# Broad Agency Announcement

## Science of Artificial Intelligence and Learning for Open-world Novelty (SAIL-ON)

Defense Sciences Office

HR001119S0038

March 15, 2019

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# PART I: OVERVIEW INFORMATION

- **Federal Agency Name:** Defense Advanced Research Projects Agency (DARPA), Defense Sciences Office (DSO)

- **Funding Opportunity Title:** Science of Artificial Intelligence and Learning for Open-world Novelty (SAIL-ON)

- **Announcement Type:** Broad Agency Announcement

- **Funding Opportunity Number:** HR001119S0038

- **Catalog of Federal Domestic Assistance (CFDA) Number(s):** 12.910 Research and Technology Development

- **Dates** (All times listed herein are Eastern Time.)
  - Posting Date: March 15, 2019
  - Proposers Day: March 5, 2019. See Section VIII.C.
  - Abstract Due Date: April 2, 2019, 4:00 p.m.
  - FAQ Submission Deadline: April 30, 2019, 4:00 p.m. See Section VIII.A.
  - Full Proposal Due Date: May 10, 2019, 4:00 p.m.

- **Anticipated Individual Awards:** DARPA anticipates multiple awards for Technical Area 1 and multiple awards for Technical Area 2. See Section II.A.

- **Types of Instruments that May be Awarded:** Procurement contracts, cooperative agreements or other transactions.

- **Agency contacts**

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  - **DARPA/DSO Opportunities Website:** http://www.darpa.mil/work-with-us/opportunities

- **Frequently Asked Questions (FAQ):** FAQs for this solicitation may be viewed on the DARPA/DSO Opportunities Website. See Section VIII.A for further information.

# PART II: FULL TEXT OF ANNOUNCEMENT

## I. Funding Opportunity Description

This Broad Agency Announcement (BAA) constitutes a public notice of a competitive funding opportunity as described in Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016. Any resultant negotiations and/or awards will follow all laws and regulations applicable to the specific award instrument(s) available under this BAA (e.g., FAR 15.4 for procurement contracts or 2 CFR § 200.203 for cooperative agreements). Proposals received as a result of this BAA will be evaluated in accordance with evaluation criteria specified herein through a scientific review process.

### A. Introduction

The Defense Sciences Office (DSO) of the Defense Advanced Research Projects Agency (DARPA) is soliciting innovative research proposals for new artificial intelligence (AI) methodologies and techniques that support: (1) the principled characterization and generation of novelty in open worlds; and (2) the creation of AI systems capable of operating appropriately and effectively in open worlds. Proposed research should investigate innovative approaches that enable revolutionary advances in science, devices, or systems. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

### B. Background

Military uses of AI are anticipated to be widespread. Military operations are typically characterized by novel situations, which arise in open worlds. We use the term "novelty" here to refer to situations that violate implicit or explicit assumptions about agents, the environment, or their interactions. As AI increasingly becomes ubiquitous for various aspects of military operations (including in decision support, human-machine collaboration, and autonomy), it will be essential for military AI applications to be aware of novelty in open worlds and capable of acting appropriately and effectively when confronted by novel situations.

Past AI approaches have not succeeded at handling novelty. Expert systems failed partially due to brittleness and the expense of recurrent updating needed as the world changed. Case-based reasoning was formulated to adapt past solutions to current situations, but in practice became retrieval of similar past cases without adaptation. Transfer learning requires careful engineering of the AI; it does not occur during the use of a system but rather before a system is deployed. Deep learning is highly sensitive to imperceptibly changed examples. Well publicized successes such as AlphaGo Zero and Libratus generate many instances of training data with no changes to input or output features or interaction rules. Autonomous vehicles handle novel situations by retraining based on many miles of driving that include occurrence of previously unanticipated events.

Current research efforts in AI are characterized by: (1) a dependence on massive amounts of training data with no changes to input or output features, to interaction rules, and most important, to environment, goals, or context; (2) evaluation of ad-hoc approaches in which the introduced novelty is created by the researchers developing the solutions; and/or (3) no systematic qualitative and quantitative framework or measures of novelty.

Open set classification techniques have recently received attention from a handful of researchers.

While these techniques recognize the possibility of novel classes and can even partially identify such classes with reasonable accuracy, they are currently limited to well-defined tasks such as recognizing when letters are added to a dataset of images of digits or identifying species of animals that were not seen in the original training set; they do not apply to changes in environment, task, context, or goals that may occur during execution.

## C. Program Description/Scope

The Science of Artificial Intelligence and Learning for Open-world Novelty (SAIL-ON) program will research and develop the underlying scientific principles and general engineering techniques and algorithms needed to create AI systems that act appropriately and effectively in novel situations that occur in open worlds, which is a key characteristic needed for potential military applications of AI. The focus is on novelty that arises from violations of implicit or explicit assumptions in an agent's model of the external world, including other agents, the environment, and their interactions. Specifically, the program will: (1) develop scientific principles to quantify and characterize novelty in open world domains; (2) create AI systems that act appropriately and effectively in open world domains; and (3) demonstrate and evaluate these systems in multiple domains, including a selected DoD domain.

To guide and evaluate the development of AI systems that can act appropriately and effectively in novel situations characteristic of open worlds, SAIL-ON is structured according to a domain-independent abstraction hierarchy that characterizes degrees and types of novelty that may be encountered by an intelligent agent in an open world. In the SAIL-ON program, novel situations are understood as those that violate implicit or explicit assumptions about the world where "the world" is understood to be a specified domain such as chess or a visual classifier for automobiles. An initial prototype of such a hierarchy is presented in Figure 1. It is recognized that this hierarchy may not be accurate in multiple aspects, such as the order of levels (indicated by the numbering in Figure 1), missing or redundant levels, the lack of inclusion of additional relevant dimensions (e.g., whether the novelty is local or global, the frequency with which novel situations occur, etc.), or others. This list is intended as a starting point, and proposers are encouraged to suggest improvements and corrections in their proposals and to use their modified version as a basis for their technical approach. To demonstrate the generality across domains of a proposer's alternative hierarchy, examples should be provided for all levels in not only the proposer's suggested domain(s) but also in at least one other domain. Alternative hierarchies may include additional or modified levels, different ordering, other factors or dimensions that are not addressed in the prototype, alternative definitions, or any other improvements that make the hierarchy more accurate or useful for understanding and advancing the research and development of open world AI capabilities. DARPA anticipates that further improvements beyond the version in Figure 1 and any proposed alternatives will result from the understanding gained during the SAIL-ON program research; an explicit goal of the program is to produce an accurate and accepted theory of novelty with both qualitative descriptions and quantitative measures corresponding to the difficulty imposed on AI systems.

| | | **Open World Novelty Hierarchy** |
|---|---|---|
| Entities and Attributes | 0 | **Instances**: Previously unseen objects or entities. (This is common to all machine learning today, and included as level 0 only for completeness) |
| | 1 | **Class**: Previously unseen classes of objects or entities. |
| | 2 | **Attribute**: Change in a feature of an object or entity, such as color, shape, or orientation, not previously relevant to classification or action |
| | 3 | **Representations**: Change in how entities and features are specified, corresponding to a transformation of dimensions or coordinate system, not necessarily spatial or temporal. |
| Interactive | 4 | **Relations** (static): Change in allowed relationships between entities, such as in object-class hierarchies, or adjacency (if in physical space). |
| | 5 | **Interactions** (dynamic): Change in allowed interactions between entities, i.e., "rules of the games" resulting in state changes |
| | 6 | **Capabilities:** Change in allowable actions of entities with respect to preconditions, post-conditions, or side-effects. |
| External | 7 | **Environment:** Change in the world independent affecting all entities similarly, depending on factors independent of the entity. |
| | 8 | **Goals:** Change in objectives of actions, especially in a multi-entity or adversarial environment. |
| | 9 | **Context:** Change in meaning of actions that provides a different interpretation or narrative frame on a series of interactions |

**Figure 1 Initial Prototype Open World Novelty Hierarchy**

## D. Program Structure

SAIL-ON comprises three interacting Technical Areas (TAs) to be addressed in parallel: (TA1) Novelty Characterization and Generation; (TA2) Open World Capabilities; and (TA3) Evaluation and Transition. Proposals for TA1 and TA2 only are solicited by this BAA; TA3 will be conducted by a Government team comprised of FFRDC's and/or Government Laboratories and is not being solicited by this BAA. A proposal may address either TA1 or TA2; a proposer wishing to respond to both TA1 and TA2 must submit separate proposals for each TA (see section III.D.1.).

