



Broad Agency Announcement

In the Moment (ITM)

Defense Sciences Office

HR001122S0031

March 14, 2022

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BAA Attachments:

- Attachment A: ABSTRACT SUMMARY SLIDE TEMPLATE
- Attachment B: ABSTRACT TEMPLATE
- Attachment C: PROPOSAL SUMMARY SLIDE TEMPLATE
- Attachment D: PROPOSAL TEMPLATE VOLUME 1: TECHNICAL & MANAGEMENT
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- Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS

PART I: OVERVIEW INFORMATION

- **Federal Agency Name:** Defense Advanced Research Projects Agency (DARPA), Defense Sciences Office (DSO)
- **Funding Opportunity Title:** In the Moment (ITM)
- **Announcement Type:** Initial Announcement
- **Funding Opportunity Number:** HR001122S0031
- **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 14, 2022
 - Proposers Day: March 18, 2022. See Section VIII.A.
 - Abstract Due Date: March 30, 2022, 4:00 p.m.
 - FAQ Submission Deadline: May 2, 2022, 4:00 p.m. See Section VIII.B.
 - Full Proposal Due Date: May 17, 2022, 4:00 p.m.
- **Anticipated Individual Awards:** DARPA anticipates multiple awards for Technical Area 1 and 2 and a single award each for Technical Area 3 and 4.
- **Types of Instruments that May be Awarded:** Procurement contracts, grants, cooperative agreements or Other Transactions. Award instruments will be limited to procurement contracts and Other Transactions for proposers whose proposed solution includes Controlled Unclassified Information (CUI).
- **Agency contacts**
 - **Technical POC:** Matt Turek, Program Manager, DARPA/DSO
 - **BAA Email:** ITM@darpa.mil
 - **BAA Mailing Address:**

DARPA/DSO
ATTN: HR001122S0031
675 North Randolph Street
Arlington, VA 22203-2114
 - **DARPA/DSO Opportunities Website:** <http://www.darpa.mil/work-with-us/opportunities>
- **Teaming Information:** See Section VIII.C for information on teaming opportunities.
- **Frequently Asked Questions (FAQ):** FAQs for this solicitation may be viewed on the DARPA/DSO Opportunities Website. See Section VIII.B for further information.
- **Security:** ITM is a basic research program that should not require performer access to CUI or Controlled Technical Information (CTI). DARPA anticipates that proposals will be unclassified. See Sections IV.B.4 and IV.B.5 for more details.

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 as well as 2 C.F.R. § 200.203. 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.

A. Introduction

The Defense Advanced Research Projects Agency (DARPA) Defense Sciences Office (DSO) is soliciting innovative research proposals for research and technology development that supports the building, evaluating, and fielding of algorithmic decision-makers that can assume human-off-the-loop decision-making responsibilities in difficult domains, such as combat medical triage. Difficult domains are those where trusted decision-makers disagree; no right answer exists; and uncertainty, time-pressure, resource limitations, and conflicting values create significant decision-making challenges. Other examples of difficult domains include first response and disaster relief. Two specific domains have been identified for this effort - small unit triage in austere environments and mass casualty triage.

The Department of Defense (DoD) continues to expand its usage of Artificial Intelligence (AI) and computational decision-making systems. DoD missions involve making many decisions rapidly in challenging circumstances and algorithmic decision-making systems could address and lighten this load on operators. In order to employ such systems, the DoD needs rigorous, quantifiable, and scalable approaches for building and evaluating these systems. Current AI evaluation approaches often rely on datasets such as ImageNet¹ for visual object recognition or the General Language Understanding Evaluation (GLUE)² for Natural Language Processing (NLP) that have well defined ground-truth, because human consensus exists for the right answer. In addition, most conventional AI development approaches implicitly require human agreement to create such ground-truth data for development, training, and evaluation. However, establishing conventional ground truth in difficult domains is not possible because humans will often disagree significantly about the right answer. Rigorous assessment techniques remain critical for difficult domains; without them, the development and fielding of algorithmic systems in such domains is untenable. In the Moment (ITM) seeks to develop techniques that enable building, evaluating, and fielding trusted algorithmic decision-makers for mission-critical DoD operations where there is no right answer and, consequently, ground truth does not exist.

Specifically, DARPA seeks capabilities that will (1) quantify the alignment of algorithmic decision-makers with key decision-making attributes of trusted humans; (2) incorporate key human decision-maker attributes into more human-aligned, trusted algorithms; (3) enable the evaluation of human-aligned algorithms in difficult domains where humans disagree and there is

¹ ImageNet Large Scale Visual Recognition Challenge. Russakovsky, Olga, et al. International Journal of Computer Vision, 2015, Vol. 115.

² GLUE: A Multi-Task Benchmark and Analysis Platform for Natural Language Understanding. Wang, Alex, et al. New Orleans, LA : International Conference on Learning Representations, 2019.

no right outcome; and (4) develop policy and practice approaches that support the use of human-aligned algorithms in difficult domains. Proposed research should embody innovative approaches that enable revolutionary advances in the current state of the art. Specifically excluded is research that primarily results in simply evolutionary improvements to the existing state of the art.

B. Background

ITM definitions

The following terms are used throughout the BAA and are defined as follows.

- Triage: The system of sorting and prioritizing casualties based on the tactical situation, the mission, and the available resources.³ In ITM triage also incorporates limited treatment options.
- Mass Casualty: An event that overwhelms immediately available medical capabilities to include personnel, supplies, and/or equipment,⁴
- Difficult decision-making: Decision-making in situations where trusted decision-makers frequently disagree; no right answer exists; and uncertainty, time-pressure, limited resources, and conflicting values create significant decision-making challenges.
- Algorithmic decision-maker: A software implementation of a decision-making process. Also referred to as a decision-making algorithm.
- Domain: An application area with associated knowledge sources. Example: In Phase 1, small unit triage in an austere environment. Associated knowledge would include information such as resources, training, standard operating procedures, and treatment options.
- Scenario: A scenario takes place within a domain and specifies the conditions of the environment and one or more situations of interest and forms the basis for a probe or series of probes.
- Probe: A probe is a decision-making query posed to a decision-maker (algorithmic or human). Probes may be in the form of forced-choice or open-ended questions. Probes are designed to elicit information about underlying decision-maker attributes.
- Scenario environment: The scenario environment is the mechanism for instantiating a scenario. Examples of different scenario environments would be text based, audio-visual, and simulated gaming environments.
- Decision-maker attribute: Characteristics of decision-makers indicative of their outcome preferences and/or their decision-making process. Examples include risk-seeking vs. risk-

³ Mass Casualty and Triage, Emergency War Surgery Course, Joint Trauma System, Defense Health Agency https://jts.amedd.army.mil/assets/docs/education/ewsc/Mass_Casualty_Triage_EWSC_1.0.pdf

⁴ Ibid

aversion⁵ or maximizing vs. satisficing.⁶

- Decision-maker descriptors: Computational representations that capture attribute information from decision-makers' responses to one or more probes. Descriptor representations should also support computing the reference distribution. While the term descriptor in the machine learning community typically indicates a vector-based representation of features, ITM proposers may use any representation that meets the computational goals specified in the BAA.
- Reference pool of decision-makers: Trusted human decision-makers with expertise in the domain and potential scenarios. The responses of these decision-makers to probes may be used to train, tune, or evaluate algorithmic decision-makers, and establish reference distributions.
- Attribute space: A mathematical space defined across multiple dimensions of decision-maker attributes.
- Reference distribution: A probability distribution defined on the attribute space that captures the prevalence of decision-maker attributes.
- Decision-maker under test: The decision-maker under test is the system whose alignment is being compared against a reference decision-maker or reference pool of decision-makers.
- Alignment score: Comparison measure of the decision-maker descriptor from a decision-maker under test and the reference distribution. Notionally an alignment score ranges from 0 (no alignment) to 1 (fully aligned).
- Forced-choice: A probe that requires a decision, or choice, be made between a finite number of alternatives (usually a small number of options).
- Open-ended: A probe for which no alternatives are provided, and the decision-maker must produce their own probe response.
- Psychological fidelity: A concept that captures how closely a scenario engages human decision-makers in the same mental processes and stressors experienced in the real-world decision-making.
- DevEthOps: A set of practices that considers and tests the potential legal, moral, and ethical (LME) implications of design choices during DevOps (development & operations) cycles.

Difficult Decisions and a Basis for Trust

Difficult decisions occur when the decision-maker is confronted with challenges that include too many or too few options, too much or too little information, uncertainty about the outcome that may result from a course of action, uncertainty about how to value foreseeable outcomes,

⁵ Prospect Theory: An Analysis of Decision under Risk. Kahneman, Daniel and Tversky, Amos. The Econometric Society, 1979, Vol. 47.

⁶ Police Perfection: Examining the Effect of Trait Maximization on Police Decision-Making. Shortland, Neil, Thompson, Lisa and Alison, Laurence. Frontiers in Psychology, 2020, Vol. 11.

resource limitations, and conflicts in core values.⁷ Humans often disagree about the right course of action or the right answer when faced with these difficult decisions. The lack of a right answer, i.e., the lack of ground truth in algorithm terms, undermines a typical assumption in how we build and assess algorithmic systems today, namely that ground truth outcomes are available for algorithm development, evaluation, and certification. In terms of trust, the performance numbers that result from comparing system decisions against ground truth are often relied on to decide whether to operationalize a system. In difficult domains, this sort of ground truth is not available and a different basis for trust must be found.

ITM seeks to use the algorithmic expression of key human attributes as the basis for trust in algorithmic decision-makers. ITM will investigate this basis for trust in the context of human-off-the-loop decision-making in difficult domains and seeks to enable the development, evaluation, and fielding of algorithmic decision-makers in difficult domains. ITM will develop a computational framework for key human attributes and a quantitative alignment score in order to assess the alignment of an algorithmic decision-maker to key decision-makers. Leveraging this computational framework, ITM will develop algorithms that express key human decision-making attributes and explore the alignment framework as a method for establishing appropriate trust in algorithmic decision-making systems.

The Role of Trust in Delegation

ITM is interested in a specific notion of trust, specifically the willingness of a human to delegate difficult decision-making to an algorithmic system. Mayer et al.^{8,9} defines trust as “the willingness of a party to be *vulnerable to the actions of another* party based on the expectation that the other will perform a particular action important to the trustor, *irrespective of the ability to monitor or control* that other party” and provides one of many trust models in the research literature, as illustrated in Figure 1. Factors of perceived trustworthiness include key attributes or characteristics of the entity being trusted. While the trust literature often identifies technical performance characteristics (e.g., error rate) as factors of trust for autonomous systems, ITM is most interested in human attributes and characteristics (e.g., risk tolerance vs. risk aversion, maximizing vs. satisficing behavior, or other personality characteristics; subject matter expertise; and human values to name a few) that could be encoded into algorithmic systems. The trustor’s propensity, based on prior experiences, may bias them towards or away from trusting the other entity. Both the trustor’s propensity and the trustee’s factors of perceived trustworthiness modulate the existence and degree of appropriate trust in the moment of a difficult decision. The trustor makes a perceived risk calculation, and, if trust overcomes the perceived risk, they will take a risk in a relationship, leading to an outcome that may impact the factors of perceived trustworthiness. In the context of ITM, key human attributes contribute to the factors of perceived trustworthiness, and the quantitative alignment score between the trustor and trustee is a proxy for the perceived risk.

⁷ Shortland, Neil D., Alison, Laurence J. and Moran, Joseph M. *Conflict, How Soldiers Make Impossible Decisions*. New York, NY: Oxford University Press, 2019.

⁸ Mayer, Roger C., James H. Davis, and F. David Schoorman. "An integrative model of organizational trust." *Academy of management review* 20.3 (1995): 709-734.

⁹ Kohn, Spencer C., et al. "Measurement of Trust in Automation: A Narrative Review and Reference Guide." *Frontiers in psychology* 12 (2021).

Operationalizing the envisioned alignment framework will require computational methods to identify key decision-maker attributes and quantify the alignment between the algorithmic decision-making system and human decision-makers. ITM will focus on human-off-the-loop, algorithmic decision-making in difficult domains to understand the limits of such a computational framework. In order to scope the research, ITM has identified two specific difficult domains that represent real-world DoD and civilian concerns and will force developers to grapple with central issues in difficult decision-making - small unit triage in austere environments in Phase 1; mass casualty triage in Phase 2.

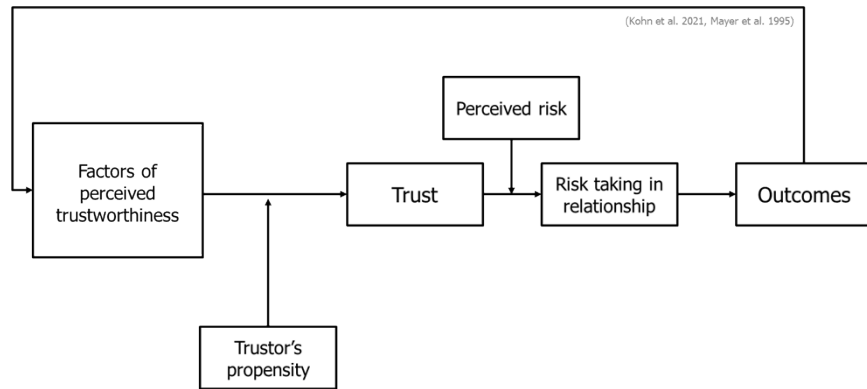


Figure 1 - Model of the trust process

Limitations of a Current Autonomy Approach for Delegated Decision-Making

DoD missions create unique operational needs that may not be well supported by current approaches in industry. The decision-making requirements for self-driving cars are an example of delegating to algorithms in a domain where difficult scenarios can occur. For self-driving cars, one can encode risk values into the simulation environment that trains the algorithm.^{10,11} These risk values are chosen a-priori, in a process separate from end users, and hard-code an objective function, requiring policy and developer consensus at training time. By baking the behavior into the algorithm, there is no mechanism for an algorithm to adapt to changes in desired behavior or to situational guidance. This may be a reasonable approach for self-driving vehicles, where the rules of the road are generally static from day-to-day. However, hard-coded objective functions with their one-size-fits-all approach do not address DoD needs, where rules of engagement and commander’s intent vary from situation to situation and may evolve rapidly within a dynamic scenario.

