Broad Agency Announcement

Knowledge Management at Scale and Speed (KMASS)

Defense Sciences Office

HR001121S0034 **Amendment 1**

June 24, 2021

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BAA Attachments:

- Attachment A: ABSTRACT SUMMARY SLIDE TEMPLATE
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- 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:** Knowledge Management at Scale & Speed (KMASS)
- **Announcement Type:** Amendment 1
- **Funding Opportunity Number:** HR001121S0034
- **NAICS Code:** 541715
- **Catalog of Federal Domestic Assistance (CFDA) Number(s):** 12.910 Research and Technology Development
- **Dates** (All times listed herein are Eastern Time.)
  - Posting Date: June 24, 2021
  - Proposers Day: July 7, 2021 See Section VIII.A.
  - Abstract Due Date: **July 14, 2021, 4:00 p.m.**
  - FAQ Submission Deadline: August 19, 2021 4:00 p.m. See Section VIII.B.
  - Full Proposal Due Date: September 2, 2021, 4:00 p.m.
- **Anticipated Individual Awards:** DARPA anticipates multiple awards for TA B/C/D and one award for TA E.
- **Types of Instruments that May be Awarded:** Procurement contracts, 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**: Ted Senator, Program Manager, DARPA/DSO
  - **BAA Email:** KMASS@darpa.mil
  - **BAA Mailing Address:**

    DARPA/DSO
    ATTN: HR001121S0034
    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:** KMASS will be unclassified. DARPA anticipates that submissions received under this BAA will be unclassified. See Section 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 Sciences Office (DSO) at the Defense Advanced Research Projects Agency (DARPA) is soliciting innovative research proposals in the area of collecting, organizing, sharing, and applying organizational knowledge about key tasks and how to perform them. Proposed research should investigate innovative approaches that enable revolutionary advances in science, devices, or systems. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

Organizations, including the military, store massive amounts of knowledge intended for human consumption, e.g., doctrine, policy, procedures, etc. Creating these documents, videos, and other modes is both expensive and time consuming. They are not structured or indexed to support rapid and appropriate application to particular tasks and may be inconsistent or confusing. Further, this knowledge must be augmented by local and timely knowledge appropriate to the particulars of a task, accounting for any unique context or situations. Capturing the knowledge along with this context as it is created currently requires a dedicated effort on the part of the person performing the task, which often does not happen. Applying stored knowledge requires a user to know that it exists, where it exists, when it is needed and relevant, how to retrieve it, and how to locate the specifics in what typically is a multi-page document or several minute long video with audio. Applying stored knowledge may not always be possible given time constraints.

The Knowledge Management at Scale and Speed (KMASS) program will research, develop, integrate, evaluate, and demonstrate underlying technology that will enable effective use of documented knowledge, acquisition of new knowledge as part of regular workflows, and application of useful knowledge when and where it is required and with necessary granularity. KMASS technology will scale to a broad set of tasks and contexts across an organization by collecting and modifying knowledge "in-the-flow" as part of regular task execution and applying the knowledge documented for one purpose to other purposes as appropriate. KMASS will deliver user specific knowledge "nuggets" that are useful for a current task—whether the knowledge is requested or not by the user—exactly when needed, while avoiding irrelevant or already known information. This concept is a core tenet of KMASS and may be referred to as the "JustINs" – i.e., just in time, just enough, and just for me[1]. KMASS systems will contain a persistent knowledge store comprising source documents in human understandable form in multiple modalities (e.g., text, videos, presentations, etc.), augmented with appropriate tags and

[1] Rosenberg, M. J. (2001). E-learning: Strategies for delivering knowledge in the digital age. New York: McGraw-Hill.

indexed for identification, retrieval, linking, and application that will update at the speed of task performance. KMASS requires advances in three key complementary areas: Organizing **B**ackground Knowledge, **C**apturing Local Knowledge, and **D**isseminating Contextualized Knowledge usefully, appropriately, and on time.

B. Background

State of the Practice
Intel co-founder Robert Noyce once said "Knowledge is power. Knowledge shared is power multiplied." In the modern world, the ability to create new knowledge is far outpacing the ability to capture and share it with others who will benefit from its use. However, knowledge capture is inhibited because processes for creating knowledge are separate from processes used to collect it. To make insights and discoveries available to others, people must disengage from their knowledge-producing workflows and engage in knowledge-sharing workflows such as writing documents or talking with coworkers. Application of documented knowledge is difficult because locating specific knowledge and determining whether and how it applies to the details of a current task are time consuming and often not feasible given constraints of task performance.

Today's knowledge management (KM) tools focus on storing documents for access across an organization and/or connecting individuals with others who may possess relevant knowledge. These tools are largely semantic-free, with no understanding of content and, therefore, require continued and extensive curation and maintenance to provide any utility as well as careful and extensive searching to retrieve exactly what would assist with specific task performance.

There are often vast libraries of data both in an organization's internal systems and in the cloud. Although tools do exist to extract such data on demand, e.g., key-word searches or personal assistants (such as Google, Alexa, Siri), there is currently no consistent, automatic way for people to acquire just exactly the knowledge they need and no more. Commercial search engines still require a person to read through several retrieved documents to identify, locate, and understand the specific information that would be useful and applicable to the current task. A personal assistant may provide more targeted information, but generally not to the level of understanding required and only in specific domains. Videos and audio tracks provide their own set of constraints because specialized software is often required to retrieve necessary data embedded within them. Combined with the fact that producing these artifacts is time consuming, tedious, and typically only done for the knowledge that is worth the high cost of producing it, organizations lose much of the potential power to which Noyce alludes.

Today's KM also supports collaboration and other social practices that are oriented towards person-to-person knowledge exchanges within communities of practice (CoPs). For KMASS, CoPs are groups of individuals who have overlapping interests in activities in which their organization participates. They do similar things, and they benefit from sharing knowledge about how these things are done. Person-to-person exchanges of knowledge, whether they be face-to-face conversations, phone calls, emails, or briefings, have many advantages over documents. People can quickly tailor their answers to the details of a given situation and quickly provide additional information that the knowledge seeker may not yet realize they need. A person can answer multiple questions that may be relevant to a given task, or different related task, in ways that stored artifacts cannot anticipate. Through conversation, one can quickly assess the background of a person and limit the knowledge provided to that which the person truly

needs and is directly applicable to the specific situation. Dialogues allow people to refine queries and deliver knowledge in a way that enhances communication and comprehension.

There are limitations to using human experts as knowledge sources, beginning with knowing whom to ask. Over time, people tend to build up a network of contacts, but for newcomers this network is, in the best case, a mentor who needs to take time from his/her other tasks to either answer questions or assist with networking. Even experienced people find themselves needing to go outside of their network on occasion, which can be a difficult process. Identifying the experts in an organization, together with their areas of expertise, and making this information available to others is a focus of the "connecting people with people" branch of current KM practice. Another issue is providing incentives for people to share their knowledge. Experts are typically highly valued, much-in-demand employees, and it can be a challenge to balance the time they spend helping others against the time spent directly applying their expertise. Finally, this mode of information exchange is not conducive to proactively sharing newly acquired insights, best practices, etc. as they are acquired and developed.

Motivation

A motivation for KMASS can be found in the "New Dimensions in Testimony" (NDT) exhibit created by the University of Southern California's (USC) Institute for Creative Technologies. (see https://ict.usc.edu/prototypes/new-dimensions-in-testimony/) in collaboration with the USC Shoah Foundation and Conscience Display. Currently being shown at museums throughout the country, this exhibit is based upon hours of video that were taken of Pinchas Gutter, a Holocaust survivor, as he was interviewed about his experiences as a child in Germany. In the exhibit, visitors are able to query a holographic image of Mr. Gutter and get the best match to their question that can be found in the store of videos. NDT was costly to produce, required a specialized room to create the holographic images, and in its current form is static and, thus, the set of questions that it can answer is limited. Nonetheless, it is a compelling example of the power of narrative and the potential for technology to support effective, memorable communication.

Another more familiar motivation can be found in "how to" videos, which are becoming increasingly common on the Internet. Such videos currently comprise the second most common type of video on the popular YouTube site, following only product reviews. The popularity of these artifacts is clear evidence of the value that video demonstrations bring to knowledge consumers. It also suggests that, when using the appropriate modes of input, "teaching while doing" is an easy and natural way for people to communicate their understanding of step-by-step processes. Videos like these are a step towards the KMASS vision, but enhancements are needed. Like documents, it can be a challenge to find the best, most appropriate video out of a large set of candidates. In their current form, videos are difficult to search. Unlike NDT, people often need to watch an entire clip to find a specific nugget of information. Like NDT, individual videos are essentially static, and there is no easy way to add to them or alter them.