The SAIL-ON program will be executed in three phases: 18 months for Phase 1 (base) to enable establishment of infrastructure and initial capabilities, and 12 months each for Phase 2 (option) and Phase 3 (option) to focus on capability improvements, increasingly difficult challenges, and evaluation of DoD relevance. In each phase of the program it is expected that the domain-independent characterization of novelty will be improved and that increasingly sophisticated and effective techniques for recognizing, characterizing, and responding to novel situations across domains will be developed.

There will be both mid-term evaluations and end-of-phase final evaluations. The mid-term evaluations will be used to understand the reasonableness and appropriateness of initial metrics and potentially to modify any overly ambitious values for the metrics. TA1 performers will facilitate the evaluations by providing novelty generators in the chosen domains, across levels of the novelty hierarchy. TA2 performers will need to show how their systems respond to the novelties introduced by TA1 generators. Initial performance metrics are described in Section E.

Proposals must address all three program phases, to include full technical and cost information. Phases 2 & 3 should be proposed as fully priced options to be executed at the Government's discretion based on funding availability and a performer's progress against the SAIL-ON

program goals. All TA's are planned for the full 42 month period of performance.

TA1 performers will be responsible for jointly (with all other TA1 performers) maintaining and updating the novelty hierarchy and associated metrics to characterize and quantify novelty in open world domains, including developing methods for quantifying novelty, and for constructing software that generates novel situations exemplifying multiple levels of the novelty hierarchy in chosen domains. TA2 performers will research and develop AI capabilities and systems that can identify and respond to novelty across the novelty hierarchy in multiple open world domains. TA2 systems will be evaluated using TA1 novelty generating software. DARPA intends to select several distinct and diverse domains for use in the SAIL-ON program evaluations but only one TA1 performer per domain. Each TA1 domain will support at least two TA2 performer evaluations. Each TA2 performer's capabilities and systems will be evaluated in multiple, but not necessarily all, domains.

The TA3 Government team will provide independent validation and verification of the TA2 systems in all phases of the program and will apply and evaluate TA2 technology to a capstone DoD application. In Phase 1, the TA3 Government team will develop and validate selection criteria for an appropriate DoD application for the SAIL-ON capstone evaluation and will identify and tradeoff potential DoD applications against these criteria.  Based on this analysis, DARPA will select the capstone application. In Phase 2 of the program, the TA3 Government team will construct a novelty generator for the selected DoD capstone application, and in Phase 3 this team will enhance this novelty generator and conduct the DoD capstone evaluation and demonstration. The TA3 Government team will be responsible for any needed tailoring of the TA2 systems to support this evaluation. TA1 and TA2 teams are expected to provide technology and support to the TA3 Government team as needed.

## E.  Technical Area Descriptions

Each Technical Area solicited by this BAA is described in detail below.

**Technical Area 1 (TA1) Novelty Characterization and Generation:**

TA1 performers will be responsible for: (1) jointly maintaining, evaluating, and updating a hierarchy and associated metrics to characterize and quantify novelty in multiple open world domains, including developing methods for quantifying novelty; and (2) for constructing a series of novelty generating software that generates novel situations exemplifying multiple levels of the novelty hierarchy in chosen domains. Each TA1 performer will develop a novelty generator for a single domain.

TA1 proposers must propose a domain for which an AI solution currently exists and explain their approach for generating and inserting a set of progressively more difficult novel situations corresponding to their proposed novelty hierarchy in this domain. For example, a proposer might propose the game of chess or Go, another board game, a specific card game or video game, object recognition or classification, activity labeling, or autonomous vehicle driving, or some other domain, and identify a corresponding existing AI capability, e.g., a chess or Go playing program, a poker playing program, a video game playing program, an object recognition program, or an autonomous driving program, respectively, for which baseline performance measures exist and which can serve as a baseline measure for performance in an unmodified

domain. The proposer must present a technical approach to creating novelty generators around this existing capability at all levels of the novelty hierarchy, to include examples of the types of novel situations that might be generated, such as changing the size of a game board, how pieces are allowed to move or interact, or objectives of a game.

Domains will vary in their characteristics. One could imagine domains which are deterministic or stochastic, single or multi-agent, have complete or incomplete knowledge of the environment and of opponent's resources and state, and so forth. While preferred domain characteristics are not provided in the BAA, it is suggested that proposers include a clear statement of domain characteristics and provide technical details of how those characteristics will be leveraged when generating and inserting novel events into the domain. Note that the domains mentioned in this section or elsewhere in the BAA are for example purposes only; there is no *a priori* preference for these domains or for any other domain(s) that an proposer may propose other than their ability to support and enable research advances in open world novelty capabilities across the full set of novelty levels by multiple TA2 performers with distinct technical approaches. Generative approaches that are unpredictable are preferred over brute force approaches that select from a large set of pre-specified situations. The proposer's approach must include a plan to specify an application programming interface (API) that will enable use by TA2 performers to evaluate their open world capability systems. Proposals must explain how their proposed domain will provide these abilities.

Implementation and use of novelty generators will provide the experimental evidence and experience for validating and improving the novelty hierarchy. To enable use of the novelty hierarchy by the DoD to design and evaluate open world AI systems, TA1 performers must also propose, apply, and validate qualitative and quantitative measures of novelty and a methodology for understanding the difficulty for AI applications in handling different levels of novelty. TA1 performers will need to be able to identify which level(s) of the novelty hierarchy that a specific generated novelty instantiates. TA1 performers will also need to be able to demonstrate that novelty generators are capable of generating novelties across their entire novelty hierarchy in quantifiable ways.

TA1 performers will be expected to collaboratively design and specify API's for their novelty generators that enable their use by multiple TA2 performers. TA1 performers are also expected to collaborate and jointly maintain the novelty hierarchy used in the SAIL-ON program. Proposals must address how the proposer will work with other SAIL-ON performers.

Key challenges for TA1 performers include validating the novelty hierarchy through experimentation, quantifying novelty at all levels of the hierarchy, exposing and making explicit inductive bias and other implicit assumptions of AI solutions in existing domains, defining API's for novelty generators, and most importantly, ensuring that examples of generated novelty are not easily predictable by TA2 open world AI systems or researchers. Proposals need to explain how their approach will address these and any other identified challenges and provide quantified metrics for evaluating the quality of their novelty generators. Proposals must clearly identify technical risks and mitigation plans.

**Technical Area 2 (TA2) Open World Capabilities:**

The objective of TA2 is to develop AI systems with the capabilities needed to identify, characterize, and act appropriately and effectively to novel situations in open world domains.