Figure 2 illustrates Mayer’s trust model applied to the self-driving car scenario. When a driver delegates decision-making to the vehicle, there is no ability to independently characterize the decision-maker attributes of the self-driving car algorithm, making the perception of risk uncalibrated based on unknown alignment between the driver’s decision-making preferences and

¹⁰ Nelson, Gabe. Self-driving cars make ethical choices. Automotive News. [Online] July 13, 2015. <https://www.autonews.com/article/20150713/OEM06/307139936/self-driving-cars-make-ethical-choices>.
¹¹ Hyatt, Kyle. Waymo's simulators are doing 100 years of driving per day, even while working from home. CNET. [Online] April 28, 2020. <https://www.cnet.com/roadshow/news/waymo-100-years-simulation-daily-self-driving-car/>.

that of the vehicle. The driver's trust in the vehicle is initially based on their confidence in the vehicle developer and then evolves with experience. From a societal perspective, car insurance processes may mitigate misalignments between the driver and the vehicle's decisions. However, equivalent insurance processes do not exist for difficult DoD domains.

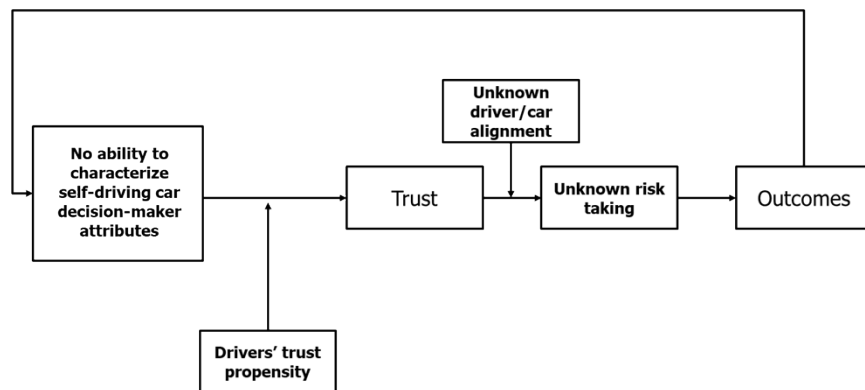


Figure 2 - Trust model applied to self-driving cars

In contrast to this model, the ITM program seeks insight into the factors of perceived trustworthiness for algorithmic decision-makers, mechanisms for assessing the alignment of decision-makers, and methods for improving the alignment between an algorithmic decision-maker and a group of trusted decision-makers or a specific decision-maker.

Motivating Examples for ITM

The following examples illustrate the need for algorithms that can be aligned with a group of humans or with a specific, individual human. It is not intended that ITM performers will directly develop the applications in the examples. Instead, they are meant to illustrate some of the long-term needs ITM research must address.

Fully-autonomous triage decision-maker for small military units

If successful, ITM technology could enable military personnel with limited medical training to conduct triage decision-making in the field. Such technology could significantly improve triage decision-making at point-of-injury, through decision-making built to model a group of carefully chosen human decision-makers who represent highly-experienced, capable, and trusted triage decision-makers. This group of human decision-makers would become the standard that the triage decision-making algorithms seek to emulate and operationalize across the entire force. It is important to note that the members of any trusted pool of decision-makers may exhibit different decision-making attributes, and ITM technology will need to support capturing and modeling that variability without requiring consensus from the trusted humans.

Fully-autonomous triage for a combat support hospital commander

ITM technology may also enable the development of a fully-autonomous triage decision-maker, fine-tuned to a particular unit commander, in a combat support hospital (CSH) setting. In this scenario, there is a senior leader (such as a Colonel trained as a trauma surgeon) with appropriate authorities and exquisite training responsible for the medical decision-making within the CSH. ITM technology would enable fine-tuning the decision-making algorithm so that it is aligned with the key decision-making attributes of the specific CSH leader. Due to their position,

authorities, and training, that leader would likely be held responsible for the decisions made within the CSH, including those of any autonomous system. In order for that leader to trust the algorithmic decision-making system enough to employ it in a human-off-the-loop manner, the algorithm must be highly aligned with that individual. To build appropriate trust, ITM envisions supporting an interactive process between an algorithm and the senior leader prior to operational use that enables fine-tuning the algorithm to be aligned with that individual.

C. Program Description/Scope

ITM is 3.5-year, two-phase program with a 24-month Phase 1 (base) and an 18-month Phase 2 (option). This BAA is soliciting for only Phase 1 and 2. A notional 12-month third phase is envisioned should funding be secured. ITM will focus development in four distinct technical areas (TAs), which will proceed through Phase 1 and 2, and the notional Phase 3. Decision-maker characterization (TA1), Human-aligned algorithms (TA2), Evaluation (TA3), and Policy & Practice (TA4). TA1 and TA2 address key elements of trust: TA1 will develop the underlying theory and technologies for quantitatively characterizing decision-makers in difficult domains and assessing alignment between decision-makers. TA2 will develop approaches for building human-aligned algorithmic decision-makers for difficult domains. TA3 will be responsible for designing and executing overall program evaluations, evaluating both TA1 and TA2. TA4 will provide expertise in DoD policy related to autonomous decision-making and Legal, Moral, and Ethical (LME) considerations. All four technical areas are being competed via this BAA.

Proposers may propose to multiple TAs. In that case, proposers should submit a separate proposal for each TA. To prevent a conflict of interest, a single performer will not be awarded both a TA3 effort and either a TA1 or TA2 effort. For scoping plans and costs for interactions with other TAs, proposers should anticipate two awards for TA1, two awards for TA2, a single award for TA3, and a single award for TA4.

The ITM program domains will be small unit triage in austere environments in Phase 1 and mass casualty triage in Phase 2. Proposers will need general knowledge of triage as well as domain-specific knowledge in order to be successful. Research addressing ITM's goals will require, beyond triage domain knowledge, expertise and advances in decision-making, cognitive science, experimental psychology, simulation environments, data science, artificial intelligence, machine learning, evaluation, and decision-making policy for autonomous systems. Strong proposals will include cross-disciplinary research efforts supported by a cross-disciplinary team with relevant expertise.

Out of Scope

Research in the following areas is considered out-of-scope for purposes of ITM:

- Approaches that develop hardware.
- Approaches that directly implement the Motivating Examples for ITM.
- Approaches that develop sensing or perception techniques for triage environments.
- Approaches that apply only to human decision-making and do not support the development of algorithmic decision-makers.
- Approaches that exclusively develop novel knowledge graphs or ontologies for triage domains.

- Approaches that require humans-in-the-loop/humans-on-the-loop at program evaluation time or in operational use to make difficult decisions.
- Approaches that require large numbers of human interactions during the alignment process with a group or single individual.

D. Program Structure

ITM’s four TAs are illustrated in Figure 3. This figure is not intended as a design framework or specification for an ITM system, and proposers should recommend additional interactions as needed in support of their research plans.

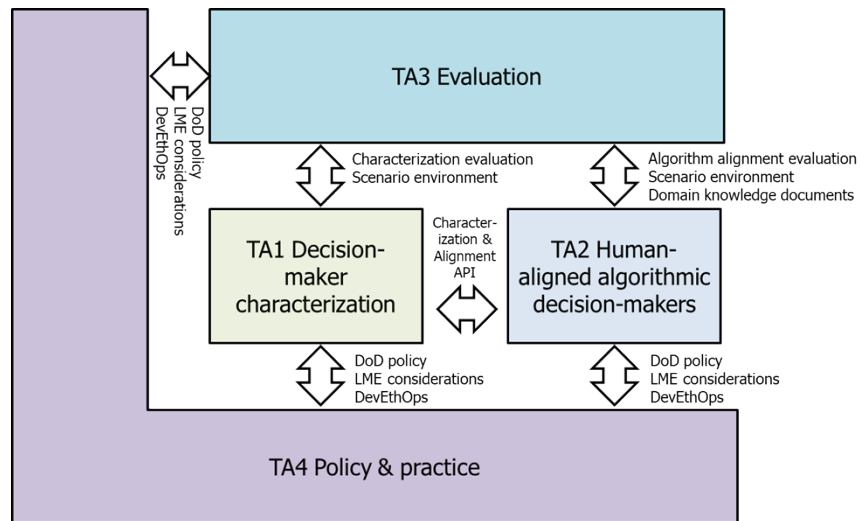


Figure 3 ITM Technical Areas (TAs) and key interactions

Figure 4 illustrates how TA1, Decision-maker characterization, and TA2, Human-aligned algorithmic decision-makers, relate to the trust model for delegated decision-making.

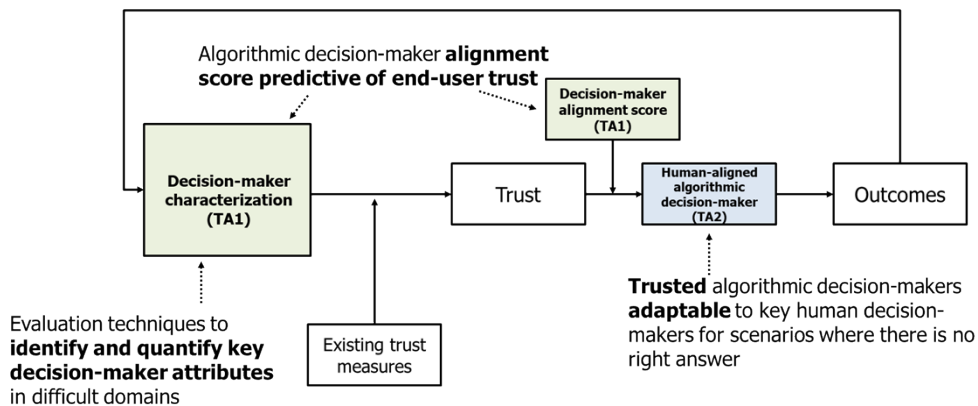


Figure 4 - ITM approach to delegation and alignment

Program Phases and Schedule:

ITM will use a phased-acquisition approach. The program will have two phases dedicated to technical development and a notional third phase to enable application of ITM capabilities to one (or more) domains of interest to U.S. Government transition partners.

- Phase 1 will be 24 months in duration. Phase 1 will develop a proof of concept for ITM technologies, demonstrate the ability to measure alignment, and demonstrate the ability to tune algorithmic decision-maker alignment to a group of trusted human decision-makers. The Phase 1 domain will be small unit triage in austere environments. By the end of this phase, ITM will have demonstrated the fundamental capabilities needed to:
 - identify and characterize trusted decision-makers according to key human attributes
 - align algorithmic decision-makers in the Phase 1 domain with a group of trusted human decision-makers
 - evaluate decision-maker alignment with a group of trusted decision makers
 - engage with the relevant policy communities on ITM technology and begin development of a certification model for algorithmic decision-makers

Work beyond Phase 1 is subject to availability of funding and technical progress.

- Phase 2 will be 18 months in duration. Phase 2 will build on the triage domain experience gained in Phase 1 and will expand the decision-making challenges to more complex mass casualty events. Phase 2 will focus on developing the capabilities necessary to fine-tune an algorithmic decision-maker to exhibit the attributes of an individual human decision-maker. By the end of this phase, ITM will:
 - refine the capability to identify and characterize trusted decision-makers according to attributes in a second domain
 - align algorithmic decision-makers in the Phase 2 domain with an individual trusted human decision-maker
 - evaluate decision-maker alignment with an individual trusted decision maker
 - develop policy recommendations for ITM technology in collaboration with the relevant policy communities and produce a draft certification model for algorithmic decision-makers
- If funded, the notional Phase 3 will be 12 months in duration. The domain for Phase 3 will be determined based on technical progress and Government partner needs. At the end of Phase 3, we anticipate having the ability to demonstrate ITM capabilities that support a domain chosen by a transition partner. Phase 3 will be contingent on the availability of funds, technical performance in prior phases, utility of technical approaches to transition partner use cases, and significant U.S. Government partner interest.

The period of performance will be the same for all performers across the technical areas. Proposers should propose a base effort for Phase 1 and a Phase 2 option. A draft Statement of Work (SOW) and Rough Order of Magnitude (ROM) cost for Phase 3 will be a Phase 1 deliverable for all performers. This draft SOW and ROM will be used for budgeting purposes, and will not be evaluated. Should funding be identified for Phase 3, DARPA will issue Phase 3 Proposal Instructions during Phase 2 requesting proposals from performers whose Phase 2 options have been exercised. Phase 3 proposals will be evaluated against the criteria in the Phase 3 Proposal Instructions, which will be consistent with the criteria in this BAA. Participation in

Phases 2 and 3 is contingent upon successful performance in prior phases as well as availability of funds.

In order to avoid potential funding gaps between decisions regarding progression from one phase to the next and the execution of contract options, a decision on whether to continue individual teams' efforts into Phase 2 are anticipated at roughly Month 21. Decisions regarding progression into Phase 3 are anticipated at roughly Month 40 of the program, which will be the 16th month of Phase 2. The final months of Phase 1 and Phase 2 will be used to prepare for the subsequent phase by refining research and evaluation plans and improving results. For all performers, a final report will be due 60 days after the last phase in which they participate.

E. Technical Area Descriptions

The sections below outline the program objectives for TAs 1, 2, 3 and 4, respectively. The proposer's research plan must include a constructive task breakdown and plan for achieving the program goals, including interactions with the other TAs. Quantitative metrics for the program are discussed in the section on TA3.

Technical Area 1: Decision-maker characterization

The focus of TA1 is developing technologies that identify and quantitatively model key decision-making attributes of trusted humans in order to produce a quantitative decision-maker alignment score.

TA1 proposals should identify the theory (or theories) of decision-making that will form the basis for identifying and quantitatively characterizing key decision-maker attributes. Theory selection should be informed by existing research. While targeted experiments on the program may serve to enhance the existing theories of decision-making, developing a wholly new decision-making theory is beyond the scope of ITM. The underlying theory of decision-making should be relevant for decision-making in difficult domains, particularly the small unit triage in austere environments (Phase 1) and mass casualty triage (Phase 2) domains that will be the experimental domains of ITM. Strong proposals will describe a theory that is also applicable across other important DoD domains.