Storytelling and story understanding provide a third motivation for KMASS. Stories are a natural way for people to convey information. They increase comprehension and retention.[2] When

[2] Dalhstrom, M. (2014) "Using narratives and storytelling to communicate science with nonexpert audience," Proceedings of the National Academy of Sciences, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4183170/.

directly compared to expository text, narratives were read twice as quickly and recalled twice as well.[3] Such stories would link to specific sources and backup information to clarify contexts in which they apply and would be delivered just when needed to illustrate a point.

Illustrative Example
This example illustrates some of the real-world knowledge management issues that KMASS will overcome. This example is NOT intended as a use case for KMASS research, evaluation, or application; it is simply illustrative of some of the issues KMASS research must address. (KMASS research domains will be proposed by research teams and need not, nor are they expected to, be in a military context; KMASS evaluation and application domains will be determined at a later time by DARPA, as described later in this BAA.)

Captain Jones is an Army captain deployed to an Attack Helicopter Battalion as an individual augmentee. When he is informed of his assignment, he is told that he is lucky: he will have a full two weeks of overlap with his predecessor. Since he knows the basic unit Tactics, Techniques, and Procedures (TTPs)[4] for helicopter operations, he plans to spend that time learning the most important facts and details of his predecessors' position. When he arrives in theatre, the man he is replacing, Captain Smith, greets him and wastes no time, immediately telling stories about the job, including a lot of nuts-and-bolts details and stories about when things went wrong or didn't go as planned. CPT Jones feels like he is drinking from a firehose, as CPT Smith goes on. He realizes that he can't fully appreciate all the many details, exceptions, and one-offs, because he really doesn't fully grasp the simpler, probably more basic information that CPT Smith hasn't spent much time explaining. He knows that CPT Jones is trying to pass on important lessons learned, so he does his best to write it down and hopes he can make sense of it later.

The following day, he takes his first tour of the region. CPT Smith takes him by the mess hall and introduces him to some of the "who's who" on base. He meets a handful of civilian contractors and is told what they do and how they can be most helpful. CPT Smith's flight schedule prevents him from being able to hang around as long as he would like, so CPT Jones does his best to memorize names and makes a mental note to stop by after he is more acclimated to the position.

As he follows CPT Smith to the copter, CPT Jones takes mental notes of his surroundings at the same time he is trying to keep track of the new facts and details that CPT Smith provides as they walk. The two officers spend the rest of the day flying to the Forward Operating Bases (FOBs) of the ground forces that the battalion supports. CPT Smith points out features of the geography: mountainous areas, passes, settled areas, operating boundaries, etc. At one point, CPT Smith points to a small village in the distance and says that it is best to avoid flying near it, as the locals have a habit of filing noise complaints with the Brigade. Over the course of the day, CPT Smith unloads a wealth of knowledge that gets jotted down in CPT Jones' notebook.

Two days later, CPT Smith tells CPT Jones that it's his turn to fly and then quizzes him as they retrace the route. As he pilots the helicopter, CPT Jones appreciates the limitations of his

[3] Graesser A., & Ottati V. (1995) "Why Stories? Some evidence, questions, and challenges". *Knowledge and Memory: The Real Story*, ed Wyer RS, Lawrence Erlbaum Associates, Hillsdale, NJ.
[4] TTP's incorporate the evolving knowledge and experience required of a soldier by capturing the "who", "what", "where", "when", and "how" of warfighting.

notebook, which is inaccessible. He is thankful that he remembers to avoid the noise-averse village, but he is dismayed by how much of their previous trip's content he had not yet absorbed. CPT Smith assures him that he'll pick up everything he needs to know quickly enough.

The two weeks of overlap pass quickly. Just as CPT Smith has predicted, CPT Jones did eventually learn what he needed to know, though there were many times during his tour when CPT Jones recognized that the costs of some of the lessons he learned could have been lower. As his year-long tour is coming to an end, he decides that rather than have his successor rely solely upon the sort of quick education that CPT Smith gave him, it would be better to write down the important things learned over the year for his successor's benefit. Perhaps this could become an artifact that grew over time. For CPT Jones, it turns out to be a very difficult task. He can't remember all the things that he didn't know at the time he arrived and needed to know post haste. He no longer has the notes from the few days spent with CPT Smith, and the only specific things that he can remember are some of the flying restrictions that CPT Smith mentioned on that first side-by-side flight, together with the fact he had introduced him to *a lot* of people, and he had needed to learn a lot of names fast. CPT Jones struggles with how to turn those memories into easily digested, usable written guidance. In the end, he has forty pages of written material, much of which is just contact information. A lot of the advice amounts to exceptions from routine processes that aren't explained. CPT Jones realizes that his replacement will likely not fully appreciate these routine processes when he arrives, but he doesn't want to write them down, because he recognizes that he is already planning to hand off quite a bit of reading.

Knowledge Management Issues

The example presented above illustrates some of the current limitations with respect to today's KM technology and suggests potential improvements to be provided by KMASS.

While not explicit in the story above, it is assumed that there was much written documentation available that CPT Jones never had time to look at, let alone understand in detail. This might have included briefings, organization charts, personnel directories and biographies, contracts for support personnel, mission plans and reports, geographic or demographic background, technical documentation, or many others. These documents may have been in paper or electronic form, may have been located in different file cabinets in different buildings, may not have been clearly labeled, may have been in different formats, and may not have been known or accessible to him. Most important, they were not organized according to a common structure, so what he needed to know was hidden in portions of different diverse documents and required him to locate the relevant portions and mentally link facts across multiple documents. Much of what he tried to learn may have been available in these documents, but even if he had known where to look, he would not have had the time.

Both CPT Smith and CPT Jones learned a lot during their tours; these lessons could have benefited other helicopter pilots in other theaters at later times. After CPT Smith departed, he was extremely busy with his next assignment. Consulting with CPT Smith would have been valuable to CPT Jones to review each mission and as an instructor for Lieutenants who had not yet been assigned to theater. But the demands of CPT Smith's next assignment meant that these potential benefits were unrealized.

The Army, Navy, Air Force, and Marines all use variants of the Sikorsky UH-60 Black Hawk helicopter with different modifications that provide different capabilities and equipment to

support different mission sets. Sharing knowledge about how to employ these capabilities is a challenge. In general, individuals working together in the same Army Battalion will find it easier to locate each other than individuals assigned to Army units in different geographic locations or individuals in other Services. The Army has roughly 50 helicopter Battalions, the Navy at least 40 Squadrons, and the Air Force over 16 helicopter Groups, spread across the country and throughout the world. KMASS systems would have to scale to organizations of this size, covering the scope and diversity of their background knowledge sources and missions. While their missions and deployments are not identical, there would be useful information that could be shared between individuals with the same role in different Battalions, Squadrons, etc., provided that the contexts are clear to avoid misapplication of lessons learned.

C. Program Description / Scope

KMASS requires advances in three key complementary technical areas (TAs): Organizing **B**ackground Knowledge (TA B), **C**apturing Local Knowledge (TA C), and **D**isseminating Contextualized Knowledge usefully, appropriately, and in a timely manner (TA D). A fourth Evaluation TA (TA E) will be focused on providing the Government with independent assessments of progress for the TA B/C/D research development efforts. While proposers may choose to submit separate proposals for both TA B/C/D and TA E efforts, a team may be selected as a performer only on either TAs B/C/D or TA E.

KMASS research under TAs B/C/D will be conducted by integrated teams that simultaneously address the objectives of all three TAs. It is essential for the success of the program that performers address them simultaneously to achieve the vision of a complete integrated KMASS system because: (1) advances in each area that do not interoperate will not achieve the KMASS vision, (2) component technologies may span multiple areas (e.g., storytelling and story understanding) and have their own deep representations that enable both collection and dissemination of contextualized knowledge, and (3) lightweight knowledge representation (e.g., tagging and the indexing) enables persistent storage of knowledge in human-consumable form as well as interchange between different deep representations. While the research goals of each TA are distinct, component solutions that do not address all of them together will not achieve the goals of the program. For these reasons, R&D teams will need to assemble end-to-end pipelines, including a persistent knowledge store and any other required infrastructure components, to demonstrate their ability to meet program goals. Proposals must justify their selection of any existing technologies, their research approaches for augmenting existing technologies, and their research approaches for new technologies for all components of an integrated KMASS system.

KMASS TA B/C/D research teams will propose their own research domains. Examples of what might constitute such a domain are appliance repair, IT support, first aid, accounting, scientific research, etc. Evaluations will be performed internally by each team in their research domain and program-wide in domains proposed by the TA E external evaluation team, described later in the BAA, and approved by DARPA. Evaluations will measure progress against the objectives of all three TAs. Proposals must justify their selected domain by explaining how its characteristics map to KMASS objectives qualitatively and quantitatively and must explain how their proposed solution will generalize to other domains.