TA2 proposals must provide a detailed phased technical approach for research and development leading to these open world AI capabilities. The approach must address identification, characterization, and action (or decision, if a static domain) generation capabilities at all levels of a novelty hierarchy. Just as in TA1, a proposal may suggest changes to the hierarchy that a proposer believes matches its phased approach to capabilities development. Capabilities need not be developed in the order corresponding to the initial hierarchy in Figure 1 if a proposer believes that an alternative order is more appropriate. Proposals must identify what information their systems might require from a novelty generator in order to generate appropriate actions. For example, a system might have to be told the level of a change that might occur, that a change has occurred, feedback that a hypothesized change has occurred, or other information that is required by a specific technical approach. Proposals must identify the feedback needed about the consequences of an action, if any, from a novelty generator or a human, when this feedback would be required, and what this means for the TA1/TA2 API. (An example of feedback might be the result of playing a hand in a card game.) Proposals must identify the domain(s) in which they intend to conduct their research and the domain characteristics to which their developed capabilities would apply. Proposers should describe how their approach minimizes or eliminates the need for explicit information from the novelty generator and the need for human intervention, as well as how it relies on data for training.

For purposes of evaluation, novelty situation instances are created by a TA1 developed novelty generator. Because a goal of the SAIL-ON program is general (i.e., domain-independent) open world AI techniques and systems, each TA2 developed open world AI system must be evaluated in multiple – but not all – program domains. DARPA recognizes that TA2 teams will need their own novelty generators to support their research, and encourages sharing of such novelty generators among TA2 performers. Proposals should explain how they would support such sharing.

Evaluation of open world AI capabilities will use separate metrics for identification and response to novelty. The number of examples of the novel situation (e.g., the number of moves made in chess after an objective changed, or the number of hands played in poker after sevens suddenly became wild) will be the independent variable. Dependent variables will include correct identification that a change occurred and effectiveness of the actions taken in response to the change. Proposals are encouraged to suggest additional measurements and metrics. Proposals must specify target and stretch goals for these metrics and provide a basis for these goals. An initial set of metrics and goals is presented in Table 1. More ambitious but realistic goals may be proposed, provided there is a credible approach to achieving them.

| TA2 performer Metrics | Ph1, 6 mo | Ph 1, 12 mo | Ph1, 18 mo | Ph2, 24 mo | Ph2, 30 mo | Ph3, 36 mo | Ph3, 42 mo |
|---|---|---|---|---|---|---|---|
| Domains per TA2 performer | 1 | 2 | 2 | 3 | 3 | 3 + DoD | 3 + DoD |
| Novelty Levels from hierarchy (cumulative) | 0-3 | 0-3 | 0-3 | 4-6 | 4-6 | 7-9 | 7-9 |
| # of Novel Examples Needed | N | 90% of N | 75% of N | 65% of N | 50% of N | 35% of N | 25% of N |
| Performance Comparisons | SOA AI "player" with no novelty capability | | | | | | |
| Novelty Detection Performance | 50% | 60% | 70% | 75% | 80% | 85% | 90% |
| Novelty Reaction Performance (with system detection) | 50% | 55% | 65% | 70% | 75% | 80% | 85% |
| Novelty Reaction Performance (given detection) | 55% | 65% | 70% | 75% | 80% | 85% | 90% |

**Table 1:  Example TA2 performer metrics**

Proposals must clearly identify technical risks and mitigations. Proposals must identify the characteristics and limitations of domains to which their approach may apply. Proposals must specify multiple exemplar domains that might be suitable for evaluation and application of their approach.

Potential approaches for TA2 might include various methods of machine learning, plan recognition, knowledge representation, anomaly detection, fault diagnosis and recovery, probabilistic programming, causal modeling, problem reformulation, theory/belief revision, goal reasoning, and others. There is no preference for approaches in this list compared to any other approach that may achieve the TA2 objectives.

## F.  Schedule/Milestones

The overall program schedule and milestones are depicted in Figure 2.

Proposers should provide a technical and programmatic strategy that conforms to the provided program schedule and presents an aggressive plan to fully address all program goals, metrics, milestones and deliverables. The task structure must be consistent across the proposed schedule, Statement of Work, and cost volume. A target start date of October 1, 2019 may be assumed for planning purposes.

Schedules will be synchronized across performers, as required, and monitored/revised as necessary throughout the program.

All proposals must include the following meetings and travel in the proposed schedule and costs:

- To continue integration and development between TAs, foster collaboration between teams, and disseminate program developments, a two to three day Principal Investigator (PI) meeting will be held approximately every six months, with locations split between the East and West Coasts of the United States. For budgeting purposes, plan for a 2 ½ day kickoff meeting in the Washington, DC area, and additional 2 ½ day meetings every 6 months alternating between the Washington, DC area and the San Francisco, CA area,

with four meetings during phase 1 and 2 each during phases 2 and 3.

- Regular teleconference meetings will be scheduled with the Government team for progress reporting as well as problems identification and mitigation. Proposers should also anticipate at least one site visit per year by the DARPA Program Manager during which they will have the opportunity to demonstrate progress towards agreed-upon milestones. For budgeting purposes, assume two site visits during Phase 1 of the program and one site visit during each of Phases 2 and 3.
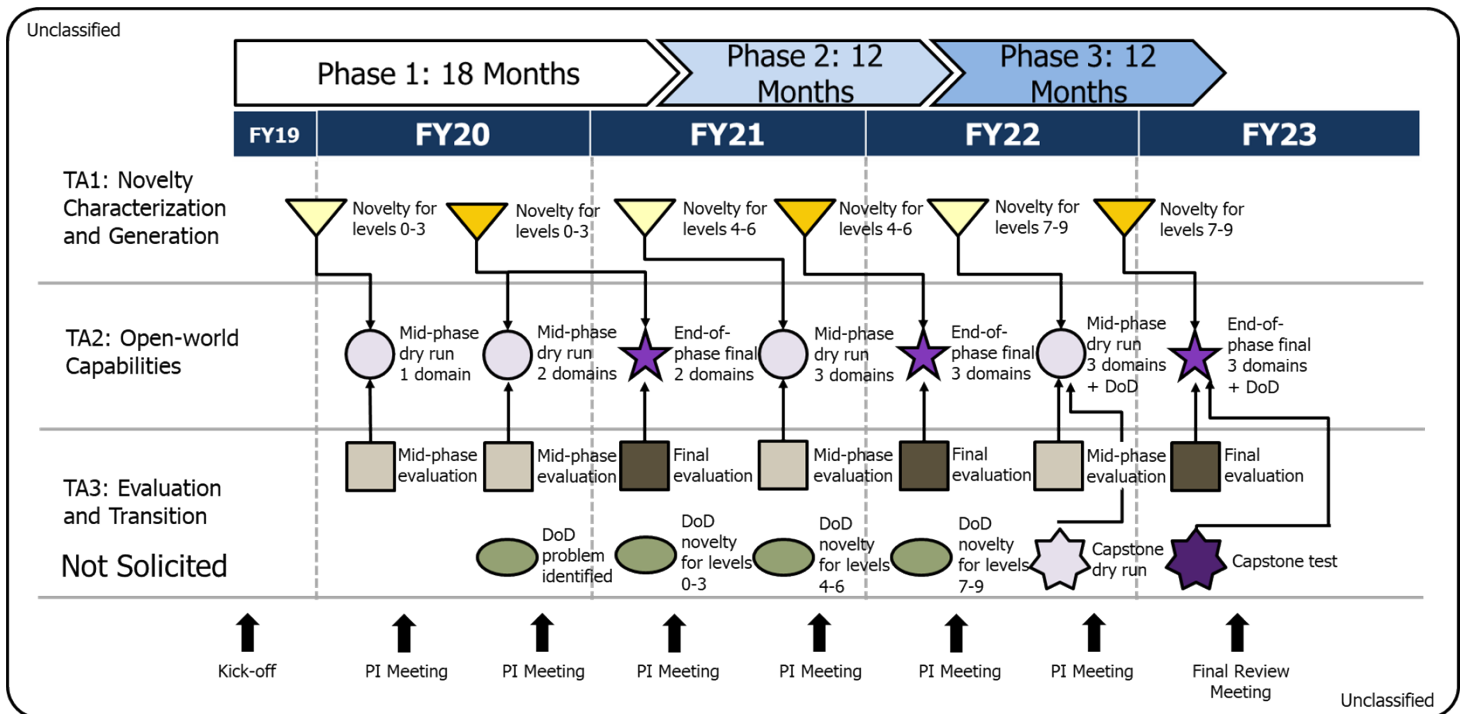