TA1 is responsible for developing a mathematical and computational framework for quantitatively characterizing key decision-maker attributes from a group of trusted humans. This framework includes a decision-maker attribute space, computational decision-maker descriptors, and a quantitative alignment score.

The envisioned ITM framework (illustrated in Figure 5) starts with a reference pool of trusted human decision-makers. TA1 will need to secure its own human decision-makers with triage domain expertise for development of the characterization framework. During program evaluations, TA3 will provide access to trusted human decision-makers with relevant expertise in the ITM domains. The decision-maker pool provided by TA3 is anticipated to be small in size, perhaps on the order of 3 to 5 individuals, and is drawn from a population of humans that are already trusted to make critical decisions in ITM domains. There is no expectation that this trusted pool will agree or reach consensus, and the ITM characterization framework must represent both individual and group decision-maker variability.

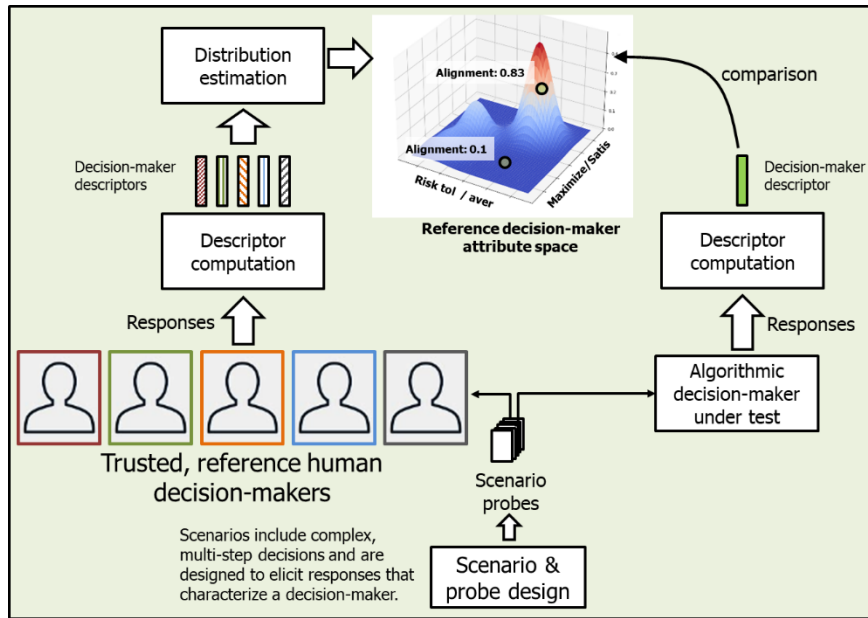


Figure 5 - ITM Decision-maker characterization framework

TA1 will develop scenarios and probes for each decision-making domain designed to place a decision-maker in challenging situations. While it is the TA3 evaluation team’s responsibility to provide the scenario environment(s), TA1 must create scenarios and probes in the scenario environment that have psychological fidelity^{12,13,14} to real-world decisions to support the development of reference distributions for decision-maker attributes. TA1 teams are expected to execute development scenarios with decision-makers to provide multiple exemplar reference distributions to TA2 for algorithm development and tuning.

Examples of how to create psychological fidelity include creating time-pressure, controlling situational knowledge, and limiting potential choices. Scenarios and probes should be designed such that decisions in response to the probes reveal information about key decision-maker attributes. The types of attributes of interest must be identified in advance of scenario design and should be motivated by the TA1 team’s decision-making theory and based on models of human decision-making in difficult domains. Probes will primarily be forced-choice style questions, as constraining the possible choices will likely be important to extracting information about underlying decision-maker attributes. Probes will be presented to the members of the reference pool of trusted decision-makers in the scenario environment.

TA1 proposals should clearly describe what aspects of psychological fidelity are necessary in the scenario environment to effectively support their decision-making theory and planned scenarios.

¹² Kozlowski, Steve WJ, and Richard P. DeShon. "A psychological fidelity approach to simulation-based training: Theory, research and principles." *Scaled worlds: Development, validation, and applications* (2004): 75-99.

¹³ Quick, Jacob A. "Simulation training in trauma." *Missouri medicine* 115.5 (2018): 447.

¹⁴ Chiniara, Gilles, et al. "Moving beyond fidelity." *Clinical Simulation*. Academic Press, 2019. 539-554.

Each member of the reference pool is expected to make decisions independently of the other members of the reference pool.

TA1 should address the following additional challenges when designing scenarios and probes.

- Algorithmic decision-makers will be presented the same set of scenarios and probes. Responses by algorithmic decision-makers will also need to be captured in the computational representation and represented as decision-maker descriptors.
- The approach needs to be sample-efficient (i.e., no more than hundreds of questions total across all scenarios in a domain).
- Scenarios and probes will support the TA2 tasks of aligning to a group of decision-makers in Phase 1 and to a specific decision-maker in Phase 2.
- Scenarios and probes should be constructed using the domain knowledge documents identified by the TA3 evaluation team and not require domain knowledge outside those documents.

Strong proposals will develop a scenario design process that results in scenarios and probes that some day could be used by service members in the field to fine tune decision-makers as the final step in accepting algorithmic decision-making systems for operational use.

Decision-maker responses to probes should be captured in a computational representation, shown in Figure 5 as decision-maker descriptors. TA1's decision-maker descriptors should represent the presence and strength of key decision-maker attributes and enable computational analysis, such as computing the distribution of decision-maker attributes in the attribute space. This distribution will form the basis for quantifying whether an algorithm exhibits key decision-maker attributes that are similar to the reference pool of trusted decision-makers. Notionally, this distribution is expected to behave like a probability distribution. In the example in Figure 5, a notional two-dimensional attribute space is shown, with one axis defined by risk tolerant vs. risk avoiding behaviors and a second axis defined by maximizing vs. satisficing behaviors.

Proposers should define and justify their own attribute space based on their chosen theory of decision-making and should not limit themselves to the example distribution in the BAA. Meaningful attribute spaces will likely have more dimensions than the two illustrated in the example. The decision-maker attribute space (or potentially multiple spaces) should capture key attributes of decision-makers that impact outcome preferences and decision-making process. An attribute space should have human-understandable attributes, such as sensitivity to risk or tendency to optimize on expected outcomes, that can guide selection of situation-appropriate decision-makers based on their key attributes. The definition of the attribute space must support the computation of a distribution over key attributes. Strong proposals will consider the impact of situational information, domain knowledge, and other contextual elements on decision-maker attributes and how that may affect decision-maker preferences. Proposers are free to include other elements in the reference distribution than those listed here, but should clearly describe why those elements are important to the decision-making process.

While the notional illustration of TA1 implies using feature vectors for decision-maker descriptors and a probability distribution for the distribution over the attribute space, proposers may choose other representations. If alternative representations are proposed, proposers should explain how their representation will support the development of TA2 algorithmic decision-makers that can be brought into alignment with selected decision-makers. The TA2 algorithmic

decision-makers will likely be designed to expect a probability distribution over decision-maker attributes, so TA1 proposals that depart from that representation should clearly describe what operations their representation will support and how those are similar to operations that are available on a probability distribution.

TA1 must develop a quantitative alignment score based on a decision-maker descriptor from a decision-maker under test and the reference distribution over the decision-maker attribute space. The alignment score indicates how closely a decision-maker exhibits the attributes from a trusted pool of humans or from a single reference human decision-maker. The alignment score should be designed such that it informs perceived risk calculations and is indicative of end-user trust. In the notional example shown in Figure 5, algorithmic descriptors that map to the tails of the reference distribution indicate poor alignment between the algorithm and the trusted humans, i.e., the algorithm is not exhibiting the same sort of decision-maker attributes as the trusted humans. Algorithmic descriptors that map to a high-density area of the reference distribution indicate good alignment between the algorithm and the trusted humans, i.e., the algorithm is exhibiting the same sort of decision-maker attributes as the trusted humans. The quantitative alignment score is notionally a continuous score between 0 (no alignment) and 1 (high alignment), but proposers are free to offer frameworks that provide alternate ranges. Proposers should specify how their alignment score will handle multiple modes in the reference distribution and how the alignment score will be designed to be correlated with measures of human trust. If proposers opt for multiple attribute spaces, such as organized by topics like domain knowledge or core values, they should describe the utility of the separate attribute spaces and how they will produce a summary alignment score across all the attribute spaces.

TA1 performers must collaborate with other TA1 and TA2 performers in the development of a program-wide standard Application Programming Interface (API) for decision-makers under test and an API (jointly referred to as the alignment and characterization API) for the reference distribution for trusted decision-makers. TA1 proposers should specify key functionality that they expect to be available in the reference distribution API. Each TA1 will be responsible for implementing the API for their reference distribution.

TA1 must participate in program evaluations. TA3 will evaluate TA1's ability to characterize decision-makers and to generate meaningful alignment scores for an algorithmic decision-maker, such as those produced by TA2. TA1 will provide their implementation of the characterization framework to TA2 to enable algorithms that use the framework during development or evaluation. For instance, TA2 may interactively explore a set of probes to understand computationally how those probes map into the attribute space and how that impacts the alignment score. Given the interaction between TA1 and TA2 efforts, TA1's responsibilities include collaboration with TA2 to provide their characterization framework and collaboration with TA3 in support of the evaluation. In support of evaluations, TA1 performers will also collaborate with other TA1, TA2, and the TA3 performers on computational representations for the scenarios, probes, and scenario context.

Strong TA1 proposals will:

- Describe a decision-making theory for difficult decisions that is foundational for their characterization approach and framework and that applies across multiple DoD domains beyond the program specified domains.

- Define a space of key decision-maker attributes that is informative of decision-maker behavior.
- Consider the impact of situational information, domain knowledge, and other contextual elements on decision-maker attributes and how that may affect decision-maker preferences.
- Create difficult decision-making scenarios with multiple probes that elicit decision-maker responses that provide insight into their decision-maker attributes.
- Develop a scenario design process that results in scenarios and probes that someday could be used by service members in the field to fine tune decision-makers
- Identify human decision-makers with relevant expertise in the ITM domains that will be used for development of the characterization framework.
- Represent decision-maker responses to scenarios and probes in a computational framework.
- Compute a reference distribution over decision-maker attributes for a small pool of trusted humans.
- Compare a decision-maker under test to a reference distribution of trusted humans to compute a quantified alignment score between the test decision-maker and the reference distribution.
- Provide for compute needs in support of framework development, internal testing, and program evaluations.
- Have access to an Institutional Review Board (IRB) and experience with the process of acquiring and maintaining Government approval to conduct HSR. Significant Human Subjects Research (HSR) elements are anticipated in relation to decision-making theory refinement and computational framework development.

Technical Area 2: Human-aligned algorithmic decision-makers

TA2 will develop human-aligned algorithms that leverage the TA1 computational characterization process and the quantitative alignment score (see blue panel in Figure 6). The human-aligned algorithms should be able to balance situational information with a preference for the key decision-maker attributes identified by TA1 and the reference distribution across the attribute space.

In the notional approach shown in Figure 6, a mathematical regularization approach is used to balance situational information with a preference for certain decision-maker attributes. Other mathematical formulations are encouraged, and proposers should NOT limit themselves to regularization approaches.

TA1 will provide their implementation of the characterization framework to TA2 to enable algorithms that use the framework during development or evaluation. For instance, TA2 may interactively explore a set of probes to understand computationally how those probes map into the attribute space and how that impacts the alignment score. TA2 algorithms will need to generalize to novel scenarios, probes, and reference distributions, such as those provided by multiple TA1 teams or those developed by TA3 to support evaluation. As a result, it will be critical for TA2 to develop approaches that can represent multiple types of key attributes and that

can build an understanding of how those key attributes relate to the structure of the scenarios and probes.

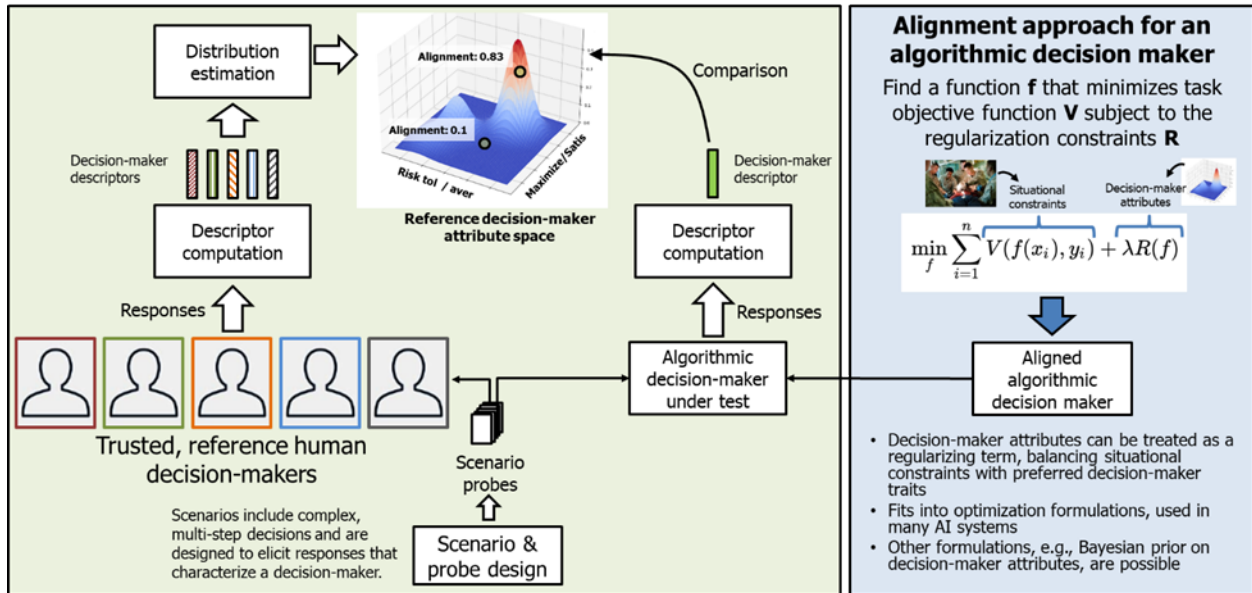


Figure 6 - ITM Alignment approach for an algorithmic decision-maker

To support the program goal of demonstrating human-aligned decision-makers for the program domains, TA2 algorithms must demonstrate the ability to align to the largest cluster within the reference distribution in Phase 1. In Phase 2, TA2 algorithms must demonstrate the ability to align with the decision-maker attributes from a single, trusted human. Alignment in this context means that the algorithm exhibits the same decision-maker attributes as the trusted humans and exhibits them in the same contexts, as decision-maker attributes may change across scenarios. TA2 performers should expect that they will have to demonstrate alignment with multiple attribute spaces from different TA1 performers.