DARPA has identified a set of program-wide metrics against which progress toward TA B/C/D objectives will be assessed. Relative merits of different technical approaches will be compared

throughout the course of the program. These metrics correspond to the specific objectives for TAs B/C/D and emphasize scale and speed. They are further elaborated upon in Section I.E Technical Area Descriptions and shown in Figure 3 of Section I.F Schedule/Milestones. For TA B, DARPA is interested in solutions that can deliver knowledge in increasingly finer granularity, even as the size of the corpus increases. For TA C, the primary metric is the amount of additional time or effort it takes a knowledge producer to correctly add knowledge to a KMASS system while he/she is engaged in another task. For TA D, there is a set of metrics associated directly with the JustINs and another to measure the time distraction caused by a knowledge consumer's need to interact with a KMASS system.

To focus the research efforts, KMASS will address the use case of an individual newly assigned to a job. He/she may have general knowledge (e.g., from formal education or training) about the requirements of the position (i.e., is qualified for their position) but may not know the specifics of how the job is performed in a particular unit in a particular location under particular constraints and in particular circumstances. He/she may overlap with the person he/she is replacing for a short period of time, or may not; and the person being replaced may or may not be available for consultation after he/she departs. This replacement must learn how to function effectively as quickly as possible. Rotation and retirement use cases are generalizations of this fundamental use case and may be addressed in later phases of the program, depending on technical progress.

DARPA anticipates that effective KMASS solutions will require advances in and incorporation of multiple technologies into a complete KMASS system. DARPA intends KMASS systems to be integrated sets of component technologies that function cooperatively to achieve its goals. DARPA has identified the following technologies as potential contributors to KMASS systems. This list is representative but not prescriptive or exhaustive. Proposers are encouraged to suggest and justify alternatives that they believe will be more effective.

> *Storytelling and Story Understanding.* Narratives are an effective way to communicate, and there is a well-established body of research focused upon understanding and/or generating narratives. Good stories have well-understood structure, which can be used as a basis for storing, composing, and accessing knowledge content.
>
> *Semantic processing*. Knowledge representation and reasoning techniques are well understood and widely applied. They provide a robust ability to represent axiomatic knowledge in ways that support seamless integration with existing content that can be adapted and applied to the specifics of current circumstances.
>
> *Large scale contextual models.* Recent advances in machine learning have demonstrated an impressive ability to generate text in response to one-word inputs and questions and in conversations and even to generate computer code in response to a short natural language description. The underlying deep-learning technology, known as transformers, can find important associations in large, unstructured corpora. While thus far focused primarily upon text processing, this ability to find important associations suggests a promising approach to inferring context from multiple data streams.

Natural language processing, particularly speech processing, is mature, proven, and affordable. This supports the goal of seamless, in-the-flow capture and dissemination of knowledge.

Process modeling. There is a long history of modeling processes and making inferences from those models, both with respect to which process steps are active and which steps should be taken next. This offers a foundation for representing "how-to" information in a way that will support reasoning about tasks, subtasks, and goal achievement.

Multimodal communication technologies. The explosion of small, affordable sensor technology has created the ability to acquire information from a variety of data streams. A KMASS system may leverage such technology to assist with the challenge of capturing knowledge, understanding the context in which it is being produced and/or applied, and communicating seamlessly with consumers of knowledge as they perform their tasks.

Out of Scope
Research in the following areas is considered out-of-scope for purposes of KMASS:

- Knowledge representation and reasoning (KR&R) – KR&R seeks to enable machines to reason in ways that people already can and do; KMASS is focused upon helping people share the knowledge that they have with other people
- Social incentives (e.g., techniques to encourage users to provide or maintain organizational knowledge)
- Approaches to creating and managing effective teams – KMASS systems provide the benefit of experience to individuals in the same role in different teams, rather than support for teams comprising multiple individuals in distinct roles
- Manual knowledge acquisition techniques that don't scale
- Improvements to enabling technologies (e.g., natural language processing (NLP)) that aren't specifically in support of and integrated with a KM system
- Computer/Human teaming
- Personal Assistants
- Tacit knowledge elicitation (i.e., knowledge that experts have difficulty in articulating, such as how to make value judgments)
- Distributed systems for knowledge sharing. While individual users can be expected to have workstations or some other form of personal computing device to support user interactions and data collection, KMASS systems will use server-side approaches to persisting and sharing knowledge.

D. Program Structure

KMASS is organized around four TAs: Organizing **B**ackground Knowledge (TA B), **C**apturing Local Knowledge (TA C), **D**isseminating Contextualized Knowledge (TA D), and **E**valuation (TA E). Research teams will address TAs B, C, and D; and a single evaluation team will address TA E. While proposers may choose to submit separate proposals to TAs B/C/D and to TA E, an individual team may be selected for an award only under either TAs B/C/D or TA E. Figure 1 summarizes TA B/C/D problems, objectives, and key challenges. TA E focuses upon assisting with the evaluation of technical progress and is not depicted in the figure. This figure is not intended as a design framework or specification for a KMASS system.

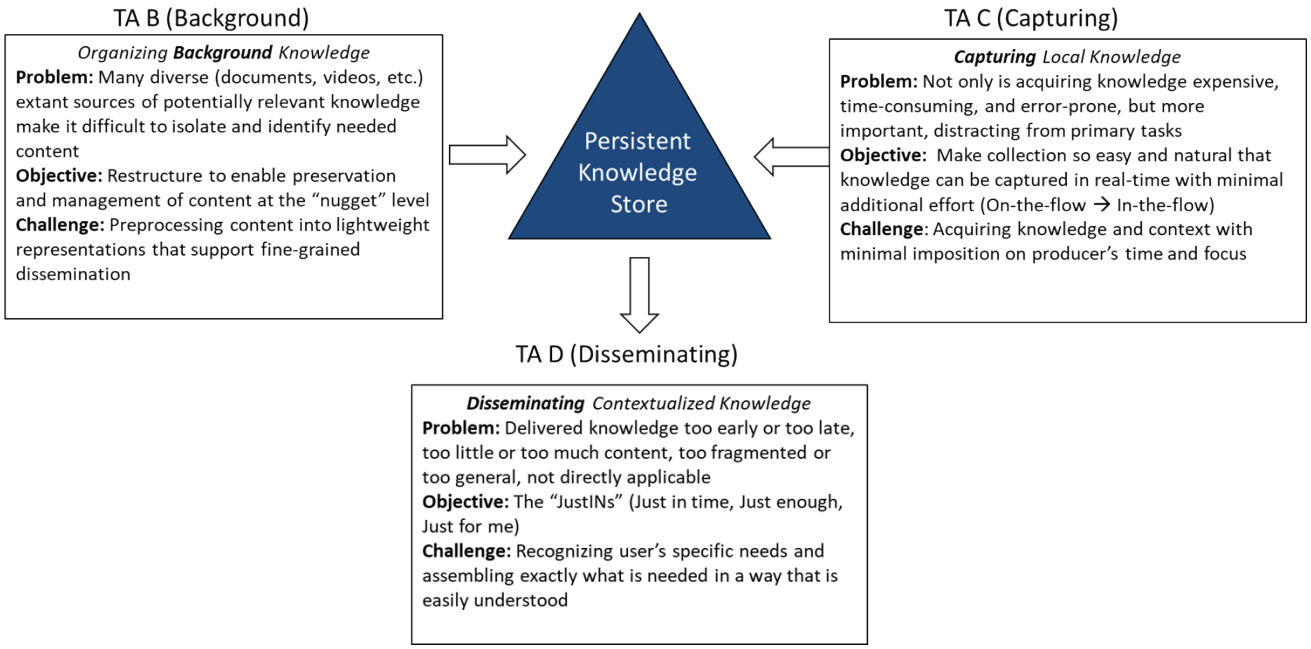

Figure 1 Technical Areas B, C and D

Program Phases and Schedule: KMASS will be a 36-month program, comprised of three successive phases. Phases 1 will be 14 months, Phase 2 will be 12 months, and Phase 3 will be 10 months. Proposers should propose a base effort for Phase 1 and separate options for both Phases 2 and Phase 3. Participation in Phases 2 and 3 is contingent upon successful performance in prior phases as well as availability of funds and Government priorities.