**Figure 2: Program schedule**

### G. Deliverables

Performers will be expected to provide at a minimum the following deliverables:
- Comprehensive quarterly technical reports due within ten days of the end of the given quarter, describing progress made on the specific milestones as laid out in the SOW.
- A phase completion report submitted within 30 days of the end of each phase, summarizing the research done.
- Other negotiated deliverables specific to the objectives of the individual efforts. These may include registered reports, experimental protocols, publications, data management plan, intermediate and final versions of software libraries, code, and APIs, including documentation and user manuals, and/or a comprehensive assemblage of design documents, models, modeling data and results, and model validation data.
- Reporting as outlined in Section VI.C.

In addition to the above, TA1 performers must deliver:

- A working evaluation domain with an accompanying novelty generator at the appropriate novelty levels instantiated as shown on the program schedule.
- A revised novelty hierarchy that reflects current research every six months.
- An assessment of the novelty generator's ability to sample novelty at each level and across levels every six months.

In addition to the minimum deliverables above, TA2 performers must deliver:
- A working system capable of being evaluated in the stated number of domains throughout the duration of the program.
- Evaluation result reports due within two weeks of the completion of each evaluation.


## H. Government-furnished Property/Equipment/Information

None.


## I. Other Program Objectives and Considerations

### 1. Collaboration

Throughout the course of the program, it will be necessary for all performers—regardless of category—to share relevant information regarding their research and development to support the larger program goals. DARPA expects all program performers to work collaboratively with one another to realize the program objectives outlined herein, so proposers should carefully review the goals for the entire program in order to fully understand the context of each program objective, performer category, and TA within the overall program structure. All proposals should describe plans for ensuring transparency of their processes to enable interactions with other program performers in Volume 1. Proposals that fail to include these plans may be deemed non-conforming and removed from consideration.

In particular, TA1 performers will need to provide their novelty generator software, documentation, and technical support to TA2 performers for use in evaluation, and TA2 performers will need to share the results of these evaluations, to include not only performance metrics and measurements but also feedback on the novelty generator itself to TA1 performers. All TA1 performers and TA2 performers will jointly update the novelty hierarchy based on these results. TA1 and TA2 performers will need to provide code, documentation, and support to the TA3 Government team. TA1 and TA2 performers will need to agree on an API between TA1's novelty generator and TA2's open world AI system.

To ensure collaboration, all performer contracts will include an Associate Contractor Agreement (ACA) clause for portions of the contracts requiring joint participation between the TAs in the accomplishment of the program goals. This provision will become a material requirement for any agreements or contracts awarded as a result of this BAA. The ACA clause will include the basis for sharing information, data, technical knowledge, expertise and/or resources essential to the integration of the program technical areas and components. This clause will ensure appropriate coordination and integration of work by program contractors, ensure complete compatibility between data, tools and services, and prevent unnecessary duplication of efforts and maximize

commonality. Without exception, all ACAs must be in place within three months of contract award. See Section VIII.C for a sample ACA clause.

## 2. Intellectual Property

Because SAIL-ON is a 6.1 basic research program, it is desirable that program products and knowledge be available for use by the broad AI research community. Therefore, intellectual property rights asserted by proposers are strongly encouraged to be aligned with open source regimes. See Section VI.B.4 for more information related to intellectual property. Any commercial software that is a necessary component of a performer's approach must be identified and include a description of the license rights to be provided to the Government and how the license rights provided will enable use in any follow-on Government research programs.

## II. Award Information

### A. General Award Information

DARPA anticipates multiple awards in each of TA1 and TA2, with fewer awards in TA1 than TA2.

The level of funding for individual awards made under this BAA will depend on the quality of the proposals received and the availability of funds. Awards will be made to proposers[1] whose proposals are determined to be the most advantageous to the Government, all evaluation factors considered. See Section V for further information.

The Government reserves the right to:

- select for negotiation all, some, one, or none of the proposals received in response to this solicitation;
- make awards without discussions with proposers;
- conduct discussions with proposers if it is later determined to be necessary;
- segregate portions of resulting awards into pre-priced options;
- accept proposals in their entirety or to select only portions of proposals for award;
- fund awards in increments with options for continued work at the end of one or more phases;
- request additional documentation once the award instrument has been determined (e.g., representations and certifications); and
- remove proposers from award consideration should the parties fail to reach agreement on award terms within a reasonable time or the proposer fails to provide requested additional information in a timely manner.

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[1] As used throughout this BAA, "proposer" refers to the lead organization on a submission to this BAA. The proposer is responsible for ensuring that all information required by a BAA--from all team members--is submitted in accordance with the BAA. "Awardee" refers to anyone who might receive a prime award from the Government, including recipients of procurement contracts, cooperative agreements, or Other Transactions. "Subawardee" refers to anyone who might receive a subaward from a prime awardee (e.g., subawardee, consultant, etc.).

Proposals identified for negotiation may result in a procurement contract, cooperative agreement, or other transaction (OT), depending upon the nature of the work proposed, the required degree of interaction between parties, 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 http://www.darpa.mil/work-with-us/contract-management#OtherTransactions.

In accordance with 10 U.S.C. § 2371b(f), the Government may award a follow-on production contract or Other Transaction (OT) for any OT awarded under this BAA if: (1) that participant in the OT, or a recognized successor in interest to the OT, successfully completed the entire prototype project provided for in the OT, as modified; and (2) the OT provides for the award of a follow-on production contract or OT to the participant, or a recognized successor in interest to the OT.
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 does not anticipate applying publication restrictions of any kind to individual awards for fundamental research that may result from this BAA.  Notwithstanding this statement of expectation, the Government is not prohibited from considering and selecting research proposals that, while perhaps not qualifying as fundamental research under the foregoing definition, still meet the BAA criteria for submissions.  If proposals are selected for award that offer other than a fundamental research solution, the Government will either work with the proposer to modify the proposed statement of work to bring the research back into line with fundamental research or else the proposer will agree to restrictions in order to receive an award.

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 determine whether the proposed research shall be considered fundamental and to select the award instrument type. Appropriate language will be included in resultant awards for non-fundamental research to prescribe publication requirements and other restrictions, as appropriate. This language can be found at http://www.darpa.mil/work-with-us/additional-baa.

For certain research projects, it may be possible that although the research to be performed by a potential awardee is non-fundamental research, its proposed subawardee's effort may be fundamental research. It is also possible that the research performed by a potential awardee is fundamental research while its proposed subawardee's effort may be non-fundamental research. In all cases, it is the potential awardee's responsibility to explain in its proposal which proposed efforts are fundamental research and why the proposed efforts should be considered fundamental research.

## III. Eligibility Information

### A. Eligible Applicants

All responsible sources capable of satisfying the Government's needs may submit a proposal DARPA's consideration.

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. This information is required for Government Entities proposing to be awardees or subawardees.

### 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. Foreign Participation

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. For classified submissions, this includes mitigating any Foreign Ownership Control and Influence (FOCI) issues prior to transmitting the submission to DARPA. Additional information on these subjects can be found at http://www.dss.mil/isp/foci/foci_faqs.html.