For the Phase 2 goal of fine-tuning an algorithm to a single trusted human decision-maker, it is assumed that the single decision-maker is similar to, or a member of, the trusted group of humans. As a result, the fine-tuning process may leverage the group alignment process as a good initialization. The expectation for fine-tuning is that there is less variability in a single human than there is across a group of humans, so the fine-tuning process may be more difficult than tuning to fit within a group's attribute distribution. In future operational applications of ITM, the fine-tuning process would occur prior to operational deployment and involve a question-answer process between the algorithm and the human. For ITM, it is envisioned that TA2 will be provided with information on a particular human decision-maker by TA1 or TA3 in the form of the decision-maker attributes and their reference distribution. If needed for development, TA1 would have the responsibility of creating and providing scenarios and probes for the target individual to support the adaptation of TA2 algorithms to the decision-making attributes of a particular human.

TA2 algorithms will answer forced-choice questions (probes) in the scenarios designed by TA1. These questions will be the same questions used to elicit information from the trusted humans.

The responses will be used by TA1 when generating an alignment score with respect to a reference distribution. Strong TA2 proposals will describe how their systems will extend to scenarios and probes that allow open-ended answers by the end of Phase 2 and will describe how they will implement the alignment process envisioned for both Phase 1 and Phase 2.

TA2 performers will collaborate with TA1 performers and other TA2 performers to develop a program-wide standard interface and API (jointly referred to as the alignment and characterization API) for the reference distribution for trusted decision-makers. TA2 proposers should specify the key functionality that their algorithms will require in the reference distribution API. TA1 will be responsible for implementing the API for their reference distribution. TA2 teams will be responsible for using the API as part of their algorithm development to facilitate incorporating information from different reference distribution designs as a part of the alignment process.

TA2 algorithms will need to incorporate domain knowledge from a set of natural language documents provided by the TA3 evaluation team. Domain knowledge documents will define the scope of information needed to answer the probe questions. All sources should be in standard document formats, such as MS Word or Excel or Adobe PDF, that enable computation. TA1, TA2, and TA3 performers will collaborate to convert documents into a shared computable representation that can be ingested by the decision-making algorithms. If a unique representation is needed, TA2 will have primary responsibility for the conversion of domain knowledge into a format that supports their algorithm design. TA2 algorithms will be restricted to ITM-provided domain knowledge when responding to scenarios and probes.

TA2 performers must integrate the algorithmic decision-maker with the scenario environment provided by the evaluation team (TA3) in order to support execution of the scenarios and probes. TA2 teams will collaborate with the TA1 performers and other TA2 performers on computational representations for the scenarios, probes, scenario context, and any other information necessary for TA2 to answer the probes. The program will focus on decision-making capabilities and avoid algorithm perception bottlenecks by specifying the information in the scenario environment in computational representations. TA3 is responsible for implementing the computational representation and the metadata stream defining scenario environment state. In consideration of real-world conditions, algorithms that do not rely on perfect situational awareness are more desirable than those that do. The evaluation designed by TA3 may include test conditions with the environment and scenarios represented at various levels of detail to test the impact of imperfect situational awareness, but these experiments will be separate from the primary evaluation experiments.

TA2 teams must participate in program evaluations. Using key attributes, reference distribution, and alignment scoring framework provided by TA3, TA2 will be evaluated based on the ability of an algorithm to align with a group of trusted decision-makers or an individual trusted decision-maker. TA2 algorithms will need to generalize to novel scenarios, probes, and reference distributions, such as those developed by TA3 to support evaluation. TA2 algorithms may also be used by TA3 as part of the evaluation process for TA1's alignment score. TA2 algorithms should be designed such that they may be ablated, to provide a baseline algorithm without alignment to the attributes of trusted human decision-makers. Given the technical interaction between TA1 and TA2 efforts, TA2 should expect to collaborate closely with other TA2 teams,

TA1 teams, and TA3, particularly in support of the evaluation.

A strong TA2 proposal will:

- Build decision-making algorithms that can demonstrate quantifiable alignment with trusted human decision-maker attributes in difficult domains.
- Describe how to tune an algorithmic decision-maker to be more quantifiably aligned with the attributes of a reference group of trusted human decision-makers.
- Describe how to fine-tune an algorithmic decision-maker to be quantifiably aligned with the attributes of an individual human decision-maker.
- Describe how to incorporate domain knowledge for use in the algorithmic decision-maker.
- Describe the required elements for the computational representations of the scenarios, probes, and scenario context to support TA2 algorithm development.
- Describe the TA2 requirements for the program-wide standard interface and API.
- Provide for compute needs in support of algorithm development, internal testing, and program evaluations.
- Describe how their systems will extend to scenarios and probes that allow open-ended answers by the end of Phase 2 and how they will implement the Phase 1 and Phase 2 alignment processes.

Technical Area 3: Evaluation

ITM will use a dedicated evaluation team to assess the performance of the decision-maker characterization TA (TA1) and the Human-aligned algorithmic decision-makers TA (TA2). The preliminary ITM metrics can be found in Figure 7 and described in more detail in the text that follows.

Technical Area to be measured	Measurement	Phase 1	Phase 2
TA1 & TA2, jointly¹⁵	Behavioral measure of triage professional delegation to an ITM aligned algorithmic decision-maker	60% delegation preference over baseline algorithmic decision-maker	85% delegation preference over baseline algorithmic decision-maker
TA1: Decision-maker characterization	Intraclass correlation coefficient (ICC) of ITM alignment measure with a human trust scale	0.3	0.5
TA2: Human-aligned algorithmic decision-makers	Ability to tune algorithmic decision-maker into a subset of the attribute space	Within the largest cluster of human attributes	Within a single human’s attributes

Figure 7 - Preliminary ITM metrics

¹⁵ This table discusses evaluation design and metrics only. Proposers are not to propose to TA1 and TA2 jointly.

TA3 will assess the willingness of humans to delegate difficult decisions to TA2’s human-aligned algorithmic decision-makers. The TA2 algorithms will be built with key decision-maker attributes quantified by TA1. TA3 will provide a quantitative analysis of humans’ willingness to delegate to ITM algorithms versus algorithms that do not implement the key attributes identified by TA1.

The preliminary ITM metrics use a behavioral measure, illustrated in Figure 8, to quantify the frequency with which triage professionals prefer the aligned ITM algorithm over baseline algorithms. Baseline algorithms, in this context, are algorithms that have no knowledge of the key decision-maker attributes. TA2 performers will provide the baseline algorithms which could be implemented by turning off the key decision-maker attributes within a TA2 algorithm. The behavioral measure is dependent on capabilities from both TA1 and TA2: TA1 must have correctly characterized the target group of human decision-makers in terms of their key decision-making attributes, and the TA2 algorithm must appropriately reflect those attributes.

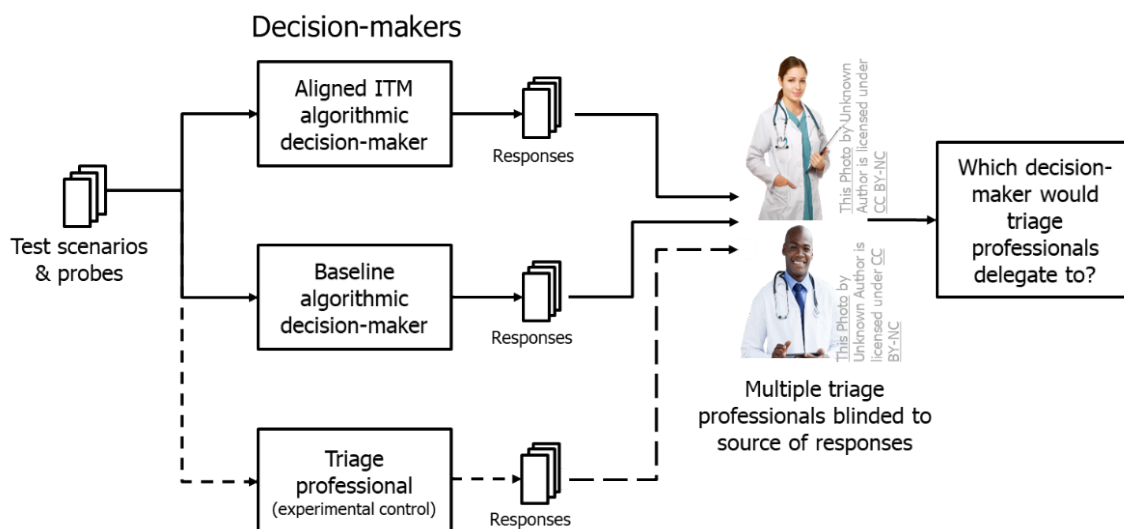


Figure 8 - Behavioral measure of the ITM characterization and alignment process

In the example experiment design shown in Figure 8, the triage professionals responsible for the delegation decision are blinded to the source of the responses, so that their delegation preferences are not biased by the type of decision-maker providing the responses. The responses from an experienced, human triage decision-maker are also included in the design to provide a control and to enable the analysis of the preference for human decisions over algorithm decisions or vice-versa. TA3 is responsible for providing the human decision-makers used in any of the program evaluations.

The preliminary Phase 1 goal is a 60% delegation preference to ITM algorithms over baseline algorithms, and 80% in Phase 2.¹⁶ While these preliminary performance targets for the program

¹⁶ Goals are motivated by research on triage nurse performance.

Tam, Hon Lon; Chung Sui Fung; Lou, Chi Kin. A review of triage accuracy and future direction. BMC Emergency Medicine. 18:58, 2018.

have been set based on this design, TA3 proposers can propose changes to this design or provide a wholly new experimental design that will evaluate the willingness of humans to delegate to ITM-developed algorithms. If new evaluation designs or alterations to the design are proposed, TA3 proposers must provide a detailed rationale for the alternative, including any resulting changes to the performance targets. Changes to the program metrics will be solely at DARPA's discretion.

As noted earlier, the design of the delegation experiment requires that both TA1 and TA2 are successful in their core tasks. In order to understand the individual performance of TA1 and TA2, the program evaluation includes two other preliminary metrics, a self-report measure of trust and an algorithmic measure, detailed in the paragraphs that follow.

A self-report measure of trust will be used to evaluate the quantitative alignment score produced by TA1's characterization process, in support of the goal that the alignment score serves as a proxy for delegation trust. Self-report measures¹⁷ typically present surveys to users that have interacted with an algorithm, and responses are often encoded in Likert scores. In the preliminary ITM metrics, an intraclass correlation coefficient (ICC)¹⁸ will be used to measure the correlation between the ITM quantitative alignment score (notionally a continuous number between 0 and 1) and the quantized Likert scores. TA3 performers should identify self-report trust measures that are appropriate as a comparison for the TA1 alignment score and justify why those particular trust measures are preferred.

The preliminary Phase 1 and Phase 2 goals (shown in Figure 7) were selected to be in line with what are generally considered to be medium correlation scores for trust measures (from 0.25 to 0.4) in Phase 1 and strong correlation scores (above 0.4) in Phase 2. TA3 may also want to consider developing decision-makers that can be used to test the alignment score in controlled ways. For instance, a human executing a scripted set of decisions that exhibits particular attributes could be used to test whether the alignment score accurately captures aligned and misaligned decision-makers. Similarly, a strictly rules-based algorithm could also be used to test alignment and misalignment in controlled ways. TA3 proposers can propose changes to this design or provide a wholly new experimental design, but must justify in detail how the proposed design accomplishes the goal of assessing whether the TA1 alignment score is a proxy for delegation trust. Changes to the program metrics will be solely at DARPA's discretion.

The preliminary program metrics also contain an algorithmic measure in order to assess the TA2 algorithms' ability to align with a group of humans or a single, individual human. Figure 9 notionally illustrates the process.

Mistry, Binoy, et al. "Accuracy and reliability of emergency department triage using the emergency severity index: an international multicenter assessment." *Annals of emergency medicine* 71.5 (2018): 581-587.

Martin, Andrew, et al. "An examination of ESI triage scoring accuracy in relationship to ED nursing attitudes and experience." *Journal of Emergency Nursing* 40.5 (2014): 461-468.

¹⁷ Kohn, Spencer C., et al. "Measurement of Trust in Automation: A Narrative Review and Reference Guide." *Frontiers in psychology* 12 (2021).

¹⁸ https://en.wikipedia.org/wiki/Intraclass_correlation

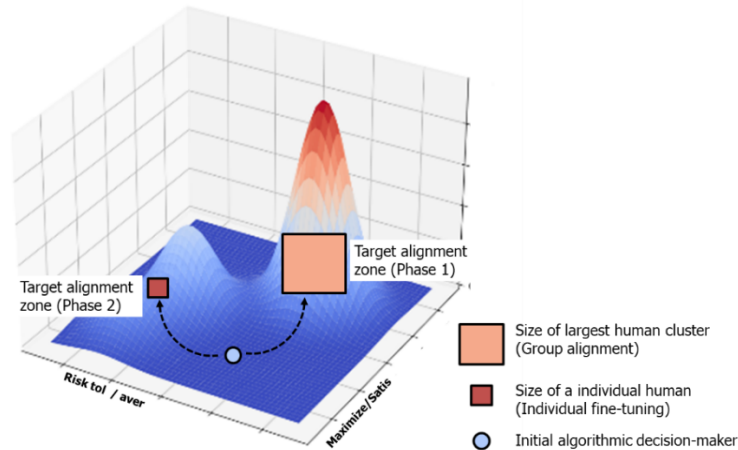


Figure 9 - Algorithm alignment measure

TA3 performers will provide one or more reference distributions along with the probes that were used to generate the distribution. These reference distributions will need to have attributes that are consistent with those identified by TA1. TA3 will define a geometric region in the plane of the attributes that corresponds to attributes of a large subgroup of the trusted humans. TA3 will test a baseline TA2 algorithm to understand what attributes are expressed by the algorithm and what region of the attribute space is defined by those attributes. Using the TA3 provided reference distribution and probes, TA2 will produce an aligned algorithm, and TA3 will verify that TA2's aligned algorithm is expressing attributes within the designated geometric region. This may be done, for instance, with a hold-out set of probes that elicited the same attributes from the trusted decision-makers. In Phase 2, the same process will be used, but the size of the geometric region will be reduced to correspond to the attributes of a single trusted human. TA3 proposers can propose changes to this design or provide a wholly new experimental design, but must justify in detail how the proposed design accomplishes the goal of assessing whether TA2 algorithms can be aligned with a group of humans (Phase 1) and ultimately a single human (Phase 2). Changes to the program metrics will be solely at DARPA's discretion.