In order to avoid potential funding gaps between decisions regarding progression from one phase to the next and execution of contract options, a decision on whether to continue individual teams' efforts into Phase 2 will be made at roughly month 12. Decisions regarding progression into Phase 3 will be made at roughly month 24 of the program, which will be the 10th month of Phase 2. The final two months of both Phase 1 and Phase 2 will be used to prepare for the subsequent phases by refining research plans and improving software baselines. For all performers, a final report will be due 60 days after the last phase in which they participate.

TA B/C/D research performers are expected to conduct formal self-evaluations of their efforts at roughly months 5 and 11 of Phase 1 and at later times as they deem useful and appropriate to measure progress toward their research goals and to support design decisions. In Phases 2 and 3, program-wide evaluations will be conducted by the TA E contractor. These will be staggered during the phase, with the expectation that each TA B/C/D team will be evaluated twice in each phase.

TA B/C/D research teams will conduct self-evaluations in their own research domains in Phase 1. If a TA B/C/D proposal anticipates the need for HSR as part of their internal evaluations, they must comply with the approval procedures detailed in Section VI.B.6, to include providing the information specified therein as required for proposal submission. A draft protocol submitted to the Institutional Review Board (IRB) must be included as an attachment to their proposal. (This attachment will NOT count against the proposal page limit.)

The TA E performer will not be conducting evaluations in Phase 1. During Phase 1, TA E will be responsible for reviewing the TA B/C/D evaluation plans and structures, observing TA B/C/D evaluations, and independently reviewing the results produced by the TA B/C/D researchers to support DARPA's assessment of their performance in this phase. More details on this plan are provided below in the descriptions of the TAs.

During Phases 2 and 3, the TA E performer will use its own corpora to independently assess each of the TA B/C/D teams' systems. DARPA expects that these evaluations will require HSR, and TA E proposers must submit their HSR plans in compliance with the guidance provided below in Section VI.B.6. DARPA anticipates that the evaluation of each TA B/C/D effort will need to occur over several days or weeks and recognizes that it is not reasonable for all evaluations to be conducted in parallel. TA E proposers should provide their plan for maximizing the fairness of evaluations, and TA B/C/D proposers must recognize that they should not plan on being the last performer evaluated during any one cycle.

KMASS will also have a military engagement effort that will be led by a Government laboratory, Federally Funded Research and Development Center, or University Affiliated Research Center. This BAA is not soliciting proposals for this effort. This effort will work with interested parties in the U.S. Armed Services to develop a suitable demonstration of TA B/C/D technologies in a domain of interest to the DoD. While the bulk of this effort will be conducted by the organization chosen to lead this effort, TA B/C/D and TA E performers should expect to support this effort in Phase 3. TA B/C/D teams will need to make their technology available for demonstration, and the TA E team should assist with the preparations for the effort, based upon their experiences with setting up evaluations in Phases 2 and 3.

E. Technical Area Descriptions

Figure 2, described in the subsections below, shows a notional plan for the evolution of technology through the life of the program. These are examples and not requirements. Proposers should provide their own detailed, constructive plan for research and development of KMASS systems leading towards program goals and provide their own phased vision for how they expect their technology to evolve over the three years of the program, addressing all the aspects depicted in the figure (i.e., TAs B/C/D or E, knowledge source and delivery formats, knowledge producer/consumer levels). The descriptions of each phase in each TA are qualitative and correspond to the quantitative metrics for the program discussed later in the BAA. From this perspective, only the three-phase structure, the expectation of two evaluations per phase, and the division between the TA B/C/D and TA E teams should be viewed as requirements.

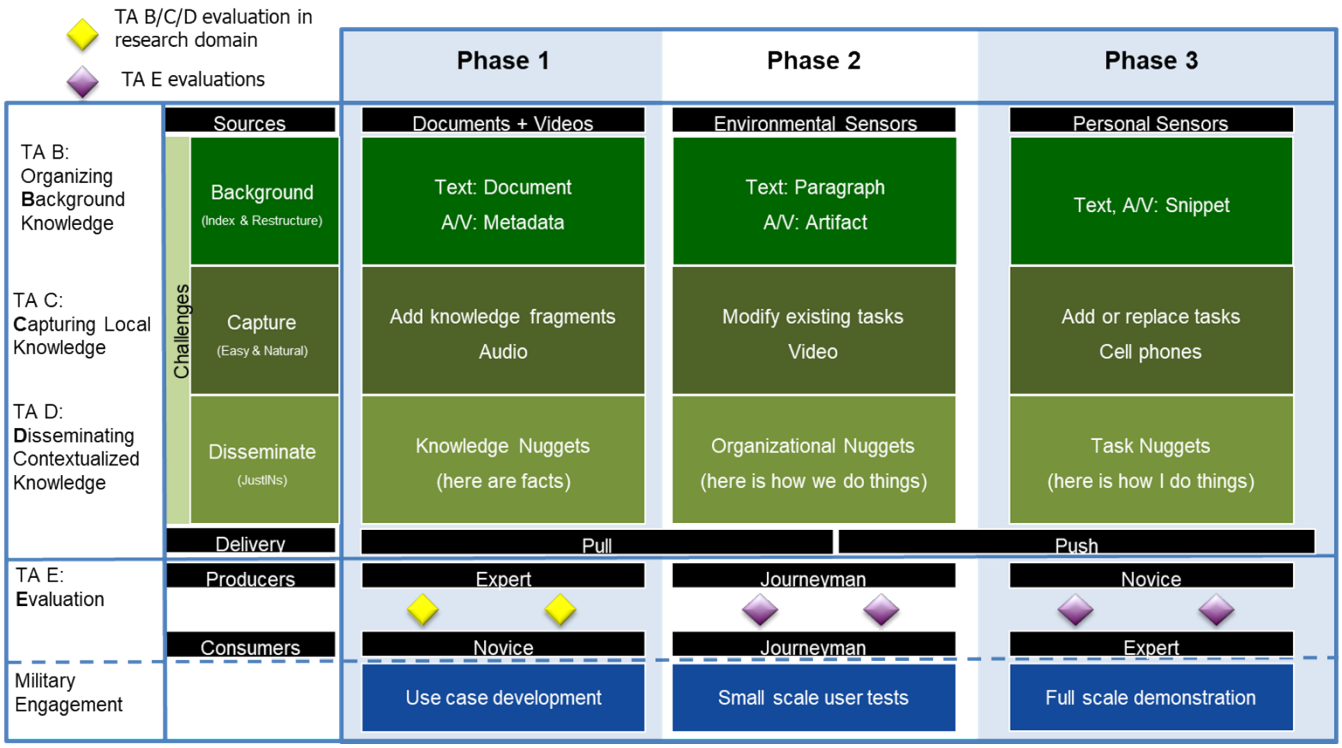

Figure 2 Program Structure and Schedule

The sections below outline program objectives for TAs B, C, D, and E, respectively. For each TA, an example is given for a notional development pathway, corresponding with Figure 2. Anticipated program-wide measures of technical progress for the TA are identified.

Technical Area B: *Organizing **B**ackground Knowledge*

This TA focuses upon processing existing multi-media knowledge sources into lightweight representations that support fine-grained dissemination. For KMASS program purposes, these sources will contain knowledge relevant to executing tasks, such as instructions, manuals, textbooks, recipes, how-to videos, etc. Corpora may also contain domain-relevant content that is *not* directly relevant to executing tasks but is representative of the diverse sources of information that someone working in a domain might need to be familiar with. The key challenge for this area will be to index and restructure sources to enable preservation and management of content at the "nugget" level.

Envisioned Technology Development Path

This TA is about developing technologies for managing the large set of extant artifacts that comprise generally available background knowledge. Managing evolving content is also of interest. For example, when a policy document is updated, the old policy document should not be offered as a source of knowledge. Similarly, if the procedure for requesting meeting space in an organization changes, the new procedure doesn't simply take precedence over the old one; it replaces it completely.

Document processing and indexing is in general more mature than similar processing of video, with audio being somewhere in between. For documents, the anticipated evolution of granularity will start with a state-of-the-art ability to find relevant documents in response to queries and then

proceed to isolating the most pertinent section of the document, followed by delivering the exact snippet of knowledge that a user requires.

For audio and video, the current state of the art is based upon metadata, such as titles and keywords, that content developers supply along with the artifact. Notionally, as shown in Figure 2, during Phase 1 TA B researchers may demonstrate their ability to suggest videos based upon these metadata descriptions. In Phase 2, they could proceed to finding appropriate artifacts based upon contents not described in the metadata. By Phase 3, TA B might be able to find specific segments of audio and video that answer user queries.

The "sources" line across the top of the TA B/C/D section of Figure 2 captures the expectation that researchers will begin with better understood, more readily available sources of inputs, such as documents and existing videos, and add less-well-understood input modalities, such as cameras and microphones, and then personal communication devices such as cell phones, over the course of the program. While documents and videos are primarily sources of knowledge, the additional modalities may be useful to elicit the contextual information needed to tailor information to consumers' needs.