## 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.

Include any OCIs affirmations and disclosures in Attachment G Proposal Template Vol. 3-Admin and National Policy Requirements.

## 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 (e.g., OTs 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.

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 Requirements

### 1. Ability to Receive Awards in Multiple Technical Areas - Conflicts of Interest

Proposers may submit to either or both Technical Areas 1 and 2. Separate proposals are required for each TA. Any proposer who submits to both TA1 and TA2 must include in both proposals, potentially with different levels of detail as appropriate for the method that is proposed, an explanation of how no evaluation advantage will be gained by the proposer's TA2 system against their TA1 novelty generator compared to any other TA2 performer's system evaluated against the proposer's TA1 novelty generator. The purpose of this is not only to provide for a fair and equitable evaluation, but also to ensure that the TA1 novelty generator is not biased in any unknown or subtle way towards any TA2 approach. Potential methods for avoiding advantaging a proposer's TA2 evaluation might include a specific plan to avoid information flow from their TA2 team researchers to their TA1 researchers independent of any other TA2 team's researchers, a commitment to use TA1 evaluation domains from other selected TA1 performers, or any other method that may be effective. There is no preference for these exemplar methods. Proposers who

elect to propose to both TA1 and TA2 must submit separate proposals for both efforts so DARPA can select their proposal for either or both TA's.

## 2. Ability to Support Classified Development

No classified work is anticipated under TA1 or TA2 of this BAA.

## IV. Application and Submission Information

Prior to submitting a full proposal, proposers are *strongly encouraged* to first submit an abstract as described below. This process allows a proposer to ascertain whether the proposed concept is: (1) applicable to the SAIL-ON BAA and (2) currently of interest. For the purposes of this BAA, applicability is defined as follows:

- The proposed concept is applicable to the technical areas described herein.
- The proposed concept is important to DSO's current investment portfolio.
- The proposed concept investigates an innovative approach that enables revolutionary advances, i.e., will not primarily result in evolutionary improvements to the existing state of practice.
- The proposed work has not already been completed (i.e., the research element is complete but manufacturing/fabrication funds are required).
- The proposer has not already received funding or a positive funding decision for the proposed concept (whether from DARPA or another Government agency).

Abstracts and full proposals that are not found to be applicable to the SAIL-ON BAA as defined above may be deemed non-conforming[2] and removed from consideration. All abstracts and full proposals must provide sufficient information to assess the validity/feasibility of their claims as well as comply with the requirements outlined herein for submission formatting, content and transmission to DARPA. Abstracts and full proposals that fail to do so may be deemed non-conforming and removed from consideration. Proposers will be notified of non-conforming determinations via letter.

## A. Address to Request Application Package

This document contains all information required to submit a response to this solicitation. No additional forms, kits, or other materials are needed except as referenced herein. No request for proposal or additional solicitation regarding this opportunity will be issued, nor is additional information available except as provided at the Federal Business Opportunities website (http://www.fbo.gov), the Grants.gov website (http://www.grants.gov/), or referenced herein.

## B. Content and Form of Application Submission

## 1. Abstract Information

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[2] "Conforming" is defined as having been submitted in accordance with the requirements outlined herein.

As stated above, proposers are strongly encouraged to submit an abstract in advance of a full proposal to minimize effort and reduce the potential expense of preparing an out of scope proposal. The abstract provides a synopsis of the proposed project by briefly answering the following questions:

- What is the proposed work attempting to accomplish or do?
- How is it done today, and what are the limitations?
- Who will care and what will the impact be if the work is successful?
- How much will it cost, and how long will it take?

DARPA will respond to abstracts with a statement as to whether DARPA is interested in the idea. If DARPA does not recommend the proposer submit a full proposal, DARPA will provide feedback to the proposer regarding the rationale for this decision. Regardless of DARPA's response to an abstract, proposers may submit a full proposal. DARPA will review all conforming full proposals using the published evaluation criteria and without regard to any comments resulting from the review of an abstract.

Proposers should note that a favorable response to an abstract is not a guarantee that a proposal based on the abstract will ultimately be selected for award negotiation.

While it is DARPA policy to attempt to reply to abstracts within thirty calendar days, proposers to this solicitation may anticipate a response within approximately three weeks. These official notifications will be sent via email to the Technical POC and/or Administrative POC identified on the abstract coversheet.

- **Abstract Format**

All proposers are required to use Attachment A: Abstract Summary Slide Template and Attachment B: Abstract Template provided to this solicitation on http://www.fbo.gov and http://www.grants.gov. Attachment A Abstract Summary Slide Template described herein must be in .ppt or .pptx format and should be attached as a separate file to this document.

2. **Full Proposal Information**

Proposals consist of Volume 1: Technical and Management Volume, Volume 2: Cost Volume, and Volume 3: Administrative and National Policy Requirements Volume.

To assist in proposal development, various attachments have been provided along with the BAA posted on http://www.fbo.gov (Attachment C: Proposal Summary Slide Template; Attachment D: Proposal Template Volume 1 Technical & Management Volume; Attachment E: Proposal Template Volume 2 Cost Volume; Attachment F: Proposal Template Volume 2 Cost Breakdown Template; Attachment F-2: Proposal Template Vol. 2-Cost Breakdown (optional); and Attachment G: Proposal Template Volume 3 Administrative & National Policy Requirements Volume).

Full proposals requesting a procurement contract or other transaction (OT) must use the following attachments:

- Attachment C
- Attachment D
- Attachment E
- Attachment F
- Attachment F-2
- Attachment G

Full proposals requesting a cooperative agreement must use the following attachments in addition to the Grants.gov application package:

- Attachment C
- Attachment D
- Attachment F
- Attachment F-2
- Attachment G

  *Note – Budget Justification should be provided as Section L of the SF 424 Research & Related Budget form provided via Grants.gov. The Budget Justification should include the following information for the recipient and all subawardees: (1) Direct Labor: Detail the total number of persons and their level of commitment for each position listed (in Sections A and B), as well as which specific tasks (as described in the SOW) they will support.(2) Equipment (Section C) Provide an explanation for listed requested equipment exceeding $5,000, properly justifying their need to meet the objectives of the program. (3) Travel (Section D) Provide the purpose of the trip, number of trips, number of days per trip, departure and arrival destinations, number of people, etc. (4) Other Direct Costs (Section F). Provide a justification for the items requested and an explanation of how the estimates were obtained.

Proposals not meeting the format prescribed herein may not be reviewed.

- **Full Proposal Format**

All proposers are required to use the templates provided as attachments to this solicitation on http://www.fbo.gov and http://www.grants.gov. Formatting instructions are provided therein.

### 3. 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. See Section V.B.1 for additional information.

### 4. Security Information

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 requesting submission instructions from the DARPA/DSO Program Security Officer (PSO).

Security classification guidance and direction via a Security Classification Guard (SCG) and/or DD Form 254, "DoD Contract Security Classification Specification," will not be provided at this time, since DARPA is soliciting ideas only. 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.

### C. Submission Dates and Times

Proposers are warned that submission deadlines as outlined herein are in Eastern Time and will be strictly enforced. When planning a response to this solicitation, proposers should take into account that some parts of the submission process may take from one business day to one month to complete (e.g., registering for a Data Universal Numbering System (DUNS) number or Taxpayer Identification Number (TIN)).

DARPA will acknowledge receipt of *complete* submissions via email and assign identifying numbers that should be used in all further correspondence regarding those submissions. If no confirmation is received within two business days, please contact the BAA Administrator at SAILON@darpa.mil to verify receipt.