TA3 is responsible for providing scenario environments for Phase 1 and Phase 2 and defining domain specifications to include key domain elements and knowledge sources. The knowledge sources are expected to be domain knowledge documents that form the semantic basis for the scenarios and probes in each of the ITM domains (Phase 1: small unit triage in austere environments; Phase 2: mass casualty triage). Sources of such knowledge include DoD policy, rules of engagement, commander's intent documents, and documents providing domain expertise (e.g., Tactical and Combat Casualty Care Handbook). All sources should be in standard document formats, such as MS Word or Excel or Adobe PDF. When possible, existing knowledge graphs/ontologies should be used to support the domain knowledge.

TA3-supplied scenario environments must support TA1 and TA2 development and evaluation for the program chosen domains. Proposers are encouraged to use existing scenario environments if possible. TA3 proposers should describe in detail the scenario environments they will provide to the program. Having a single scenario environment is permitted, but the proposal must make it clear how the environment will support Phase 1 and Phase 2 domains. TA3 proposers should provide a working definition of psychological fidelity as it will pertain to

the ITM scenario environments and scenarios and explain which key elements of psychological fidelity will be well supported by the proposed scenario environments and any elements of psychological fidelity that may not be well aligned with the proposed environments. TA3 is responsible for providing the computational representation and the metadata stream defining the state of the scenario environment at any time point in the scenario to support the development and evaluation of TA2 algorithms.

TA3 will conduct a dry run evaluation of the algorithmic decision-makers and the decision-maker characterization approaches in each phase. In Phase 1 the metric refinement evaluation should be completed by 12 months, the dry run evaluation should be completed by 16 months, and the final Phase 1 evaluation should be completed by 19 months to support a Phase 2 continuation decision at month 21. For Phase 2, the dry run should occur at least 3 months prior to the end of phase evaluation. If funds are identified for Phase 3, details for Phase 3 dry runs will be provided in the Proposal Instructions issued in Phase 2; however, for planning purposes, proposers should assume that the dry run would occur at least 3 months prior to the end of phase evaluation for Phase 3.

TA3 will also conduct an end of phase evaluation and capstone demo for each phase, targeting assessment of TA1 and TA2 against the program specified metrics as well as any additional metrics developed by TA3. TA3 will provide detailed, written reports for dry run, interim, and final evaluations that both summarize performance and provide insightful analysis of the strengths and weaknesses of TA1 and TA2 approaches. TA3 reports are due 45 days after the execution of an evaluation event.

TA3 should develop techniques for programmatically ablating, manipulating, or fuzzing scenario context in carefully designed ways to test the impact of imperfect perception or situational understanding in real-world scenarios.

TA3 will need to design and execute HSR experiments that execute the program evaluation, in accordance with the program provided metrics. Proposers should define the number and types of participants necessary for meaningful HSR experiments. TA3 is expected to provide any necessary human decision-makers, including reference decision-makers, for the evaluations. Proposals should provide a plan for supplying trusted decision-makers, to include expected backgrounds and level of expertise. Access to a local IRB and familiarity with DoD HSR procedures is recommended. TA3 proposals should clearly identify all HSR elements and which elements of the SOW include HSR.

TA3 will need to organize and conduct end of phase demonstration events. These events will include potential transition partners and should preview the current state of ITM research. Small scale exercises with event attendees as means to demonstrate the technology are desired. Events should be planned to last for 5 days and should take place at a location that will facilitate potential transition partner participation.

TA3 should participate in a peer review process for the TA1 and TA2 alignment process, including reviewing scenario and probe design. This process will help develop the detailed understanding of TA1 and TA2 capabilities that will be necessary to conduct an effective evaluation.

Strong proposals for TA3 will:

- Identify one or more trust scales that will be used to evaluate TA1 alignment score.

- Provide a plan for supplying trusted human decision-makers as part of the evaluation process.
- Identify key confounding variables in the evaluation and describe how they will be controlled for in the evaluation design and execution.
- Identify a scenario environment or multiple scenario environments that will be provided to the program.
- Describe the aspects of psychological fidelity that are important for difficult decision-making and how those aspects are supported by the planned scenario environment(s).
- Demonstrate expertise with HSR and provide a draft HSR protocol that supports the program evaluations.
- Provide a plan for executing capstone demonstration events at the end of each phase.

Technical Area 4: Policy & practice integration

For ITM's efforts to be successful long-term, the developed approaches must perform at a high-level and be accepted by the larger policy community, particularly within the DoD. It will be the role of TA4, the policy and practice team, to help ground the program in current DoD policy and practice and to envision future policy concepts that leverage ITM technology.

Within the ITM program, the policy and practice team will:

- Provide expertise to TA1 regarding characteristics of decision-makers that are considered important in DoD policy for difficult domains, particularly the ITM domains of small unit triage in austere environments and mass casualty triage.
- Assist TA2 in interpreting key DoD policies and example Rules of Engagement (ROE) that should inform an algorithmic decision-maker in the program specified domains.
- Provide recommendations to TA3 on policy and ROE documents that could be provided in the documents defining the algorithm domain knowledge.
- Serve as policy and ROE SMEs for the developers on the program.
- Provide ethics, legal, and social implications (ELSI) guidance for the development of technology on the program.
- Lead and coordinate a DevEthOps,¹⁹ i.e., an ethical development and operations process for the program.
- Create a certification model for algorithmic triage decision-makers that could be used to determine who would benefit and when adoption is appropriate.

The certification model for algorithmic decision-makers for triage should begin the process of specifying key elements for consideration when seeking approval for use as well as how those elements might be assessed. For instance, it would not be sufficient to say that performance is an element without also recommending an evaluation process and metrics.

TA4 will develop recommendations for how DoD policy can be updated to best leverage ITM

¹⁹ DevEthOps is the set of practices that considers and tests the potential legal, moral, and ethical (LME) implications of design choices during DevOps cycles. The inspiration for DevEthOps, is DevOps, a set of practices that combine software development (Dev) and IT operations (Ops). The purpose of DevEthOps is to create AI-enabled systems that go beyond LME compliance to enable and extend virtuous intentions and actions of the reference pool of humans, system designers, developers, users, and regulators.

technologies. These recommendations will be grounded in deep understanding of the strengths and weaknesses of ITM technology, such as those revealed by the evaluation and demonstration processes. TA4 will interact with all TA teams to gain significant understanding of the program's technical capabilities and performance. TA4 proposals should provide mechanisms by which all the TAs will coordinate to develop the shared understanding necessary to support the development of future policy guidance.

TA4 is also responsible for providing ELSI guidance and leading a DevEthOps process on the program. TA4 proposers should provide a detailed description of a process that will effectively execute the DevEthOps process. Strong TA4 proposals will demonstrate experience with responsible AI practices.

In order to contribute to the communities of interest around technologies related to ITM, such as the Responsible AI community, TA4 will conduct outreach events to the DoD, other elements of the U.S. Government, industry, academia, and other relevant institutions. There are two main objectives for the outreach event: first, to incorporate insights from the broader policy community into ITM and, second, to educate the policy community about ITM advances. TA4 is responsible for the design and execution of the outreach events. For proposal purposes, two outreach events should be planned for each phase. Proposers should suggest locations and rationales based on the outreach goals and what makes best use of their team resources.

Strong TA4 proposals will:

- Provide evidence of significant expertise in DoD policy, responsible AI, and ethical AI challenges.
- Provide a plan for supporting ELSI panels and for leading ITM's DevEthOps.
- Describe a plan for outreach to the DoD and other communities that may be interested in the development of ITM capabilities. The plan should list specific organizations and communities that will be a priority for outreach events.
- Provide a plan for developing a certification model for algorithmic triage and demonstrate that the proposed team has the expertise necessary to create the certification model.

Technical Area Interactions

Table 1 lists key interactions between TAs.

TA From/To	To TA1 Decision-maker characterization	To TA2 Human-aligned algorithmic decision makers	To TA3 Evaluation	To TA4 Policy & practice	To Program
From TA1 Decision-maker characterization	Self	<ul style="list-style-type: none"> Alignment & characterization API Key decision-maker attributes Alignment score implementation Scenarios & probes Reference distributions 	<ul style="list-style-type: none"> Characterization & alignment score framework Collaboration on scenario environment API definition Scenarios & probes 	<ul style="list-style-type: none"> Insight into characterization & alignment process 	<ul style="list-style-type: none"> Key decision-maker attributes Characterization & alignment score framework Scenarios & probes Reference distributions
From TA2 Human-aligned algorithmic decision-makers	<ul style="list-style-type: none"> Alignment & characterization API collaboration 	Self	<ul style="list-style-type: none"> Aligned algorithms Baseline algorithms Alignment process Collaboration on scenario environment API definition 	<ul style="list-style-type: none"> Insight into aligned algorithms 	<ul style="list-style-type: none"> Aligned algorithms Baseline algorithms Alignment process
From TA3 Evaluation	<ul style="list-style-type: none"> Scenario environment & API 	<ul style="list-style-type: none"> Scenario environment & API Domain knowledge documentation 	Self	<ul style="list-style-type: none"> Insight into evaluation design 	<ul style="list-style-type: none"> Scenario environment & API Evaluation design & documentation Evaluation reports Capstone event organization
From TA4 Policy & practice	<ul style="list-style-type: none"> Current DoD policy DevEthOps process 	<ul style="list-style-type: none"> Current DoD policy DevEthOps process 	<ul style="list-style-type: none"> Current DoD policy DevEthOps process 	Self	<ul style="list-style-type: none"> Outreach events Triage algorithm certification model

Table 1 – Key TA interactions

Common Proposal Elements

Table 2 lists key common proposal elements for all TAs.

Common proposal elements	Evaluations & End of phase demonstration events	Human Subjects Research (HSR)	Associate Contractor Agreement (ACA)
All performers	<ul style="list-style-type: none"> Participate in evaluations as well as end of phase capstone demonstration events 	<ul style="list-style-type: none"> Recommend access to a local IRB and familiarity with DoD HSR procedures if HSR proposed Clearly identify HSR elements of the SOW Encouraged to provide a draft of any HSR protocols as supplemental materials at the end of Attachment D. Protocols do not count against page limit 	<ul style="list-style-type: none"> Sign an ACA to facilitate collaboration with all performer teams
TA1: Decision-maker characterization		<ul style="list-style-type: none"> Anticipated in relation to decision-making theory refinement and computational framework development 	
TA2: Human-aligned algorithmic decision makers Human Subjects Research (HSR)		<ul style="list-style-type: none"> Possible if human decision-makers are involved for development or training purposes 	
TA3: Evaluation	<ul style="list-style-type: none"> Conduct evaluations and organize/conduct end of phase capstone demonstration events 	<ul style="list-style-type: none"> Strongly encouraged to provide HSR protocols Define the number and types of participants necessary for meaningful experiments 	<ul style="list-style-type: none"> Responsible for negotiating an ACA across all performers
TA4: Policy & practice		<ul style="list-style-type: none"> HSR not anticipated 	

Table 2 - Key common proposal elements

CUI and CTI

DARPA expects that all of the work done on the program can be done without access to and without generating CUI, CTI, or other controlled information, and proposals that do not contain controlled information support the program’s goals of interacting with broad research and policy communities. Proposed solutions that include or require CUI, CTI, or other controlled information should make a convincing case for how the controlled information will lead to a dramatically improved capability over an approach that does not require controlled information. Potential award instruments for proposals containing CUI will be limited to contracts or Other Transactions. Proposers should review BAA Section IV.B.4 regarding DoD requirements related to protection of CUI and CTI.

F. Schedule/Milestones

Proposers should provide a technical and programmatic strategy that conforms to the entire 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. In particular, proposers should note the go/no-go decision at the end of Phase 1 that gates the execution of Phase 2 and provide research plans that will deliver significant, concrete accomplishments in Phase 1 by month 19.

A target start date of October 2022 may be assumed for planning purposes. Schedules will be synchronized across performers, as required, and monitored/revised as necessary throughout the program. Figure 10 contains the program schedule.