Evaluation
Organizing and indexing extant content is necessary, but not sufficient, for effective dissemination. TA B proposers must provide plans for demonstrating the efficacy of their technical approach *independent* of their TA D dissemination technology. Separate TA B assessments will be conducted for each mode of content (text, video, etc.) Engineering interfaces that support on-demand queries will suffice for this purpose.

From the perspective of KMASS evaluations, TA B software runs offline prior to and independent of being made accessible to consumers. If proposers expect to require special-purpose hardware to support this process, they must make this clear in their proposal, and they must explain how they intend to coordinate with TA E to ensure that evaluations involving human subjects can be conducted entirely at the TA E site.

Metrics
The ability of TA B software to locate accurately knowledge in extant corpora is the focus of this TA. For this reason, the granularity of knowledge delivered is the primary metric.

Another important dimension for this TA is the size and diversity of the corpus that a team's TA B technology can manage. DARPA expects to measure the number and size of the input artifacts during each program phase and expects the volume to grow by at least an order of magnitude over the life of the program.

Technical Area C: ***C****apturing Local Knowledge*
This TA will develop technology to make knowledge collection easy and natural, while minimizing distractions from primary tasks. In addition to computer-based graphical interfaces, this TA will incorporate multi-media sources to collect both knowledge and additional context from knowledge suppliers. The objective of this TA is to enable the capture of new knowledge in real-time with minimal additional effort.

This TA encompasses the set of activities needed to support the addition of local knowledge inside of organizations. The line between background knowledge and local knowledge can be a

fine one, but for KMASS purposes assume background knowledge is supplied as entire artifacts (e.g., documents or videos). This TA seeks to develop technologies that support the incremental addition of knowledge.

TA C technology should capture the detail and context necessary for KMASS systems to subsequently determine if and when specific knowledge should be applied. For example, suppose that a user's task is editing a periodic report and organizational rules (from background policy documents) state that all acronyms must be spelled out when they are first used. KMASS systems should be able to add a verbal annotation in which a user states "in divisional reports, we are allowed to use the XYZ acronym for our divisional name without spelling it out."

At a minimum, KMASS systems need to store this annotation and be able to retrieve it if/when someone asks a KMASS system why the XYZ acronym was not spelled out in this document. Preferably, KMASS systems would have some ability to determine which reports were divisional reports and, thus, also be able to associate this annotation with those reports as well. Exactly how TA C researchers do this will depend upon their proposed technical approaches. Researchers may consider such approaches as natural-language dialogues, visual affordances, or instrumented applications to acquire additional context.

Envisioned Technology Development Path
The "Capture" line for TA C in Figure 2 shows a likely progression through program phases along two dimensions. One of these captures a notional evolution of the complexity of the knowledge that a user will be able to provide, from simple statements of facts in Phase 1, to modifying existing workflows in Phase 2, to completely overhauling the description of how something is done in Phase 3.

The second Capture dimension reflects an evolution of the input modalities available to knowledge producers, starting with the ability to annotate artifacts with audio tracks in Phase 1, progressing to stationary cameras for video fragments in Phase 2, and proceeding to mobile devices in Phase 3.

Evaluation
For Phase 1, TA C should assume that knowledge producers are at the level of the expert whose knowledge should be trusted, both in terms of the content being provided and the expertise required to use the available tools to put that knowledge in the correct place. In practice, DARPA expects these people to be TA C engineers or other staff working directly with the research team. The level of expertise will progress in Phases 2 and 3, but for those evaluations, users will be supplied by the TA E contractor.

Metrics
Consistent with the objective of making collection easy and natural, DARPA has identified tracking the time that it takes new users to add additional nuggets of context to be an important, program-wide metric.

Technical Area D: ***D****isseminating Contextualized Knowledge*
This TA focuses upon developing the technology and techniques needed to make knowledge delivery satisfy the JustINs. It seeks to recognize consumers' specific knowledge requirements and assemble exactly what is needed in a way that can be easily understood.

TA D techniques for effectively disseminating content will depend heavily upon how background knowledge is organized in TA B and how TA C manages the addition of local content and contextual information. For this reason, the proposal for TA D must provide the researchers' vision for how these components will interact to support the goal of targeted delivery of content. The TA D proposal should clearly explain the plan for managing information about users of the system, including things like their background knowledge, previous tasks, current tasks, usage history, preferences, feedback, etc., so that the proposed TA D solution will be able to estimate the knowledge that an individual user needs and when they need it.

TA D should also address the envisioned user experience for knowledge consumers, including plans for managing the form of delivered content (text, audio, video, imagery) and how the proposed technology will choose between these, techniques for minimizing intrusion, plans for allowing the user to influence the behavior of the technology, and balancing the trade-offs between on-demand (pull) and proactive (push) delivery of content.

Envisioned Technology Development Path
The "Disseminate" line of Figure 2 shows a notional progression of the kinds of content TA D will need to deliver, starting with relatively simple facts from the background knowledge and progressing through general knowledge about how things are done locally to very specific, detailed content determined to be the best fit from a set of similar alternatives. The "Delivery" line across the bottom of this section reflects the expectation that over the course of the program, technology will evolve from user-driven questions (pull) to more proactive delivery of content.

Evaluation
The Phase 1 evaluation, which will be conducted by TA B/C/D performers as part of their TA D efforts in their chosen domain, should assume that knowledge consumers are novices that know very little about the domain or how the organization conducts its business. In Phase 2, consumers are expected to be at the journeyman level and at the expert level in Phase 3. Note however, that Phase 2/3 evaluations are going to be conducted by TA E.

To support an assessment of the time required to interface with TA D technology in Phase 1, the TA D research team should produce baseline results for how long and how well an individual with no access to technology takes to complete the tasks used for in-the-flow evaluations.

Metrics
Program-wide metrics for TA D have been identified for each of the JustINs as well as the speed of delivery:

Just in time: Time required to supply a correct answer on demand
Just enough: The number of actions a user needs to take to filter a solution
Just for me: The percentage of delivered answers that are relevant
Speed: Time to complete task baseline improvement

Technical Area E: ***E****valuation*
The role of the TA E performer is to provide the Government with independent assessments of progress of the TA B/C/D technologies throughout the course of the program. The primary challenge with performing this role is going to be developing and conducting assessments of TA B/C/D promise, progress, and performance *without* relying solely upon a single common set of

problems and measures defined by TA E. DARPA expects each selected TA B/C/D technology approach to have various strengths and weaknesses. The TA E performer will be assisting DARPA with understanding the relative merits and shortcomings of the technologies being developed for the program.

This implies a need for TA E to have some understanding of the TA B/C/D technologies in order to develop appropriate technology assessments. DARPA has structured the program to assist with this. In Phase 1 of the program, TA B/C/D researchers will conduct evaluations of their own design, using corpora and application domains that they have chosen to help them assess their own progress and demonstrate the potential value of their technology.

As an important example, TA B/C/D proposers will provide plans for demonstrating the efficacy of their technical approach *independent* of their TA D dissemination technology. This is intended to support a direct assessment of the TA B technology's ability to index and organize audio, video, and text content for subsequent retrieval, without conflating it with TA D's ability to target content to a consumer's specific context. Ideally, TA E will assess the approaches that each TA B/C/D performer uses for this purpose in Phase 1 and leverage insights from these assessments to develop their own mechanisms to demonstrate efficacy as uniformly as possible for all TA B approaches, using performer-specific interfaces only when justified by unique technical approaches.

TA E will supply the corpora (and hence the application domains) that all researchers will work with in the Phase 2/3 evaluations, no later than the Phase 2 kickoff. They will also supply the knowledge producers and consumers (the users) who participate in these assessments. All Phase 2/3 evaluations will be conducted in a location provided by TA E. This will ensure that TA B/C/D approaches are not overly targeted to a particular domain or applications and enable TA E to independently assess the TA B/C/D software. TA E proposals should identify the corpora (and corresponding application domains) that the proposer intends to use and explain why they believe that these are suited to the goals of the program.

TA E proposals must identify the domain that they will use to support Phase 2/3 evaluations of the TA B/C/D KMASS systems, including corpora of background knowledge to be provided to the TA B/C/D teams and any other information to be provided to enable their systems to perform effectively in the proposed domain. Like the TA B/C/D proposers, TA E proposers must identify the tasks that producers and consumers will engage in as they produce and consume knowledge. DARPA is seeking innovative approaches to assessing how well KMASS technology assists with the scaling challenge, as it is unlikely that a TA E proposer will be able to supply an actual organization anywhere close to the size where this challenge begins to manifest.