#### 1. Abstracts

Abstracts must be submitted per the instructions outlined herein *and received by DARPA* no later than the due date and time listed in Part One: Overview Information. Abstracts received after this time and date may not be reviewed.

#### 2. Full Proposals

Full proposal packages--full proposal (Technical and Management Volume, Cost Volume, Administrative and National Policy Requirements Volume) and, as applicable, proprietary subawardee cost proposals, classified appendices to unclassified proposals -- must be submitted per the instructions outlined herein *and received by DARPA* no later than the due date and time listed in Part One: Overview Information. Proposals received after this time and date may not be reviewed.

### D. Funding Restrictions

Not applicable.

### E. Other Submission Requirements

#### 1. Unclassified Submission Instructions

Proposers must submit all parts of their submission package using the same method; submissions cannot be sent in part by one method and in part by another method nor should duplicate

submissions be sent by multiple methods. Email submissions will not be accepted. Failure to comply with the submission procedures outlined herein may result in the submission being deemed non-conforming and withdrawn from consideration.

### a. Abstracts

DARPA/DSO will employ an electronic upload submission system (https://baa.darpa.mil/) for all UNCLASSIFIED abstracts sent in response to this solicitation. *Abstracts must not be submitted via Grants.gov.*

First time users of the DARPA BAA Submission website must complete a two-step account creation process. The first step consists of registering for an extranet account by going to the URL listed above and selecting the "Account Request" link. Upon completion of the online form, proposers will receive two separate emails; one will contain a user name and the second will provide a temporary password. Once both emails have been received, the second step requires proposers to go back to the submission website and log in using that user name and password. After accessing the extranet, proposers may then create a user account for the DARPA BAA Submission website by selecting the "Register your Organization" link at the top of the page. Once the user account is created, proposers will be able to see a list of solicitations open for submissions, view submission instructions, and upload/finalize their abstract.

Proposers who already have an account on the DARPA BAA Submission website may simply log in at https://baa.darpa.mil/, select this solicitation from the list of open DARPA solicitations and proceed with their abstract submission. Note: proposers who have created a DARPA BAA Submission website account to submit to another DARPA Technical Office's solicitations do not need to create a new account to submit to this solicitation.

All abstracts submitted electronically through the DARPA BAA Submission website must meet the following requirements: (1) uploaded as a zip file (.zip or .zipx extension); (2) only contain the document(s) requested herein; (3) only contain unclassified information; and (4) must not exceed 100 MB in size. Only one zip file will be accepted per abstract and abstracts not uploaded as zip files will be rejected by DARPA.

Technical support for the DARPA BAA Submission website is available during regular business hours, Monday – Friday, 9:00 a.m. – 5:00 p.m. Requests for technical support must be emailed to BAAT_Support@darpa.mil with a copy to SAILON@darpa.mil. Questions regarding submission contents, format, deadlines, etc. should be emailed to SAILON@darpa.mil. Questions/requests for support sent to any other email address may result in delayed/no response.

*Since proposers may encounter heavy traffic on the web server, DARPA discourages waiting until the day abstracts are due to request an account and/or upload the submission.*
*Note: Proposers submitting an abstract via the DARPA BAA Submission site MUST (1) click the "Finalize" button in order for the submission to upload AND (2) do so with sufficient time for the upload to complete prior to the deadline. Failure to do so will result in a late submission.*

### b. Proposals Requesting a Procurement Contract or Other Transaction

Proposers requesting procurement contracts or other transactions may submit full proposals through ONE of the following methods: (1) electronic upload (DARPA-preferred); or (2) direct mail/hand-carry.

### i. Electronic Upload

DARPA/DSO encourages proposers to submit UNCLASSIFIED proposals via the DARPA BAA Submission website at https://baa.darpa.mil/.

First time users of the DARPA BAA Submission website must complete a two-step account creation process. The first step consists of registering for an extranet account by going to the URL listed above and selecting the "Account Request" link. Upon completion of the online form, proposers will receive two separate emails; one will contain a user name and the second will provide a temporary password. Once both emails have been received, the second step requires proposers to go back to the submission website and log in using that user name and password. After accessing the extranet, proposers may then create a user account for the DARPA BAA Submission website by selecting the "Register your Organization" link at the top of the page. Once the user account is created, proposers will be able to see a list of solicitations open for submissions, view submission instructions, and upload/finalize their proposal.

Proposers who already have an account on the DARPA BAA Submission website may simply log in at https://baa.darpa.mil/, select this solicitation from the list of open DARPA solicitations and proceed with their proposal submission. *Note:  proposers who have created a DARPA BAA Submission website account to submit to another DARPA Technical Office's solicitations do not need to create a new account to submit to this solicitation.*

All full proposals submitted electronically through the DARPA BAA Submission website must meet the following requirements: (1) uploaded as a zip file (.zip or .zipx extension); (2) only contain the document(s) requested herein; (3) only contain unclassified information; and (4) must not exceed 100 MB in size. Only one zip file will be accepted per full proposal and full proposals not uploaded as zip files will be rejected by DARPA.

Technical support for the DARPA BAA Submission website is available during regular business hours, Monday – Friday, 9:00 a.m. – 5:00 p.m. Requests for technical support must be emailed to BAAT_Support@darpa.mil with a copy to SAILON@darpa.mil. Questions regarding submission contents, format, deadlines, etc. should be emailed to SAILON@darpa.mil. Questions/requests for support sent to any other email address may result in delayed/no response.

*Since proposers may encounter heavy traffic on the web server, DARPA discourages waiting until the day proposals are due to request an account and/or upload the submission. Note: Proposers submitting a proposal via the DARPA BAA Submission site MUST (1) click the "Finalize" button in order for the submission to upload AND (2) do so with sufficient time for the upload to complete prior to the deadline. Failure to do so will result in a late submission.*

### ii.  Direct Mail/Hand-carry

Proposers electing to submit procurement contract or other transaction proposals via direct mail or hand-carried must provide one paper copy and one electronic copy on CD or DVD of the full

proposal package. All parts of the proposal package must be mailed or hand-carried in a single delivery to the address noted in Section VII below.

### c. Proposals Requesting a Cooperative Agreement

Proposers requesting cooperative agreements may only submit proposals through ONE of the following methods: (1) electronic upload at Grants.gov (DARPA-preferred); or (2) direct mail/hand-carry to DARPA.

To evaluate compliance with Title IX of the Education Amendments of 1972 {20 U.S.C. A§ 1681 Et. Seq.), the Department of Defense is collecting certain demographic and career information to be able to assess the success rates of women who are proposed for key roles in applications in STEM disciplines. To enable this assessment, each application must include the two following forms completed as instructed: the Research and Related Senior/Key Person Profile (Expanded) form and the Research and Related Personal Data form. Both forms are provided with the application package in Grants.gov.

### i. Electronic Upload

DARPA encourages cooperative agreement proposers to submit their proposals via electronic upload at http://www.grants.gov/web/grants/applicants/apply-for-grants.html. Proposers electing to use this method must complete a one-time registration process on Grants.gov before a proposal can be electronically submitted. *If proposers have not previously registered, this process can take up to four weeks so* registration should be done in sufficient time to ensure it does not impact a proposer's ability to meet required submission deadlines. Registration requirements and instructions are outlined at http://www.grants.gov/web/grants/register.html.