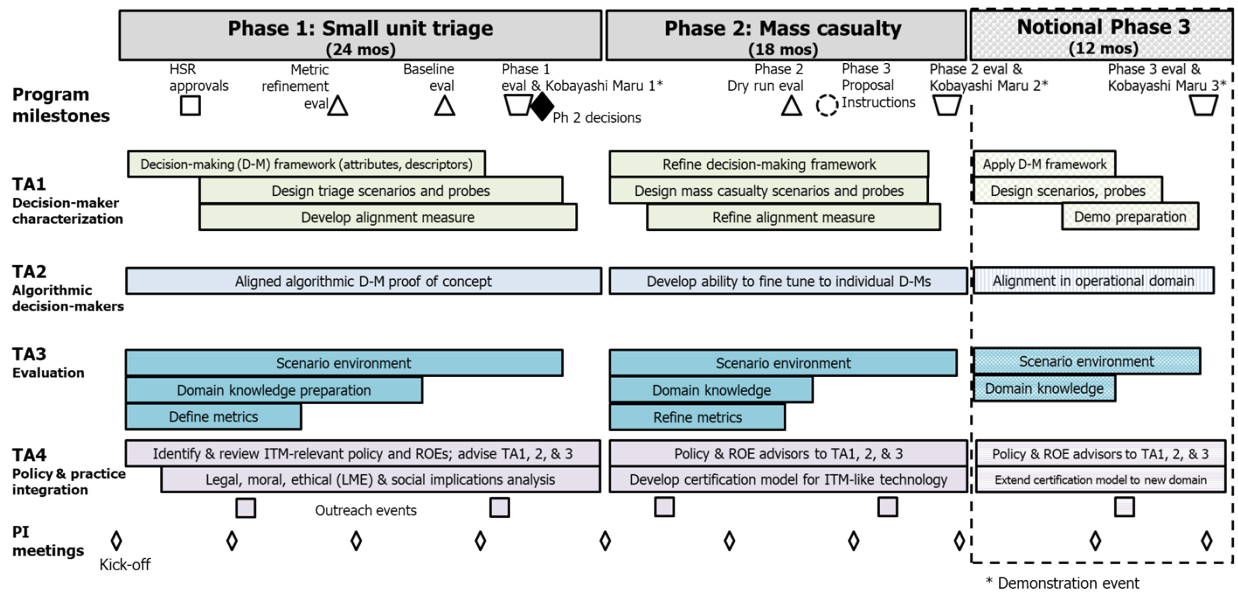


Figure 10 - ITM notional program schedule

ITM will utilize a combination of technical and management milestones to ensure effective management of the program.

- Program-wide PI meetings will be held every six months in addition to individual performer team bi-monthly meetings. Topic-specific working groups will be initiated as needed.
- Program evaluations will be held at Month 10, Month 16, and Month 19 during Phase 1; Month 30 and Month 38 during Phase 2.
- Capstone demonstration events (Kobayashi Maru events) will be held at the end of phase evaluations—Month 19 in Phase 1 and Month 38 during Phase 2. These events will invite potential transition partners to preview the current state of the research and take part in small scale exercises. TA3 will coordinate the capstone events.
- TA4 will hold a series of outreach events, two per phase for Phase 1 and 2. These outreach events with the DoD policy, industry, and academic communities will be used to explore how policy could be revised based on ITM research and insights.

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 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 eight three-day meetings over the course of 42 months: four meetings in the Washington, D.C. area and four meetings in the San Francisco, CA area.
- Regular teleconference meetings will be scheduled with the Government team for

progress reporting as well as problem identification and mitigation. Proposers should anticipate at least one site visit per phase by the DARPA Program Manager during which they will have the opportunity to demonstrate progress towards agreed-upon milestones.

G. Deliverables

Performers will be expected to provide at a minimum the following deliverables for all phases:

- Comprehensive quarterly technical reports due within ten days of the end of the given quarter, describing progress made against specific milestones in the SOW
- A phase completion report submitted within 30 days of the end of each phase, summarizing the research done
- A program completion report submitted 30 days before the end of the period of performance, giving an overview of progress achieved during the program, summarizing each phase, providing a complete list of publications and awards, and other program-related content as directed by the Government
- 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.

At the end of Phase 1, performers will be expected to submit a draft SOW and ROM cost for the notional 12-month Phase 3 effort.

Table 3 provides a list of TA specific deliverables.

Technical Area	TA Specific Deliverables
TA1 Decision-maker characterization	Documentation of the decision-making theory underlying the alignment process, attributes, and descriptors for decision-makers Software implementation of alignment score, computational descriptors, and associated framework Software implementation of the reference distribution API Scenarios and probes Reference distributions Documentation of the scenario and probe design process Computational representations of the domain knowledge Experimental protocols for any decision-making experiments documented and submitted according to HSR procedures and study pre-

	<p>registration requirements</p>
<p>TA2 Human-aligned algorithms</p>	<p>Implementation of the algorithmic decision-making system, including alignment process</p> <p>Documentation of the algorithmic system design</p> <p>Any software elements necessary to support integration with the scenario environment</p> <p>Experimental protocols for any work involving HSR documented and submitted according to HSR procedures and study pre-registration requirements</p>
<p>TA3 Evaluation</p>	<p>Evaluation design document including design for decision-makers with known misaligned attributes</p> <p>Plan for recruiting trusted decision-makers; evaluation report within 30 days of the completion of each evaluation; documentation for metrics developed for the program</p> <p>Scoring software and documentation; scenario environment software, including any modifications</p> <p>Domain knowledge documentation</p> <p>Experimental protocols for any work involving HSR documented and submitted according to HSR procedures and study pre-registration requirements</p>
<p>TA4 Policy & Practice</p>	<p>Outreach event plans provided at least 45 days in advance of an outreach event</p> <p>Outreach event reports within 30 days of an outreach event including topics discussed, discussion summaries, and attendees</p> <p>Documentation of future policy suggestions and alternatives at the end of each phase</p> <p>Policy documentation, rules of engagement and other materials provided to performer teams throughout program as part of the TA4 role</p> <p>Documentation of the certification model design and process</p>

Table 3 – Technical area deliverables

H. Government-furnished Property/Equipment/Information

DARPA will not provide any GFP, GFE, or GFI in support of the ITM effort.

I. Other Program Objectives and Considerations

1. Collaboration

All awardees will be required to work collaboratively with awardees from the other TAs to develop a fully integrated solution. All proposals must clearly describe plans for interfacing and integrating their proposed technologies/approaches with those of the performers in the other TAs. To facilitate 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 requirements. This provision will become a material requirement for any 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.D for a sample ACA clause. The selected TA3 performer will be responsible for negotiating the ACA across all selected performers.

2. Intellectual Property

In keeping with the basic research nature of ITM, DARPA's goal for ITM technology is for it to be as widely available and reused as possible. Data sharing and collaboration across TAs are required for effective performance on ITM; as such, there is an emphasis on creating and leveraging open source technologies and architectures. Intellectual property rights asserted by proposers are strongly encouraged to be aligned with open source regimes, i.e., unlimited rights. For proposals that do not offer unlimited rights, proposers should make a convincing case for how more limited rights regimes meet ITM's program goals, including broad distribution and reuse of the technology. See Section VI.B.4 for more information related to intellectual property.

II. Award Information

A. General Award Information

DARPA anticipates multiple awards for TA1 and TA2 and single awards each for TA3 and TA4.

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 proposers²⁰ 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;

²⁰ 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, grants, cooperative agreements, or Other Transactions. "Subawardee" refers to anyone who might receive a subaward from a prime awardee (e.g., subawardee, consultant, etc.).

- make awards without discussions with proposers;
- conduct discussions with proposers if it is later determined to be necessary;
- If warranted, segregate portions of resulting awards into pre-priced options;
- accept proposals in their entirety or 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;
- fund awards in increments with options for continued work at the end of one or more phases, as applicable;
- 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, conditions, and/or cost/price within a reasonable time or the proposer fails to provide requested additional information in a timely manner.

Proposals identified for negotiation may result in a procurement contract, grant, cooperative agreement, or Other Transaction (OT), 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 <http://www.darpa.mil/work-with-us/contract-management#OtherTransactions>.

In accordance with 10 U.S.C. § 4003(f), the Government may award a follow-on production contract or Other Transaction (OT) for any OT awarded under this solicitation 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 solicitation, 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 solicitation. 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 solicitation 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.

University or non-profit research institution performance under this solicitation will include effort categorized as fundamental research. In addition to Government support for free and open scientific exchanges and dissemination of research results in a broad and unrestricted manner, the academic or non-profit research performer or recipient, regardless of tier, acknowledges that such research may have implications that are important to U.S. national interests and must be protected against foreign influence and exploitation. As such, the academic or non-profit research performer or recipient agrees to comply with the following requirements:

- (a) The University or non-profit research institution performer or recipient must establish and maintain an internal process or procedure to address foreign talent programs, conflicts of commitment, conflicts of interest, and research integrity. The academic or non-profit research performer or recipient must also utilize due diligence to identify Foreign Components or participation by Senior/Key Personnel in Foreign Government Talent Recruitment Programs and agree to share such information with the Government upon request.
 - i. The above described information will be provided to the Government as part of the proposal response to the solicitation and will be reviewed and assessed prior to award. Generally, this information will be included in the Research and Related Senior/Key Personnel Profile (Expanded) form (SF-424) required as part the proposer’s submission through Grants.gov.
 1. Instructions regarding how to fill out the SF-424 and its biographical sketch can be found through Grants.gov.
 - ii. In accordance with USD(R&E) direction to mitigate undue foreign influence in DoD-funded science and technology, DARPA will assess all Senior/Key Personnel proposed to support DARPA grants and cooperative agreements for potential undue foreign influence risk factors relating to professional and financial activities. This will be done by evaluating information provided via the SF-424, and any accompanying or referenced documents, in order to identify and assess any associations or affiliations the Senior/Key Personnel may have with foreign strategic competitors or countries that have a history of intellectual property theft,

research misconduct, or history of targeting U.S. technology for unauthorized transfer. DARPA's evaluation takes into consideration the entirety of the Senior/Key Personnel's SF-424, current and pending support, and biographical sketch, placing the most weight on the Senior/Key Person's professional and financial activities over the last 4 years. The majority of foreign entities lists used to make these determinations are publicly available. The DARPA Countering Foreign Influence Program (CFIP) "Senior/Key Personnel Foreign Influence Risk Rubric" details the various risk ratings and factors. The rubric can be seen at the following link:

<https://www.darpa.mil/attachments/092021DARPA CFIP Rubric.pdf>

- iii. Examples of lists that DARPA leverages to assess potential undue foreign influence factors include, but are not limited to:
 1. Executive Order 13959 "Addressing the Threat From Securities Investments That Finance Communist Chinese Military Companies": <https://www.govinfo.gov/content/pkg/FR-2020-11-17/pdf/2020-25459.pdf>
 2. The U.S. Department of Education's College Foreign Gift and Contract Report: [College Foreign Gift Reporting \(ed.gov\)](https://www.ed.gov/collegereports)
 3. The U.S. Department of Commerce, Bureau of Industry and Security, List of Parties of Concern: <https://www.bis.doc.gov/index.php/policy-guidance/lists-of-parties-of-concern>
 4. Georgetown University's Center for Security and Emerging Technology (CSET) Chinese Talent Program Tracker: <https://chinatalenttracker.cset.tech>
 5. Director of National Intelligence (DNI) "World Wide Threat Assessment of the US Intelligence Community": [2021 Annual Threat Assessment of the U.S. Intelligence Community \(dni.gov\)](https://www.dni.gov/2021-annual-threat-assessment)
 6. Various Defense Counterintelligence and Security Agency (DCSA) products regarding targeting of US technologies, adversary targeting of academia, and the exploitation of academic experts: <https://www.dcsa.mil/>

DARPA's analysis and assessment of affiliations and associations of Senior/Key Personnel is compliant with Title VI of the Civil Rights Act of 1964. Information regarding race, color, or national origin is not collected and does not have bearing in DARPA's assessment.

University or non-profit research institutions with proposals selected for negotiation that have been assessed as having high or very high undue foreign influence risk, will be given an opportunity during the negotiation process to mitigate the risk. DARPA reserves the right to request any follow-up information needed to assess risk or mitigation strategies.

- iv. Upon conclusion of the negotiations, if DARPA determines, despite any proposed mitigation terms (e.g. mitigation plan, alternative research personnel), the participation of any Senior/Key Research Personnel still represents high risk to the program, or proposed mitigation affects the Government's confidence in

proposer's capability to successfully complete the research (e.g., less qualified Senior/Key Research Personnel) the Government may determine not to award the proposed effort. Any decision not to award will be predicated upon reasonable disclosure of the pertinent facts and reasonable discussion of any possible alternatives while balancing program award timeline requirements.

- (b) Failure of the academic or non-profit research performer or recipient to reasonably exercise due diligence to discover or ensure that neither it nor any of its Senior/Key Research Personnel involved in the subject award are participating in a Foreign Government Talent Program or have a Foreign Component with an a strategic competitor or country with a history of targeting U.S. technology for unauthorized transfer may result in the Government exercising remedies in accordance with federal law and regulation.
 - i. If, at any time, during performance of this research award, the academic or non-profit research performer or recipient should learn that it, its Senior/Key Research Personnel, or applicable team members or subtier performers on this award are or are believed to be participants in a Foreign Government Talent Program or have Foreign Components with a strategic competitor or country with a history of targeting U.S. technology for unauthorized transfer , the performer or recipient will notify the Government Contracting Officer or Agreements Officer within 5 business days.
 - 1. This disclosure must include specific information as to the personnel involved and the nature of the situation and relationship. The Government will have 30 business days to review this information and conduct any necessary fact-finding or discussion with the performer or recipient.
 - 2. The Government's timely determination and response to this disclosure may range anywhere from acceptance, to mitigation, to termination of this award at the Government's discretion.
 - 3. If the University receives no response from the Government to its disclosure within 30 business days, it may presume that the Government has determined the disclosure does not represent a threat.
 - ii. The performer or recipient must flow down this provision to any subtier contracts or agreements involving direct participation in the performance of the research.

(c) Definitions

- i. Senior/Key Research Personnel
 - 1. This definition would include the Principal Investigator or Program/Project Director and other individuals who contribute to the scientific development or execution of a project in a substantive, measurable way, whether or not they receive salaries or compensation under the award. These include individuals whose absence from the project would be expected to impact the approved scope of the project.