TA E proposers must specify an approach to evaluating each of the program-wide metrics identified below as well as any additional metrics that would add insights into progress against KMASS goals. They must also plan to assess the merits of metrics proposed by TA B/C/D teams and implement them where feasible. This is particularly important for measures that are specific to the details of a given technical approach.

As noted above, evaluations need to assess the ability of TA C and D to support collection and dissemination in-the-flow. TA E must identify a preliminary set of domain tasks that knowledge producers and consumers will be assigned in Phases 2/3 and explain how these will meet the

program goals. They must also be able to collect baseline performance values for the time that it takes users to complete the tasks used to support in-the-flow evaluations of TA C and TA D, when producers and consumers are neither distracted nor assisted by the TA C/D technologies.

TA E proposers must clearly explain their plan for supporting rigorous evaluations of TA B/C/D solutions during Phases 2/3, while allowing the individual TA B/C/D teams to pursue their independent research objectives. This should include a clear explanation of the plan for deploying TA B/C/D software into TA E facilities in an expeditious fashion that supports DARPA's aggressive evaluation schedule. This plan should consider the high likelihood of software not seamlessly transitioning into a hardware environment different from the one in which it is being developed, the need to debug issues that arise upon such a deployment, and the need to quickly insert patches and other code updates that will inevitably arise.

TA E should not predetermine preferred technical approaches by selecting a single test or set of common tests that each TA B/C/D must take. TA E should explain their plan for developing assessments based upon what they learn about TA B/C/D technologies and their evaluation requirements during Phase 1.

Phase 1 Evaluations
TA B/C/D performers will be conducting evaluations in their domains. These evaluations are expected to be conducted at roughly months 5 and 10 after initial award. For TA C, producers are expected to be experts who produce very specific facts that can be assumed to be correct. In contrast, for TA D, consumers will be at the level of novices, who know very little and are typically interested in very specific facts.

The TA E performer is expected to use Phase 1 to familiarize itself with TA B/C/D technology, infrastructure, software, etc. as part of its preparation to conduct program evaluations in Phases 2 and 3. The TA E performer is expected to review the TA B/C/D assessment plans, observe assessments as they are conducted, and review the data that TA B/C/D performers collect to gain an understanding of each research team's technical approach and the rationale behind their evaluations. They should be incorporating their understanding of the TA B/C/D technical approaches into their preparation for Phase 2, particularly corpus development and HSR protocol development.

TA E will report on their findings to DARPA and use this information to design evaluations for Phases 2 and 3 that will allow each TA B/C/D team to demonstrate the value of their technologies and their progress towards program goals. As a part of the final Phase 1 report, TA E should submit a preliminary evaluation plan to DARPA and explain how this plan allows the various technology development teams to continue to pursue their research objectives. This should include a description of how Phase 2 tests will be adjusted to account for the shift from expert producers to journeymen for TA C and from novices to journeymen for TA D.

Phase 2 Evaluations
Starting in Phase 2, TA E will conduct evaluations of TA B/C/D systems in their facilities. Each TA B/C/D team will be evaluated twice in Phase 2. TA E will provide a server to host TA B/C/D server-side capabilities as well as general-purpose workstations with microphones, speakers, and webcams for end-user access. They must plan to support as many as 25 TA C users and 10 TA D users. (These numbers refer to the number of actual humans; each human may represent more

than one persona as a virtual user to simulate an evaluation of scale.) Any additional hardware needed to support a particular TA B/C/D approach must be supplied by the TA B/C/D performer.

As noted in the relevant section above, TA B software runs offline, prior to and independent of being made accessible to consumers. TA E should arrange with TA B researchers to execute the necessary pre-processing before evaluations involving human subjects begin. Performers should measure and report the processing time required.

TA E will provide knowledge producers and consumers (users) for these assessments via HSR-approved protocols. In Phase 2, both consumers and producers are expected to be journeymen, i.e., above the level of a novice in the domain but not yet an expert. For producers, this means that the scope of their knowledge is fairly limited, but within that narrow scope it can be trusted. For consumers, it implies that KMASS dissemination technology needs to discriminate between knowledge that they already have and knowledge that is outside of the scope of their usual activities. TA E proposals must include a plan for supplying journeyman-level users in their domain for Phase 2.

At the end of Phase 2, the TA E team must submit a preliminary Phase 3 evaluation plan to the Government, that explains how it will extend TA C and D tests to account for new types of users.

Phase 3 Evaluations
TA E will conduct these evaluations and provide the users via approved HSR protocols. There will be two evaluations for each TA B/C/D team in this phase. In addition to the hardware provided for Phase 2, evaluations will also require as many as twenty-five cell phones. TA E proposals should identify the preferred type of phone, based upon ease-of-access by TA B/C/D software developers for instrumentation and application development, with cost being a secondary consideration. The phones procured by TA E are intended solely to support KMASS evaluations. TA B/C/D teams should plan to procure their own, presumably similar, models to support their software development.

In Phase 3, TA C users will include both journeyman and novice users, who may provide inconsistent or incorrect knowledge or may not be fully aware of where or how it applies. For TA D, consumers will include both journeymen and experts, who will only occasionally need very specific information.

General Guidelines Applicable to Multiple TAs
DARPA is interested in pursuing a variety of ways to achieve the programs goals. For each TA, proposers should state their technical approach, identify their research objectives, and show how these objectives align with the program objectives for that TA. Proposers should include their assessments of the relevant trade space, together with their rationale for selecting their proposed approach. Proposers should clearly explain their plans for assessing and demonstrating progress towards their technology objective, including metrics specific to their approaches. Proposers must explain how their approach will scale over the phases of the program.

Proposers to TA B/C/D must identify a domain in which they will conduct their research and development throughout the course of the program. Examples of what might constitute such a domain are appliance repair, IT support, first aid, accounting, collaborative research, etc. To do this, they should identify a set of tasks that are representative of an organization of some kind.

They should identify an available corpus of documents, videos, audios, etc. that contains information relevant to these tasks. It is important that this corpus include a representative set of step-by-step instructions that describe different procedures for doing things, background information relevant to those tasks, and, ideally, policy documents that supply additional constraints upon more general procedures. Not every document in the corpus needs to be directly relevant to these tasks, as part of the challenge for managing background knowledge stems from the tyranny of scale: people need to find information when it is comingled with large numbers of other artifacts. TA E proposers must identify a domain in which they propose to perform program-wide evaluations.

The KMASS vision is to make it easy and natural for people to produce knowledge *as they are engaged in relevant tasks.* Similarly, KMASS seeks to make knowledge available to people as they need it to perform a task (in-the-flow). Therefore, TA B/C/D proposals must identify the set of domain tasks that knowledge producers and consumers will be assigned and use these to explain how their technology will support in-the-flow collection and dissemination of knowledge. The research domain must support internal progress evaluations against KMASS metrics as well as those proposed by the researchers. The proposing team should include the experience, infrastructure, and expertise necessary to support effective research progress in this domain against all KMASS objectives.

Proposers should identify key characteristics of their proposed domain that can be used to map to other domains, such as the one depicted in the illustrative use case summarized in Section I.B. above. This will assist reviewers with understanding the relative ease of applying their technology to the domain that the TA E performer will provide for Phases 2 and 3. This research domain must be capable of supporting internal progress evaluations towards KMASS goals. Specifically, TA B/C/D proposers must explain how they will use their domain to support assessments of their ability to address the challenge of scaling to large organizations.

TA B/C/D proposers should note that Phase 2/3 evaluations are to be conducted at a site chosen by TA E. For proposal cost purposes, assume a trip to a major metropolitan area on either coast of the U.S. (whichever is more expensive). Proposers should plan on deploying their software to this location (specifically, do *not* assume any form of remote access will be supported) and must absorb all associated costs for software and any special-purpose hardware that they will need to install at the TA E location for this purpose. Assume TA E will supply up to 25 potential knowledge providers (user subjects for TA C) and up to 10 knowledge consumers (TA D users). TA E will also provide end-user workstations and a single server to support TA B/C/D deployments. TA B/C/D should describe the performance characteristics of the server hardware that they will use in their own R&D so that the Government and the TA E contractor can understand expectations for the TA E hardware.

For costing purposes, proposers should assume that they may need to provide direct, on-site support for their systems for 2 two-week periods in both Phase 2 and Phase 3 and may require additional travel to prepare for these assessments.

Because KMASS is envisioned as an integrated system comprising capabilities across TAs B/C/D, proposals must explain how these capabilities are achieved by their technical approach. Technologies that contribute capabilities across TAs must be identified and mapped to their contributions to each TA to which they contribute. In addition, common infrastructure that

supports all three TAs, including specifically the persistent knowledge store, must be identified and its characteristics and capabilities related to the KMASS objectives.