Carefully follow the DARPA submission instructions provided with the solicitation application package on Grants.gov. Only the required forms listed therein (e.g., SF-424 and Attachments form) should be included in the submission. *Note: Grants.gov does not accept zipped or encrypted proposals.*

Once Grants.gov has received an uploaded proposal submission, Grants.gov will send two email messages to notify proposers that: (1) the proposal has been received by Grants.gov; and (2) the proposal has been either validated or rejected by the system. *It may take up to two business days to receive these emails.* If the proposal is validated, then the proposer has successfully submitted their proposal. If the proposal is rejected, the submission must be corrected, resubmitted and revalidated before DARPA can retrieve it. If the solicitation is no longer open, the rejected proposal cannot be resubmitted. Once the proposal is retrieved by DARPA, Grants.gov will send a third email to notify the proposer. DARPA will send a final confirmation email as described in Section IV.C.

*To avoid missing deadlines, Grants.gov recommends that proposers submit their proposals to Grants.gov 24-48 hours in advance of the proposal due date to provide sufficient time to complete the registration and submission process, receive email notifications and correct errors, as applicable.*

Technical support for Grants.gov submissions may be reached at 1-800-518-4726 or support@grants.gov.

### ii. Direct Mail/Hand-carry

Proposers electing to submit cooperative agreement proposals via direct mail or hand-carried must provide one paper copy and one electronic copy on CD or DVD of the full proposal package. Proposers must complete the SF 424 R&R form (Application for Federal Assistance, Research and Related) provided at Grants.gov as part of the opportunity application package for this BAA and include it in the proposal submission. All parts of the proposal package must be mailed or hand-carried to the address noted in Section VII below.

## V.  Application Review Information

### A.  Evaluation Criteria

Proposals will be evaluated using the following criteria listed in descending order of importance: Overall Scientific and Technical Merit; Potential Contribution and Relevance to the DARPA Mission; and Cost Realism.

- **Overall Scientific and Technical Merit**

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

- **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.

- **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).

### B.  Review and Selection Process

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.

The review process identifies proposals that meet the evaluation criteria described above and are, therefore, selectable for negotiation of awards by the Government. DARPA policy is to ensure impartial, equitable, comprehensive proposal evaluations and to select proposals that meet DARPA technical, policy, and programmatic goals. Proposals that are determined selectable will not necessarily receive awards (see Section II). Selections may be made at any time during the period of solicitation. For evaluation purposes, a proposal is defined to be the document and supporting materials as described in Section IV.

### Handling of Source Selection Information

DARPA policy is to treat all submissions as source selection information (FAR 2.101 and 3.104), and to only disclose their contents to authorized personnel. Restrictive notices notwithstanding, 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), DARPA may also request input on technical aspects of the proposals from other non-Government consultants/experts who are strictly bound by the appropriate non-disclosure requirements.

Submissions will not be returned. The original of each submission received will be retained at DARPA and all other non-required copies destroyed. A certification of destruction may be requested via email to the BAA mailbox, provided the formal request is received within 5 days after being notified of submission status.

### C. Federal Awardee Performance and Integrity Information (FAPIIS)

Following the review and selection process described above, but prior to making an award above the simplified acquisition threshold (FAR 2.101), DARPA is required[3] to review and consider any information available through the designated integrity and performance system (currently FAPIIS). Selectees have the opportunity to comment on any information about themselves entered in the database. DARPA will consider any comments and other information in FAPIIS or other systems prior to making an award.

## VI.  Award Administration Information

### A.  Selection Notices

After proposal evaluations are complete, proposers will be notified as to whether their proposal

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[3] Per 41 U.S.C. 2313, as implemented by FAR 9.103 and 2 CFR § 200.205.

was selected for award negotiation as a result of the review process. Notification will be sent by email to the Technical and Administrative POCs identified on the proposal cover sheet. If a proposal has been selected for award negotiation, the Government will initiate those negotiations following the notification.

## B. Administrative and National Policy Requirements

### 1. Solicitation Provisions and Award Clauses, Terms and Conditions

For terms and conditions specific to grants and/or cooperative agreements, see the DoD General Research Terms and Conditions (latest version) at http://www.onr.navy.mil/Contracts-Grants/submit-proposal/grants-proposal/grants-terms-conditions and the supplemental DARPA-specific terms and conditions at http://www.darpa.mil/work-with-us/contract-management#GrantsCooperativeAgreements.

### 2. 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 http://www.darpa.mil/work-with-us/additional-baa for further information.

International entities can register in SAM by following the instructions in this link: https://www.fsd.gov/fsd-gov/answer.do?sysparm_kbid=dbf8053adb119344d71272131f961946&sysparm_search=KB0013221.

NOTE: new registrations can take an average of 7-10 business days to process in SAM. SAM registration requires the following information:
- DUNS number
- TIN
- Commercial and Government Entity (CAGE) Code. If a proposer does not already have a CAGE code, one will be assigned during SAM registration.
- Electronic Funds Transfer information (e.g., proposer's bank account number, routing number, and bank phone or fax number).

### 3. Representations and Certifications

In accordance with FAR 4.1102 and 4.1201, proposers requesting a procurement contract must complete electronic annual representations and certifications at https://www.sam.gov/. In addition, resultant procurement contracts will require supplementary DARPA-specific representations and certifications. See http://www.darpa.mil/work-with-us/additional-baa for further information.

### 4. Intellectual Property

Proposers should note that the Government does not own the intellectual property or technical

data/computer software developed under Government contracts. The Government acquires the right to use the technical data/computer software. Regardless of the scope of the Government's rights, awardees may freely use their same data/software for their own commercial purposes (unless restricted by U.S. export control laws or security classification). Therefore, technical data and computer software developed under this solicitation will remain the property of the awardees, though DARPA will have, at a minimum, Government Purpose Rights (GPR) to technical data and computer software developed through DARPA sponsorship.

If proposers desire to use proprietary computer software or technical data or both as the basis of their proposed approach, in whole or in part, they should: (1) clearly identify such software/data and its proposed particular use(s); (2) explain how the Government will be able to reach its program goals (including transition) within the proprietary model offered; and (3) provide possible nonproprietary alternatives in any area that might present transition difficulties or increased risk or cost to the Government under the proposed proprietary solution. Proposers expecting to use, but not to deliver, commercial open source tools or other materials in implementing their approach may be required to indemnify the Government against legal liability arising from such use.

All references to "Unlimited Rights" or "Government Purpose Rights" are intended to refer to the definitions of those terms as set forth in the Defense Federal Acquisition Regulation Supplement (DFARS) 227.

### a. Intellectual Property Representations

All proposers must provide a good faith representation of either ownership or possession of appropriate licensing rights to all other intellectual property to be used for the proposed project. Proposers must 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.

### b. Patents

All proposers must include documentation proving ownership or possession of appropriate licensing rights to all patented inventions to be used for the proposed project. If a patent application has been filed for an invention, but it includes proprietary information and is not publicly available, a proposer must provide documentation that includes:  the patent number, inventor name(s), assignee names (if any), filing date, filing date of any related provisional application, and summary of the patent title, with either: (1) a representation of invention ownership; or (2) proof of possession of appropriate licensing rights in the invention (i.e., an agreement from the owner of the patent granting license to the proposer)..

### c. Procurement Contracts

- **Noncommercial Items (Technical Data and Computer Software):** Proposers requesting a procurement contract must list all noncommercial technical data and computer software that it plans to generate, develop, and/or deliver, in which the Government will acquire less than unlimited rights and to assert specific restrictions on those deliverables. In the event a proposer does not submit the list, the Government

will assume that it has unlimited rights to all noncommercial technical data and computer software generated, developed, and/or delivered, unless it is substantiated that development of the noncommercial technical data and computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and computer software generated, developed, and/or delivered, proposers should identify the data and software in question as subject to 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 5 years, at which time the Government will acquire unlimited rights unless the parties agree otherwise. 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. Failure to provide full information may result in a determination that the proposal is non-conforming. A template for complying with this request is provided in Section IV.B.2.