2. Most often, these individuals will have a doctorate or other professional degrees, although other individuals may be included within this definition on occasion.

ii. Foreign Associations/Affiliations

1. Association is defined as collaboration, coordination or interrelation, professionally or personally, with a foreign government-connected entity where no direct monetary or non-monetary reward is involved.
2. Affiliation is defined as collaboration, coordination, or interrelation, professionally or personally, with a foreign government-connected entity where direct monetary or non-monetary reward is involved.

iii. Foreign Government Talent Recruitment Programs

1. In general, these programs will include any foreign-state-sponsored attempt to acquire U.S. scientific-funded research or technology through foreign government-run or funded recruitment programs that target scientists, engineers, academics, researchers, and entrepreneurs of all nationalities working and educated in the U.S.
2. Distinguishing features of a Foreign Government Talent Recruitment Program may include:
 - a. Compensation, either monetary or in-kind, provided by the foreign state to the targeted individual in exchange for the individual transferring their knowledge and expertise to the foreign country.
 - b. In-kind compensation may include honorific titles, career advancement opportunities, promised future compensation or other types of remuneration or compensation.
 - c. Recruitment, in this context, refers to the foreign-state-sponsor's active engagement in attracting the targeted individual to join the foreign-sponsored program and transfer their knowledge and expertise to the foreign state. The targeted individual may be employed and located in the U.S. or in the foreign state.
 - d. Contracts for participation in some programs that create conflicts of commitment and/or conflicts of interest for researchers. These contracts include, but are not limited to, requirements to attribute awards, patents, and projects to the foreign institution, even if conducted under U.S. funding, to recruit or train other talent recruitment plan members, circumventing merit-based processes, and to replicate or transfer U.S.-funded work in another country.
 - e. Many, but not all, of these programs aim to incentivize the targeted individual to physically relocate to the foreign state. Of particular concern are those programs that allow for continued employment at U.S. research facilities or receipt of U.S. Government research funding while concurrently receiving compensation from the foreign state.

3. Foreign Government Talent Recruitment Programs DO NOT include:
 - a. Research agreements between the University and a foreign entity, unless that agreement includes provisions that create situations of concern addressed elsewhere in this section,
 - b. Agreements for the provision of goods or services by commercial vendors, or
 - c. Invitations to attend or present at conferences.
- iv. Conflict of Interest
 1. A situation in which an individual, or the individual's spouse or dependent children, has a financial interest or financial relationship that could directly and significantly affect the design, conduct, reporting, or funding of research.
- v. Conflict of Commitment
 1. A situation in which an individual accepts or incurs conflicting obligations between or among multiple employers or other entities.
 2. Common conflicts of commitment involve conflicting commitments of time and effort, including obligations to dedicate time in excess of institutional or funding agency policies or commitments. Other types of conflicting obligations, including obligations to improperly share information with, or withhold information from, an employer or funding agency, can also threaten research security and integrity and are an element of a broader concept of conflicts of commitment.
- vi. Foreign Component
 1. Performance of any significant scientific element or segment of a program or project outside of the U.S., either by the University or by a researcher employed by a foreign organization, whether or not U.S. government funds are expended.
 2. Activities that would meet this definition include, but are not limited to:
 - a. Involvement of human subjects or animals;
 - b. Extensive foreign travel by University research program or project staff for the purpose of data collection, surveying, sampling, and similar activities;
 - c. Collaborations with investigators at a foreign site anticipated to result in co-authorship;
 - d. Use of facilities or instrumentation at a foreign site;
 - e. Receipt of financial support or resources from a foreign entity; or
 - f. Any activity of the University that may have an impact on U.S. foreign policy through involvement in the affairs or environment of a foreign country.

3. Foreign travel is not considered a Foreign Component.

vii. Strategic Competitor

1. A nation, or nation-state, that engages in diplomatic, economic or technological rivalry with the United States where the fundamental strategic interests of the U.S are under threat.

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 for 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 solicitation 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, that (a) cites the specific authority establishing their eligibility to propose to Government solicitations and compete with industry, and (b) certifies the FFRDC's compliance with the associated FFRDC sponsor agreement's terms and conditions. These conditions are a requirement 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 and compete with industry. 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. § 4892 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. Other Applicants

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 solicitation. 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 solicitation 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: VOLUME 3: ADMINISTRATIVE & 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. § 4002). 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. Ability to Receive Awards in Multiple Technical Areas - Conflicts of Interest

Proposers must submit separate proposals for each Technical Area, if proposing to more than one. A proposer selected for Technical Area 3 cannot be selected for any portion of Technical Areas 1 or 2, whether as a prime proposer, subawardee, or in any other capacity from an organizational to individual level. This is to avoid OCI situations, as defined at FAR 9.5, between the Technical Areas and to ensure objective test and evaluation results. The decision as to which proposal to consider for award is at the discretion of the Government.

E. Ability to Support Classified Development

DARPA does not expect that classified information will be used on the ITM program.

IV. Application and Submission Information

Prior to submitting a full proposal, proposers are *strongly encouraged* to first submit an abstract as described below. Proposers must submit separate abstracts for each Technical Area they wish to propose to. This process allows a proposer to ascertain whether the proposed concept is (1) applicable to the In the Moment 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 investigates an innovative approach that enables revolutionary advances, i.e., will not primarily result in evolutionary improvements to the existing state of practice.
- 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 In the Moment BAA as defined above may be deemed non-conforming²¹ 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 SAM.gov website (<https://sam.gov/>), the Grants.gov website (<http://www.grants.gov/>), or referenced herein.

B. Content and Form of Application Submission

1. Abstract Information and Formatting

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. All proposers are required to use Attachment A: ABSTRACT SUMMARY SLIDE TEMPLATE and Attachment B: ABSTRACT TEMPLATE provided with this solicitation on <https://sam.gov/> and <http://www.grants.gov/>.

Attachment A: ABSTRACT SUMMARY SLIDE TEMPLATE described herein must be in .ppt, .pptx or .pdf format and should be attached as a separate file to this document.

The abstract provides a synopsis of the proposed project, including brief answers to the following questions:

- What is the proposed work attempting to accomplish or do?
- How is the work performed today (what is the state of the art or practice), 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?
- What is new in your approach, and why do you think it will be successful?

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

²¹ "Conforming" is defined as having been submitted in accordance with the requirements outlined herein

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.

2. Full Proposal Information and Formatting

a. Proposal Volumes

Full proposals must consist of all 3 volumes described below. To assist in proposal development, templates for these volumes are posted as attachments to this solicitation on <https://sam.gov/>. The templates are specific to each volume, as outlined below.

Full proposals requesting a procurement contract or Other Transaction (OT) must use the following attachments in each volume:

- **Volume 1**
 - Attachment C: PROPOSAL SUMMARY SLIDE TEMPLATE
 - Attachment D: PROPOSAL TEMPLATE VOLUME 1: TECHNICAL & MANAGEMENT.
- **Volume 2**
 - Attachment E: PROPOSAL TEMPLATE VOLUME 2: COST
 - Attachment F: MS Excel™ DARPA COST PROPOSAL SPREADSHEET
- **Volume 3**
 - Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS

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

- **Volume 1**
 - Attachment C: PROPOSAL SUMMARY SLIDE TEMPLATE
 - Attachment D: PROPOSAL TEMPLATE VOLUME 1: TECHNICAL & MANAGEMENT
- **Volume 2***
 - Attachment F: MS Excel™ DARPA COST PROPOSAL SPREADSHEET
- **Volume 3**

- Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS

* Full proposals requesting a grant or cooperative agreement do not need to include Attachment E. Instead, Budget Justification should be provided as Section L of the SF 424 Research & Related Budget form provided via <http://www.grants.gov> (see [section IV.E.1.c](#) for additional details). The Budget Justification should include the following information for the recipient and all subawardees:

- **Direct Labor (sections A and B)** - Detail the total number of persons and their level of commitment for each position listed as well as which specific tasks (as described in the SOW) they will support.
- **Equipment (section C)** - Provide an explanation for listed requested equipment exceeding \$5,000, properly justifying why it is required to meet the objectives of the program.
- **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.
- **Other Direct Costs (section F)** - Provide a justification for the items requested and an explanation of how the estimates were obtained.
- **Participant/Trainee Support Costs (section E)** - Provide details on Tuition/ Fees/ Health Insurance, Stipends, Travel and Subsistence costs.

The Government requires that proposers use the provided MS Excel™ DARPA Standard Cost Proposal Spreadsheet in the development of their cost proposals. A customized cost proposal spreadsheet may be an attachment to this solicitation. If not, the spreadsheet can be found on the DARPA website at <http://www.darpa.mil/work-with-us/contract-management> (under “Resources” on the right-hand side of the webpage). All tabs and tables in the cost proposal spreadsheet should be developed in an editable format with calculation formulas intact to allow traceability of the cost proposal. This cost proposal spreadsheet should be used by the prime organization and all subcontractors. In addition to using the cost proposal spreadsheet, the cost proposal still must include all other items required in this announcement that are not covered by the editable spreadsheet. Subcontractor cost proposal spreadsheets may be submitted directly to the Government by the proposed subcontractor via e-mail to the address in Part I of this solicitation. **Using the provided cost proposal spreadsheet will assist the Government in a rapid analysis of your proposed costs and, if your proposal is selected for a potential award, speed up the negotiation and award execution process.**

All proposers are required to use the appropriate templates based on the type of award requested. Templates are provided as attachments to this solicitation on <https://sam.gov/> and <http://www.grants.gov>. Full Proposals that do not include the appropriate attachments as detailed here may be deemed non-conforming and may not be evaluated.

b. Technology Investment Agreements (TIA)

Proposers requesting Technology Investment Agreements (TIA) awarded under 10 U.S.C. § 4002 must include the completed form indicated below. This requirement only applies only to those who expect to receive a TIA as their ultimate award instrument.

The National Defense Authorization Act (NDAA) for FY 2019, Section 1286, directs the Secretary of Defense to protect intellectual property, controlled information, key personnel, and information about critical technologies relevant to national security and limit undue influence, including foreign talent programs by countries that desire to exploit United States' technology within the DoD research, science and technology, and innovation enterprise. This requirement is necessary for all research and research-related educational activities. The DoD is using the form below to collect the necessary information to satisfy these requirements.

The Research and Related Senior/Key Person Profile (Expanded) form, available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_KeyPersonExpanded_3_0-V3.0.pdf, will be used to collect the following information for all senior/key personnel, including Project Director/Principal Investigator and Co-Project Director/Co-Principal Investigator, whether or not the individuals' efforts under the project are funded by the DoD. The form includes 3 parts: the main form administrative information, including the Project Role, Degree Type and Degree Year; the biographical sketch; and the current and pending support. The biographical sketch and current and pending support are to be provided as attachments:

- Biographical Sketch: Mandatory for Project Directors (PD) and Principal Investigators (PI), optional, but desired, for all other Senior/Key Personnel. The biographical sketch should include information pertaining to the researchers:
 - Education and Training.
 - Research and Professional Experience.
 - Collaborations and Affiliations (for conflict of interest).
 - Publications and Synergistic Activities.
- Current and Pending Support: Mandatory for all Senior/Key Personnel including the PD/PI. This attachment should include the following information:
 - A list of all current projects the individual is working on, in addition to any future support the individual has applied to receive, regardless of the source.
 - Title and objectives of the other research projects.
 - The percentage per year to be devoted to the other projects.
 - The total amount of support the individual is receiving in connection to each of the other research projects or will receive if other proposals are awarded.
 - Name and address of the agencies and/or other parties supporting the other research projects
 - Period of performance for the other research projects.

Additional senior/key persons can be added by selecting the “Next Person” button at the bottom of the form. Note that, although applications without this information completed may pass Grants.gov edit checks, if DARPA receives an application without the required information, DARPA may determine that the application is incomplete and may cause your submission to be rejected and eliminated from further review and consideration under the solicitation. DARPA

reserves the right to request further details from the applicant before making a final determination on funding the effort.

c. DARPA Embedded Entrepreneur Initiative (EEI)

Awardees pursuant to this solicitation may be eligible to participate in the DARPA Embedded Entrepreneurship Initiative (EEI) during the award's period of performance. EEI is a limited scope program offered by DARPA, at DARPA's discretion, to a small subset of awardees. The goal of DARPA's EEI is to increase the likelihood that DARPA-funded technologies take root in the U.S. and provide new capabilities for national defense. EEI supports DARPA's mission "to make pivotal investments in breakthrough technologies and capabilities for national security" by accelerating the transition of innovations out of the lab and into new capabilities for the Department of Defense (DoD). EEI investment supports development of a robust and deliberate Go-to-Market strategy for selling technology product to the government and commercial markets and positions DARPA awardees to attract U.S. investment. The following is for informational and planning purposes only and does not constitute solicitation of proposals to the EEI.

There are three elements to DARPA's EEI: (1) A Senior Commercialization Advisor (SCA) from DARPA who works with the Program Manager (PM) to examine the business case for the awardee's technology and uses commercial methodologies to identify steps toward achieving a successful transition of technology to the government and commercial markets; (2) Connections to potential industry and investor partners via EEI's Investor Working Groups; and (3) Additional funding on an awardee's contract for the awardee to hire an embedded entrepreneur to achieve specific milestones in a Go-to-Market strategy for transitioning the technology to products that serve both defense and commercial markets. This embedded entrepreneur's qualifications should include business experience within the target industries of interest, experience in commercializing early stage technology, and the ability to communicate and interact with technical and non-technical stakeholders. Funding for EEI is typically no more than \$250,000 per awardee over the duration of the award. An awardee may apportion EEI funding to hire more than one embedded entrepreneur, if achieving the milestones requires different expertise that can be obtained without exceeding the awardee's total EEI funding. The EEI effort is intended to be conducted concurrent with the research program without extending the period of performance.

EEI Application Process:

After receiving an award under the solicitation, awardees interested in being considered for EEI should notify their DARPA Program Manager (PM) during the period of performance. Timing of such notification should ideally allow sufficient time for DARPA and the awardee to review the awardee's initial transition plan, identify milestones to achieve under EEI, modify the award, and conduct the work required to achieve such milestones within the original award period of performance. These steps may take 18-24 months to complete, depending on the technology. If the DARPA PM determines that EEI could be of benefit to transition the technology to product(s) the Government needs, the PM will refer the performer to DARPA Commercial Strategy.

DARPA Commercial Strategy will then contact the performer, assess fitness for EEI, and in consultation with the DARPA technical office, determine whether to invite the performer to participate in the EEI. Factors that are considered in determining fitness for EEI include

DoD/Government need for the technology; competitive approaches to enable a similar capability or product; risks and impact of the Government's being unable to access the technology from a sustainable source; Government and commercial markets for the technology; cost and affordability; manufacturability and scalability; supply chain requirements and barriers; regulatory requirements and timelines; Intellectual Property and Government Use Rights, and available funding.

