracts are incorporated herein and can be found at www.darpa.mil/work-with-us/additional-baa.

3. Controlled Unclassified Information (CUI) on Non-DoD Information Systems

Further information on Controlled Unclassified Information on Non-DoD Information Systems is incorporated herein can be found at www.darpa.mil/work-with-us/additional-baa.

4. Representations and Certifications

If a procurement contract is contemplated, prospective awardees will need to be registered in the SAM database prior to award and complete electronic annual representations and certifications consistent with FAR guidance at 4.1102 and 4.1201; the representations and certifications can be found at www.sam.gov. Supplementary representations and certifications can be found at www.darpa.mil/work-with-us/additional-baa.

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C. Reporting

The number and types of reports will be specified in the award document, but will include as a minimum quarterly technical and 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. Wide Area Work Flow (WAWF)

Unless using another means of invoicing, performers will be required to submit invoices for payment directly via to https://wawf.eb.mil. Registration in WAWF will be required prior to any award under this BAA.

2. i-Edison

The award document for each proposal selected for funding will contain a mandatory requirement for patent reports and notifications to be submitted electronically through i-Edison (https://public.era.nih.gov/iedison).

VII. Agency Contacts

Administrative, technical or contractual questions should be sent via e-mail to HR001117S0025@darpa.mil. All requests must include the name, email address, and phone number of a point of contact.

The technical POC for this effort is:
Dr. Robert Lutwak
DARPA/MTO
ATTN: HR001117S0025
675 North Randolph Street
Arlington, VA 22203-2114
Email: HR001117S0025@darpa.mil

VIII. Other Information

A. Proposers Day

The AMBIIENT Proposers Day will be held on April 3, 2017 at DARPA in Arlington, VA. Advance registration is required for both the physical meeting and the webcast. See DARPA-SN-17-27 posted at www.fbo.gov for all details. Attendance at the AMBIIENT Proposers Day is not required to propose to this solicitation.

B. Protesting

For information concerning agency level protests see http://www.darpa.mil/work-with-us/additional-baa#NPRPAC.