- **Commercial Items (Technical Data and Computer Software):** Proposers requesting a procurement contract must list all commercial technical data and commercial computer software that may be included in any noncommercial deliverables contemplated under the research project, and assert any applicable restrictions on the Government's use of such commercial technical data and/or computer software. In the event a proposer does not submit the list, the Government will assume 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 to evaluate the proposer's assertions. Failure to provide full information may result in a determination that the proposal is non-conforming. A template for complying with this request is provided in Section IV.B.2.

### d. Other Types of Awards

Proposers requesting an award instrument other than a procurement contract shall follow the applicable rules and regulations governing those 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. This includes both noncommercial items and commercial items. The Government may use the list as part of the evaluation process to assess the impact of any identified restrictions, and may request additional information from the proposer, to evaluate the proposer's assertions. Failure to provide full information may result in a determination that the proposal is non-conforming. A template for complying with this request is provided in Section IV.B.2.c.

### 5. Program-generated Data

Data are increasingly the key product of research and engineering endeavors. To ensure the reproducibility of results and access to source data for future research, awardees will be required

to maintain and deliver any data generated during award performance ("program-generated data") that is needed to accomplish these goals. Awardees shall be expected to document both the proprietary and non-proprietary products of their research to ensure the retention and potential reusability of this information. This may include:

- Raw unprocessed data, software source code and executables, build scripts, process sequence, programmatic communication and other collaboration activities;
- Data sets:  rarified, experimental, test and measurement data;
- Design of experiments and simulations;
- Models or simulations (computational or mathematical);
- Recordings of various physical phenomena (including images, videos, senor data, etc.);
- Access to and use of institutional, organizational or scientific community repositories and archives

All program-generated data will reside in DARPA's data repository. When possible, DARPA may share some or all of the program-generated data with the broader research community as open data (with permission to access, reuse, and redistribute under appropriate licensing terms where required) to the extent permitted by applicable law and regulations (e.g., privacy, security, rights in data, and export control). DARPA plans to enable reproducibility of results through data sharing and to establish (or contribute to) digital collections that can advance this and other scientific fields.

## 1. Human Subjects Research (HSR)/Animal Use

Proposers that anticipate involving human subjects or animals in the proposed research must comply with the approval procedures detailed at http://www.darpa.mil/work-with-us/additional-baa, to include providing the information specified therein as required for proposal submission.

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

All proposers and awardees will be subject to the DARPA requirements related to Controlled Unclassified Information on Non-DoD Information Systems as detailed at www.darpa.mil/work-with-us/additional-baa.

## 3. Electronic Invoicing and Payments

Awardees will be required to submit invoices for payment electronically via Wide Area Work Flow (WAWF) at https://wawf.eb.mil, unless an exception applies. Registration in WAWF is required prior to any award under this BAA.

## 4. Electronic and Information Technology

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. § 749d) and FAR 39.2.

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

The following provisions and clause apply to all solicitations and contracts; however, the definition of "controlled technical information" clearly exempts work considered fundamental research and therefore, even though included in the contract, will not apply if the work is fundamental research.

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.

For awards where the work is considered fundamental research, the contractor will not have to implement the aforementioned requirements and safeguards; however, should the nature of the work change during performance of the award, work not considered fundamental research will be subject to these requirements.

## C. Reporting

### 1. Technical and Financial Reports

The number and types of technical and financial reports required under the contracted project will be specified in the award document, and will include, as a minimum, monthly financial status reports and a yearly status summary. A final report that summarizes the project and tasks will be required at the conclusion of the performance period for the award. The reports shall be prepared and submitted in accordance with the procedures contained in the award document.

### 2. Patent Reports and Notifications

All resultant awards 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

DARPA will use email for all technical and administrative correspondence regarding this solicitation.

- **Technical POC**: Ted Senator, Program Manager, DARPA/DSO

- **BAA Email:**  SAILON@darpa.mil

- **BAA Mailing Address:**
  > DARPA/DSO
  > ATTN: HR001119S0038
  > 675 North Randolph Street
  > Arlington, VA 22203-2114

- **DARPA/DSO Opportunities Website:**  http://www.darpa.mil/work-with-us/opportunities

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

## VIII.   Other Information

### A.  Frequently Asked Questions (FAQs)

Administrative, technical, and contractual questions should be emailed to SAILON@darpa.mil. All questions must be in English and must include the name, email address, and the telephone number of a point of contact.

DARPA will attempt to answer questions in a timely manner; however, questions submitted within 10 days of the proposal due date may not be answered. DARPA will post an FAQ list at: http://www.darpa.mil/work-with-us/opportunities. The list will be updated on an ongoing basis until the BAA expiration date as stated in Part I.

### B.  Proposers Day

The Program Proposers Day will be held on March 5, 2019 in Arlington, VA. The event will be webcast for those who would like to participate remotely. Advance registration is required for both the physical meeting and the webcast. See DARPA-SN-19-31 posted at http://www.fbo.gov for all details. Attendance at the SAIL-ON Proposers Day or viewing the webcast is voluntary and is not required to propose to this solicitation.

### C.  Sample Associate Contractor Agreement Text

The Government intends to add the following text to all agreements and contracts awarded under this BAA.

Associate Contractor Agreements

(a) It is recognized that success of the [List brief description of research effort] research effort depends in part upon the open exchange of information between the various Associate

Contractors involved in the effort.  This requirement is intended to ensure that there will be appropriate coordination and integration of work by the Associate Contractors to achieve complete compatibility and to prevent unnecessary duplication of effort.  By executing this contract, the Contractor assumes the responsibilities of an Associate Contractor.  For the purpose of this requirement, the term Contractor includes subsidiaries, affiliates, and organizations under the control of the contractor (e.g. subcontractors).

(b) Work under this contract may involve access to proprietary or confidential data from an Associate Contractor.  To the extent that such data is received by the Contractor from any Associate Contractor for the performance of this contract, the Contractor hereby agrees that any proprietary information received shall remain the property of the Associate Contractor and shall be used solely for the purpose of the [List brief description of research effort] research effort.  Only that information which is received from another contractor in writing and which is clearly identified as proprietary or confidential shall be protected in accordance with this requirement.  The obligation to retain such information in confidence will be satisfied if the Contractor receiving such information utilizes the same controls as it employs to avoid disclosure, publication, or dissemination of its own proprietary information.  The receiving Contractor agrees to hold such information in confidence as provided herein so long as such information is of a proprietary/confidential or limited rights nature.

(c) The Contractor hereby agrees to closely cooperate as an Associate Contractor with the other Associate Contractors on this research effort.  This involves as a minimum:

(1) maintenance of a close liaison and working relationship;

(2) maintenance of a free and open information network with all Government-identified associate Contractors;

(3) delineation of detailed interface responsibilities;

(4) entering into a written agreement with the other Associate Contractors setting forth the substance and procedures relating to the foregoing, and promptly providing the Contracting Officer with a copy of same; and,

(5) receipt of proprietary information from the Associate Contractor and transmittal of Contractor proprietary information to the Associate Contractors subject to any applicable proprietary information exchange agreements between associate contractors when, in either case, those actions are necessary for the performance of either.

(d) In the event that the Contractor and the Associate Contractor are unable to agree upon any such interface matter of substance, or if the technical data identified is not provided as scheduled, the Contractor shall promptly notify the DARPA DSO Program Manager.  The Government will determine the appropriate corrective action and will issue guidance to the affected Contractor.

(e) The Contractor agrees to insert in all subcontracts which require access to proprietary information belonging to the Associate Contractor, a requirement which shall conform substantially to the language of this requirement, including this paragraph (e).

(f) Associate Contractors for this research effort include:

Contractor                                    Technical Area
[List Name of Contractor]                     [List Technical Area]