Invitation to participate in EEI is at the sole discretion of DARPA and subject to program balance and the availability of funding. EEI participants' awards may be subsequently modified bilaterally to amend the Statement of Work to add negotiated EEI tasks, provide funding, and specify a milestone schedule which will include measurable steps necessary to build, refine, and execute a Go-to-Market strategy aimed at delivering new capabilities for national defense. Milestone examples are available at: <https://www.darpa.mil/work-with-us/contract-management>.

Awardees under this solicitation are eligible to be considered for participation in EEI, but selection for award under this solicitation does not imply or guarantee participation in EEI.

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.

4. Controlled Unclassified Information (CUI) and Controlled Technical Information (CTI) on Non-DoD Information Systems

Proposers and awardees are subject to the DoD requirements related to protection of CUI and CTI IAW Executive Order 13556, *Controlled Unclassified Information*, DFARS 252.204-7000, *Disclosure of Information*, DFARS 252.204-7012, *Safeguarding Covered Defense Information and Cyber Incident Reporting*, DoD Instruction 5200.48, *Controlled Unclassified Information*, DoD Instruction 8582.01, *Security of Non-DoD Information Systems Processing Unclassified Nonpublic DoD Information*. See <http://www.darpa.mil/work-with-us/additional-baa> for additional guidance on protecting CUI on Non-DoD Information Systems.

CUI is defined as unclassified information that requires safeguarding or dissemination controls, pursuant to and consistent with applicable law, regulations, and Government-wide policies.

Controlled Technical Information (CTI) is defined as technical information with military or space application that is subject to controls on its access, use, reproduction, modification, performance, display, release, disclosure, or dissemination. The term CTI does not include information that is lawfully publicly available without restrictions.

DoD considers "technical information" to be technical data or computer software, as those terms are defined in Defense Federal Acquisition Regulation Supplement clause 252.227-7013, "Rights in Technical Data - Noncommercial Items" (48 CFR 252.227-7013). Examples of technical information include research and engineering data; engineering drawings and associated lists;

specifications, standards, process sheets, manuals, technical reports, technical orders, catalog-item identifications, data sets, studies and analyses and related information; and computer software code. Note that such technical information may or may not be controlled (i.e., CTI), depending on whether it has military or space application.

Proposers should indicate in their proposal if their proposed solution includes CUI. All proposals indicating CUI requirements must include a draft CUI protection plan in Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS detailing how CUI will be protected at performance sites as well as sub-contractor locations. The draft CUI protection plan is not a source selection criterion, and there is no page limit. During selection and negotiation, DARPA will determine additional requirements and clarification required of the CUI protection plan. Potential award instruments for proposals containing CUI will be limited to contracts or Other Transactions.

As part of Attachment D: PROPOSAL TEMPLATE VOLUME 1: TECHNICAL & MANAGEMENT, the proposer should include a Statement of Work with a breakdown of all research tasks and subtasks and indicate the proposed classification for each. For all tasks and subtasks proposed to be unclassified, proposers should distinguish between work proposed to be Fundamental Research versus work proposed to be CUI. Proposers will provide a short explanation for why each subtask should be categorized as Fundamental Research or CUI.

If CUI tasks are proposed in the Statement of Work, proposers must provide a plan for protecting Controlled Unclassified Information as part of Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 8.

CTI is to be marked “DISTRIBUTION C. Distribution authorized to U.S. Government agencies and their contractors; Critical Technology; [current date]. Other requests for this document shall be referred to DARPA, DSO” in accordance with Department of Defense Instruction 5203.24, “Distribution of Statements on Technical Documents.”

5. 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).

a. Program Security Information

i. Program Security

Proposers should include with their proposal any proposed solution(s) to program security requirements unique to this program. Common program security requirements include but are not limited to: operational security (OPSEC) contracting/sub-contracting plans; foreign participation or materials utilization plans; program protection plans (which may entail the following) manufacturing and integration plans; range utilization and support plans (air, sea, land, space, and cyber); data dissemination plans; asset transportation plans; classified test activity plans; disaster recovery plans; classified material / asset disposition plans and public affairs / communications plans.

b. Controlled Unclassified Information (CUI)

For unclassified proposals containing controlled unclassified information (CUI), applicants will ensure personnel and information systems processing CUI security requirements are in place.

i. CUI Proposal Markings

If an unclassified submission contains CUI or the suspicion of such, as defined by Executive Order 13556 and 32 CFR Part 2002, the information must be appropriately and conspicuously marked CUI in accordance with DoDI 5200.48. Identification of what is CUI about this DARPA program will be detailed in a DARPA CUI Guide and will be provided as an attachment to the BAA or may be provided at a later date.

ii. CUI Submission Requirements

Unclassified submissions containing CUI may be submitted via DARPA's BAA Website (<https://baa.darpa.mil>) in accordance with Part II Section VIII of this BAA.

iii. CUI Authorized Systems

Proposers submitting proposals involving the pursuit and protection of DARPA information designated as CUI must have, or be able to acquire prior to contract award, an information system authorized to process CUI information IAW NIST SP 800-171 and DoDI 8582.01.

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, 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 SAM.gov UEI 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 ITM@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 as detailed in Section IV.B.2 above, and, as applicable, proprietary subawardee cost proposals and 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 or email.*

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 ITM@darpa.mil. Questions regarding submission contents, format, deadlines, etc. should be emailed to ITM@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 ITM@darpa.mil. Questions regarding submission contents, format, deadlines, etc. should be emailed to ITM@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.

a. Proposals Requesting a Grant or Cooperative Agreement

Proposers requesting grants or cooperative agreements must submit proposals through one of the following methods: (1) electronic upload per the instructions at <https://www.grants.gov/applicants/apply-for-grants.html> (DARPA-preferred); or (2) hard-copy mailed directly to DARPA. If proposers intend to use Grants.gov as their means of submission, then they must submit their entire proposal through Grants.gov; applications cannot be submitted in part to Grants.gov and in part as a hard-copy. Proposers using Grants.gov do not submit hard-copy proposals in addition to the Grants.gov electronic submission.

Submissions: In addition to the volumes and corresponding attachments requested elsewhere in this solicitation, proposers must also submit the three forms listed below.

Form 1: SF 424 Research and Related (R&R) Application for Federal Assistance, available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_SF424_2_0-V2.0.pdf. *This form must be completed and submitted.*

To evaluate compliance with Title IX of the Education Amendments of 1972 (20 U.S.C. § 1681 et.seq.), the Department of Defense (DoD) 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 science, technology, engineering or mathematics disciplines. In addition, the National Defense Authorization Act (NDAA) for FY 2019, Section 1286, directs the Secretary of Defense to protect intellectual property, controlled information, key personnel, and information about critical technologies relevant to national security and limit undue influence, including foreign talent programs by countries that desire to exploit United States' technology within the DoD research, science and technology, and innovation enterprise. This requirement is necessary for all research and research-related educational activities. The DoD is using the two forms below to collect the necessary information to satisfy these requirements. Detailed instructions for each form are available on Grants.gov.

Form 2: The Research and Related Senior/Key Person Profile (Expanded) form, available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_KeyPersonExpanded_3_0-V3.0.pdf, will be used to collect the following information for all senior/key personnel, including Project

Director/Principal Investigator and Co-Project Director/Co-Principal Investigator, whether or not the individuals' efforts under the project are funded by the DoD. The form includes 3 parts: the main form administrative information, including the Project Role, Degree Type and Degree Year; the biographical sketch; and the current and pending support. The biographical sketch and current and pending support are to be provided as attachments:

- Biographical Sketch: Mandatory for Project Directors (PD) and Principal Investigators (PI), optional, but desired, for all other Senior/Key Personnel. The biographical sketch should include information pertaining to the researchers:
 - Education and Training.
 - Research and Professional Experience.
 - Collaborations and Affiliations (for conflict of interest).
 - Publications and Synergistic Activities.
- Current and Pending Support: Mandatory for all Senior/Key Personnel including the PD/PI. This attachment should include the following information:
 - A list of all current projects the individual is working on, in addition to any future support the individual has applied to receive, regardless of the source.
 - Title and objectives of the other research projects.
 - The percentage per year to be devoted to the other projects.
 - The total amount of support the individual is receiving in connection to each of the other research projects or will receive if other proposals are awarded.
 - Name and address of the agencies and/or other parties supporting the other research projects
 - Period of performance for the other research projects.

Additional senior/key persons can be added by selecting the “Next Person” button at the bottom of the form. Note that, although applications without this information completed may pass Grants.gov edit checks, if DARPA receives an application without the required information, DARPA may determine that the application is incomplete and may cause your submission to be rejected and eliminated from further review and consideration under the solicitation. DARPA reserves the right to request further details from the applicant before making a final determination on funding the effort.

Form 3: Research and Related Personal Data, available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_PersonalData_1_2-V1.2.pdf. *Each applicant must complete the name field of this form, however, provision of the demographic information is voluntary. Regardless of whether the demographic fields are completed or not, this form must be submitted with at least the applicant’s name completed.*

i. Electronic Upload

DARPA encourages grant and 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 grant or 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. The proposed schedule aggressively pursues performance metrics in an efficient time frame that accurately accounts for the anticipated workload.

- **Potential Contribution and Relevance to the DARPA Mission**

The potential contributions of the proposed effort bolster the national security technology base and support DARPA's mission to make pivotal early technology investments that create or prevent technological surprise. The proposed intellectual property restrictions (if any) will not significantly impact the Government's ability to transition the technology.

- **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 solicitation; 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.

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.

1. 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. Countering Foreign Influence Program (CFIP)

DARPA's CFIP is an adaptive risk management security program designed to help protect the critical technology and performer intellectual property associated with DARPA's research projects by identifying the possible vectors of undue foreign influence. The CFIP team will create risk assessments of all proposed Senior/Key Personnel selected for negotiation of a fundamental research grant or cooperative agreement award. The CFIP risk assessment process will be conducted separately from the DARPA scientific review process and adjudicated prior to final award.

D. Federal Awardee Performance and Integrity Information (FAPIS)

Following the review and selection process described above, but prior to making an award above the simplified acquisition threshold (FAR 2.101), DARPA is required²² to review and consider any information available through the designated integrity and performance system (currently FAPIS). Selectees have the opportunity to comment on any information about themselves entered in the database. DARPA will consider any comments and other information in FAPIS 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 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

Solicitation provisions relevant to DARPA BAAs are listed on the Additional BAA Content page on DARPA's website at www.darpa.mil/work-with-us/additional-baa. This page also lists award clauses that, depending on their applicability, may be included in the terms and conditions of awards resultant from DARPA solicitations. This list is not exhaustive and the clauses, terms and conditions included in a resultant award will depend on the nature of the research effort, the specific award instrument, the type of awardee, and any applicable security or publication

²² Per 41 U.S.C. 2313, as implemented by FAR 9.103 and 2 CFR § 200.205.

restrictions.

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>.

The above information serves to put potential proposers and awardees on notice of proposal requirements and award terms and conditions to which they may have to adhere.

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 solicitation. 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/sys_attachment.do?sys_id=c08b64ab1b4434109ac5ddb6bc4bcbb8.

NOTE: New registrations can take an average of 7-10 business days to process in SAM. SAM registration requires the following information:

- SAM Unique Entity Identifier (UEI)
- 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, all proposers are required to submit for all award instrument types supplementary DARPA-specific representations and certifications at the time of proposal submission. See <http://www.darpa.mil/work-with-us/ reps-certs> for further information on required representation and certification depending on your requested award instrument.

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. See Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

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

i. 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 Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

ii. 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 Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

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 Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

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, sensor data, etc.)
- Access to and use of institutional, organizational or scientific community repositories and archives

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.

6. 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.

7. Electronic Invoicing and Payments

Awardees will be required to submit invoices for payment electronically via Wide Area Work Flow (WAWF), accessed through the Procurement Integrated Enterprise Environment at <https://piee.eb.mil/>, unless an exception applies. Registration in WAWF is required prior to any award under this BAA.

8. 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.

9. Publication of Grant Awards

Per Section 8123 of the Department of Defense Appropriations Act, 2015 (Pub. L. 113-235), all grant awards must be posted on a public website in a searchable format. To comply with this requirement, proposers requesting grant awards must submit a maximum one (1) page abstract that may be publicly posted and explains the program or project to the public. The proposer should sign the bottom of the abstract confirming the information in the abstract is approved for public release. Proposers are advised to provide both a signed PDF copy, as well as an editable (e.g., Microsoft word) copy. Abstracts contained in grant proposals that are not selected for award will not be publicly posted.

10. 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://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-171r2.pdf>) and DoDI 8582.01 that are in effect at the time the solicitation 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 award will be specified in the award document and may include monthly financial reports, monthly technical reports and/or 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:** Matt Turek, Program Manager, DARPA/DSO
- **BAA Email:** ITM@darpa.mil
- **BAA Mailing Address:**

DARPA/DSO

ATTN: HR001122S0031
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. Proposers Day

A virtual ITM Proposers Day will be held on March 18, 2022. The event will be webcast to support remote participation. Advance registration is required for the webcast. See DARPA-SN-22-32 posted at <https://sam.gov/> for all details. Participation in the ITM Proposers Day or viewing the webcast is voluntary and is not required to propose to this solicitation.

B. Frequently Asked Questions (FAQs)

Administrative, technical, and contractual questions should be emailed to ITM@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.

C. Collaborative Efforts/Teaming

DARPA highly encourages teaming before proposal submission and, as such, will facilitate the formation of teams with the necessary expertise. Interested parties should submit a one-page profile as Adobe PDF including the following information:

- Contact information to include name, organization, email, telephone number, mailing address, organization website (if applicable).
- A brief description of the proposer's technical competencies.
- Desired expertise from other teams, if applicable.

All profiles must be emailed to ITM@darpa.mil no later than 1:00 p.m. March 23, 2022. Following the deadline, the consolidated teaming profiles will be sent via email to the proposers who submitted a valid profile. Specific content, communications, networking, and team formation are the sole responsibility of the participants. Neither DARPA nor the DoD endorses the information and organizations contained in the consolidated teaming profile document, nor does DARPA or the DoD exercise any responsibility for improper dissemination of the teaming profiles. Teams need not be finalized at the time of abstract submission.

D. Sample ACA Clause

(a) It is recognized that success of the *In the Moment* 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 *In the Moment* 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]