F. Schedule/Milestones

Figure 3 below contains metrics for each phase of KMASS for TA B/C/D. TA B/C/D proposers must clearly explain how their approach will achieve the values for each of these metrics. TA E proposers must clearly explain how they will measure each of these metrics.

These metrics are based on the understanding of what is needed to achieve the KMASS vision. Included are notional assumptions and calculations for metrics. TA B/C/D and TA E are encouraged to identify new metrics, improve upon the metrics identified in this BAA, and recommend innovative approaches to assessing the ability for the software to scale to large organizations, assuming limited program resources. Proposed metrics should include (1) baselines (with sources), (2) mapping back to KMASS goals, (3) assumptions, and (4) a formula.

TA B: Organizing Background Knowledge		Phase 1	Phase 2	Phase 3
Textual Granularity	80% accuracy locating results at these levels	documents	paragraphs	sentences
Video Granularity	65% performance locating 5-best results at these levels	videos	1 min clip	frames
Text Sources	# of documents in background knowledge	20k	120k	800k
Video Sources	# of video hours in background knowledge	40	220	400
TA C: Capturing Local Knowledge		Phase 1	Phase 2	Phase 3
Easy and Natural	Additional time to add a fact while working on a task	10 minutes	5 minutes	2 minute
TA D: Disseminating Contextualized Knowledge		Phase 1	Phase 2	Phase 3
Just in time	Time to supply a correct answer	60 seconds	8 seconds	1 second
Just enough	Number of user actions required	10	5	1
Just for me	% of relevant answers	70%	83%	98%
Integrated KMASS System		Phase 1	Phase 2	Phase 3
Speed	Speed improvement	1.1x	2x	5x
Scale	Potential scale assessments may include: knowledge elements, number of distinct tasks, number of policies that may apply to a task, number of CoP's, number of distinct roles within CoPs, number of tasks per CoP, etc.	TBD	TBD	TBD

Figure 3 KMASS Metrics

- Textual Granularity – 80% accuracy locating results at these levels (documents, paragraphs, sentences)
    - Purpose: TA B must preserve and manage textual content at the document, paragraph, and sentence levels.
    - Proposed Assumptions:
        - There will be a sequence of queries to measure accuracy.
        - The expected results of the queries will be known by the evaluator beforehand. This implies that all textual content in the corpus will be labeled at the document, paragraph, and sentence level.
    - Proposed Calculation:
      Accuracy = $\frac{TP + TN}{TP + TN + FP + FN}$, where TP,TN,FP,FN are the standard True Positives, True Negatives, False Positives, and False Negatives respectively.
- Video Granularity – 65% performance locating 5-best results at these levels (videos, 1 min clip, frames)

- Purpose: TA B must preserve and manage video content at the video, 1 min clip, and frame levels.
- Proposed Assumptions:
  - There will be a sequence of queries to measure performance.
  - The expected best result of the queries will be known by the evaluator beforehand. This implies that all video content in the corpus will be labeled at the video, 1 min clip, and frame levels.
  - Assuming a sequence of n queries, for each query there will be one best result, r_k, and the performer will be expected to return the top-5 predictions $(p_{1,k},p_{2,k},p_{3,k},p_{4,k},p_{5,k})$, where k goes from 1 to n. For each query in the sequence, if the top result is one of the top-5, the prediction will be counted as correct.
- Proposed Calculation:

  % Performance $= \frac{\sum_{k=1}^{n} \mathrm{f(k)}}{n}$, $where\ f(k) = \begin{cases} 1, & r_k \in (p_{1,k},p_{2,k},p_{3,k},p_{4,k},p_{5,k}) \\ 0, & o.w \end{cases}$

- Text Sources – # of documents in background knowledge
  - Purpose: TA B must ingest a large amount of textual content.
  - Proposed Assumptions:
    - Not all of the textual content will be unique; as in the real-world, repetition may occur.
    - The definition of a document will be corpus dependent.
- Video Sources – # of video hours in background knowledge
  - Purpose: TA B must ingest a large amount of video content.
  - Proposed Assumptions:
    - Not all of the video content will be unique; as in the real-world, repetition may occur.
    - Videos must contain an audio track.
- Easy and Natural – Additional time to add a fact while working on a task
  - Purpose: TA C must make it easy and natural for a producer to add content in-the-flow.
  - Proposed Assumptions:
    - Task(s) are defined in the corpora.
    - The facts are known by the evaluator beforehand.
    - The fact being added is directly applicable to the task being worked on.
    - A fact may be added anytime during the task.
    - After the task has been completed, the evaluator will verify that the fact has been added.
    - Assuming there are m tasks and n producers, each of which attempts a task s times, $PT_{p,n}^{t}$ will represent the total task time for producer p to complete task t on their nth attempt while adding a fact.
  - Proposed Calculation:

    Additional time $= \frac{\sum_{t=1}^{m}\left(\sum_{n=1}^{s}\sum_{p=1}^{n}(PT_{p,n}^{t} - PT_{0,n}^{t})\right)}{msn}$, where $PT_{0,n}^{t}$, is the baseline time for a producer to complete the task without adding a fact on the n-th attempt.
- Just in time – Time to supply a correct answer

    - Purpose: TA D must deliver knowledge when the consumer needs it.
    - Proposed Assumptions:
        - Correct answers will be with respect to completing a task.
        - Task(s) are defined in the corpora.
        - The correct answers are known by the evaluator beforehand.
        - Later in the program, when information is being pushed to the producer, the evaluator will have some predefined range of time that is considered appropriate to supply a correct answer.
- Just enough – Number of user actions required
    - Purpose: TA D must deliver easily understood knowledge by giving the right amount of content.
    - Proposed Assumptions:
        - Number of user actions will be with respect to completing a task.
        - Task(s) are defined in the corpora.
        - User actions will be defined by the evaluators, but can be thought of as things like running another query, clicking another link, looking up a definition, etc.
- Just for me – % of relevant answers
    - Purpose: TA D must deliver directly applicable knowledge.
    - Proposed Assumptions:
        - Relevant answers will be with respect to completing a task.
        - Task(s) are defined in the corpora.
        - Results will be user dependent.
- Speed – Speed improvement
    - Purpose: The KMASS system must reduce the overall time to complete tasks.
    - Proposed Assumptions:
        - Task(s) are defined in the corpora.
        - Total task completion time as compared to a baseline.
        - Assuming there are m tasks, n consumers each of which completes the task s times, $CT_{c,n}^{t}$ will represent the total task time for consumer c to complete task t on their nth attempt using a KMASS system.
    - Proposed Calculation:

      Speed Improvement $= \frac{\Sigma_{t=1}^{m}\left(\Sigma_{n=1}^{s}\left(\sum_{c=1}^{n}\frac{CT_{0,n}^{t}}{CT_{c,n}^{t}}\right)\right)}{msn}$, where $CT_{0,n}^{t}$, is the baseline time to complete the task on their nth attempt without a KMASS system.
- Scale – TBD
    - Purpose: The KMASS system must improve task effectiveness.

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

A target start date of January 2022 may be assumed for planning purposes.

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.

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 seven three-day meetings over the course of 36 months: four meetings in the Washington, D.C. area and three meetings in the San Francisco, CA area.

- TA B/C/D performers will conduct two evaluations per phase which will be scheduled in coordination with TA E, who will develop the master evaluation schedule for approval by DARPA.

- 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.

- Proposers should also anticipate the need to travel to the DARPA location in Arlington, VA once a year to report upon the progress of their individual efforts.

- During Phases 2 and 3, TA B/C/D must provide the technical support necessary for TA E to conduct KMASS evaluations of TA B/C/D software at a site chosen by TA E. The details of this technical support will depend upon both the TA B/C/D software architecture and the details of the TA E evaluation environment, but TA B/C/D proposers should anticipate this requirement and the potential for travel. For costing purposes, proposers may assume that the evaluations will occur at a facility in the National Capital Region.

G. Deliverables

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

- Comprehensive quarterly technical reports due within ten days of the end of the given quarter, describing progress made on the specific milestones as laid out in the SOW.

- A phase completion report submitted within 30 days of the end of each phase, summarizing the research done.

- Other negotiated deliverables specific to the objectives of the individual efforts. These may include registered reports, experimental protocols, corpora, demonstrations, publications, intermediate and final versions of software libraries, code, and APIs, including documentation and user manuals.

- TA B/C/D performers will deliver a working system capable of being evaluated by the TA E performer in Phases 2 and 3.

- TA B/C/D performers will brief DARPA on Phase 1 evaluation results and also submit a written summary of results due within two weeks of the completion of each evaluation.

- TA E will brief DARPA on evaluation results within two weeks of the completion of all TA B/C/D evaluations and also submit a written summary of results no later than 45 days after individual team's assessments are completed.

- Reporting as outlined in Section VI.C.

H. Government-furnished Property/Equipment/Information

DARPA does not anticipate providing property, equipment or information to support KMASS research efforts.

I. Other Program Objectives and Considerations

1. Collaboration

All TA B/C/D awardees will be required to work collaboratively with the TA E awardee to support planned program evaluations. TA B/C/D proposals must acknowledge the requirement to supply their software and support for evaluations in a TA E-designated facility in program Phases 2 and 3, their plan to accommodate TA E observers for Phase 1 evaluations, and software and documentation to the military engagement partners. To facilitate collaboration, all performer contracts / cooperative agreements / Other Transactions will include an Associate Contractor Agreement (ACA) clause for portions of the contracts / cooperative agreements / Other Transactions requiring joint participation between each TA B/C/D team and the TA E team in the accomplishment of the program requirements. This provision will become a material requirement for any contracts / cooperative agreements / Other Transactions 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 evaluation of TA B/C/D 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 the contracts / cooperative agreements / Other Transactions award date. See Section VIII.D for a sample ACA clause.

2. Intellectual Property

It is encouraged that all noncommercial software (including source code), software documentation, and technical data generated by the program be provided as deliverables to the Government with a minimum of Government Purpose Rights (GPR) as lesser rights may adversely impact the lifecycle costs of affected items, components, or processes. Any commercial software that is a necessary component of a performer's approach must be identified and include a description of the license rights to be provided to the Government and how the license rights provided will enable use in any follow-on Government research programs. See Section VI.B.4 for additional information.

II. Award Information

A. General Award Information

DARPA anticipates multiple awards for TA B/C/D and a single award for TA E.

The level of funding for individual awards made under this BAA will depend on the quality of the proposals received and the availability of funds. Awards will be made to proposers[5] whose proposals are determined to be the most advantageous to the Government, all evaluation factors considered. See Section V for further information.

The Government reserves the right to:

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

Proposals identified for negotiation may result in a procurement contract, cooperative agreement, or Other Transaction (OT), depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors.

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

In accordance with 10 U.S.C. § 2371b(f), the Government may award a follow-on production contract or Other Transaction (OT) for any OT awarded under this 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

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

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.

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.§ 2539b may be the appropriate statutory starting point for some entities, specific supporting regulatory guidance, together with evidence of agency approval, will still be required to fully establish eligibility. DARPA will consider FFRDC and Government Entity eligibility submissions on a case-by-case basis; however, the burden to prove eligibility for all team members rests solely with the proposer.

2. 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: PROPOSAL TEMPLATE 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. § 2371). Cost sharing is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

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

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

No organization, whether a prime, subcontractor, individual, or any in any other capacity, may be awarded work on TA B/C/D and TA E. 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.

IV. Application and Submission Information

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

- The proposed TA B/C/D concept is applicable to all of the TAs described herein.
- The proposed TA E concept is applicable to all of the TAs described herein which includes identifying intended corpora, application domains, and supporting rationale.
- The proposed TA E concept demonstrates an understanding of the relevant TA B/C/D technologies that they will be expected to assess.
- The proposed concept is suitable for both scale and speed.
- The proposed concept is important to DSO's current investment portfolio.
- The proposed concept investigates an innovative approach that enables revolutionary advances, i.e., will not primarily result in evolutionary improvements to the existing state of practice.
- The proposed work has not already been completed (i.e., the research element is complete but manufacturing/fabrication funds are required).
- The proposer has not already received funding or a positive funding decision for the proposed concept (whether from DARPA or another Government agency).

Abstracts and full proposals that are not found to be applicable to the KMASS BAA as defined above may be deemed non- conforming[6] 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

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

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 by briefly answering 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 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 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 cooperative agreement do not need to include Attachment E: PROPOSAL TEMPLATE VOLUME 2: COST. 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. DARPA Embedded Entrepreneur Initiative (EEI)

Awardees pursuant to this solicitation may be eligible to participate in the DARPA Embedded Entrepreneur 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 to 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 Transition Working Groups; and (3) Additional funding for awardees to hire an embedded entrepreneur to achieve specific

commercialization milestones and work towards the delivery of a robust transition plan for 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 commercial milestones to deliver 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's Commercial Strategy team.

DARPA's Commercial Strategy team 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 Guard (SCG) and/or

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

C. Submission Dates and Times

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

DARPA will acknowledge receipt of *complete* submissions via email and assign identifying numbers that should be used in all further correspondence regarding those submissions. If no confirmation is received within two business days, please contact the BAA Administrator at KMASS@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 KMASS@darpa.mil. Questions regarding submission contents, format, deadlines, etc. should be emailed to KMASS@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 KMASS@darpa.mil. Questions regarding submission contents, format, deadlines, etc. should be emailed to KMASS@darpa.mil. Questions/requests for support sent to any other email address may result in delayed/no response.

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

ii. Direct Mail/Hand-carry

Proposers electing to submit procurement contract or Other Transaction proposals via direct mail or hand-carried must provide one paper copy and one electronic copy on CD or DVD of the full proposal package. All parts of the proposal package must be mailed or hand-carried in a single delivery to the address noted in Section VII below.

c. Proposals Requesting a Cooperative Agreement

Proposers requesting cooperative agreements 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: Research and Related Senior/Key Person Profile (Expanded), available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_KeyPersonExpanded_2_0-V2.0.pdf. *This form must be completed and submitted.*
The Research and Related Senior/Key Person Profile (Expanded) form 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:

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

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

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

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

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

ii. Direct Mail/Hand-carry

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

V. Application Review Information

A. Evaluation Criteria

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

- **Overall Scientific and Technical Merit**

The proposed technical approach is innovative, feasible, achievable, and complete.

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

The review process identifies proposals that meet the evaluation criteria described above and are, therefore, selectable for negotiation of awards by the Government. DARPA policy is to ensure impartial, equitable, comprehensive proposal evaluations and to select proposals that meet DARPA technical, policy, and programmatic goals. Proposals that are determined selectable will

not necessarily receive awards (see Section II). Selections may be made at any time during the period of solicitation. For evaluation purposes, a proposal is defined to be the document and supporting materials as described in Section IV.

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. Federal Awardee Performance and Integrity Information (FAPIIS)

Following the review and selection process described above, but prior to making an award above the simplified acquisition threshold (FAR 2.101), DARPA is required[7] to review and consider any information available through the designated integrity and performance system (currently FAPIIS). Selectees have the opportunity to comment on any information about themselves entered in the database. DARPA will consider any comments and other information in FAPIIS or other systems prior to making an award.

VI. Award Administration Information

A. Selection Notices

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

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

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 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:

- DUNS number
- TIN
- Commercial and Government Entity (CAGE) Code. If a proposer does not already have a CAGE code, one will be assigned during SAM registration.
- Electronic Funds Transfer information (e.g., proposer's bank account number, routing number, and bank phone or fax number).

3. Representations and Certifications

In accordance with FAR 4.1102 and 4.1201, proposers requesting a procurement contract must complete electronic annual representations and certifications at https://www.sam.gov/.

In addition, 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. 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**: Ted Senator, Program Manager, DARPA/DSO
- **BAA Email:** KMASS@darpa.mil
- **BAA Mailing Address:**

  DARPA/DSO
  ATTN: HR001121S0034
  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

The KMASS Proposers Day will be held on July 7, 2021 via webcast. Advance registration is required. See DARPA-SN-21-33 posted at https://SAM.gov/ for all details. Participation in the KMASS Proposers Day 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 KMASS@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 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 KMASS@darpa.mil no later than 4:00 p.m. July 9, 2021. 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 Associate Contractor Agreement (ACA) Text

The Government intends to add the following text to all cooperative agreements / contracts / Other Transactions awarded under this BAA.

Associate Contractor Agreements

(a) It is recognized that success of the [List brief description of research effort] research effort depends in part upon the open exchange of information between the various Associate Contractors involved in the effort. This requirement is intended to ensure that there will be appropriate coordination and integration of work by the Associate Contractors to achieve complete compatibility and to prevent unnecessary duplication of effort. By executing this contract, the Contractor assumes the responsibilities of an Associate Contractor. For the purpose of this requirement, the term Contractor includes subsidiaries, affiliates, and organizations under the control of the contractor (e.g. subcontractors).

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

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

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

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

(3) delineation of detailed interface responsibilities;

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

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

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

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

(f) Associate Contractors for this research effort include:

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