Broad Agency Announcement
Faithful Integrated Reverse-Engineering and Exploitation (FIRE)
Microsystems Technology Office
HR001123S0025
15 March, 2023

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PART I: OVERVIEW INFORMATION

- **Federal Agency Name**: Defense Advanced Research Projects Agency (DARPA), Microsystems Technology Office (MTO)
- **Funding Opportunity Title:** Faithful Integrated Reverse-Engineering and Exploitation (FIRE)
- **Announcement Type:** Initial Announcement
- **Funding Opportunity Number:** HR001123S0025
- **Catalog of Federal Domestic Assistance Numbers (CFDA):** 12.910 Research and Technology Development
- **Dates:** (All times listed herein are Eastern Time)
    - Posting Date: March 15, 2023
    - Proposers Day: March 16, 2023
    - Abstract Due Date: March 31, 2023
    - FAQ Submission Deadline: April 21, 2023
    - Proposal Due Date: May 19, 2023
    - Estimated period of performance start: October, 2023
- **Concise description of the funding opportunity:** The Faithful Integrated Reverse-Engineering and Exploitation (FIRE) program seeks to develop tools that provide a transformative end-to-end capability from system acquisition to exploitation, including preparation.
- **Anticipated Funding Available for Award:** $70M
- **Anticipated individual awards**: DARPA anticipates multiple awards for all Technical Areas (TAs).
- **Anticipated funding type:** 6.2
- **Types of instruments that may be awarded:** Cooperative Agreement, Procurement contract, or other transaction. Grants will not be considered.
- **Agency contact:**

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PART II: FULL TEXT OF ANNOUNCEMENT

I. Funding Opportunity Description

The Defense Advanced Research Projects Agency (DARPA) often selects its research efforts through the Broad Agency Announcement (BAA) process. This BAA is being issued, and any resultant selection will be made, using the procedures under Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016 and 2 C.F.R. § 200.203. Any negotiations and/or awards will use procedures under FAR 15.4, Contract Pricing. Proposals received as a result of this BAA shall be evaluated in accordance with evaluation criteria specified herein through a scientific review process. DARPA BAAs are posted on the System for Award Management (SAM) website, under the Contract Opportunities link, at https://sam.gov/.The following information is for those wishing to respond to the BAA.

The Microsystems Technology Office (MTO) at DARPA seeks proposals that provide a strong and innovative technical approach that show a constructive plan to fully address the FIRE program goals and metrics. Proposers 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.

The FIRE BAA has a classified addendum that is strongly encouraged for TA4 and TA5 proposers and optional for TA1, TA2, and TA3. Please fill out Attachment 6 for more information.

A. Background

The Faithful Integrated Reverse-engineering and Exploitation (FIRE) program seeks to develop transformative tools to find, exploit, and patch vulnerabilities in medium-complexity cyber-physical systems (CPS) within a month from when the physical system is delivered to the analysis team. FIRE is primarily interested in cyber-physical vulnerabilities (CPV), ones that arise from the composition of hardware, software, and physical components where each component may not be vulnerable in-and-of itself.

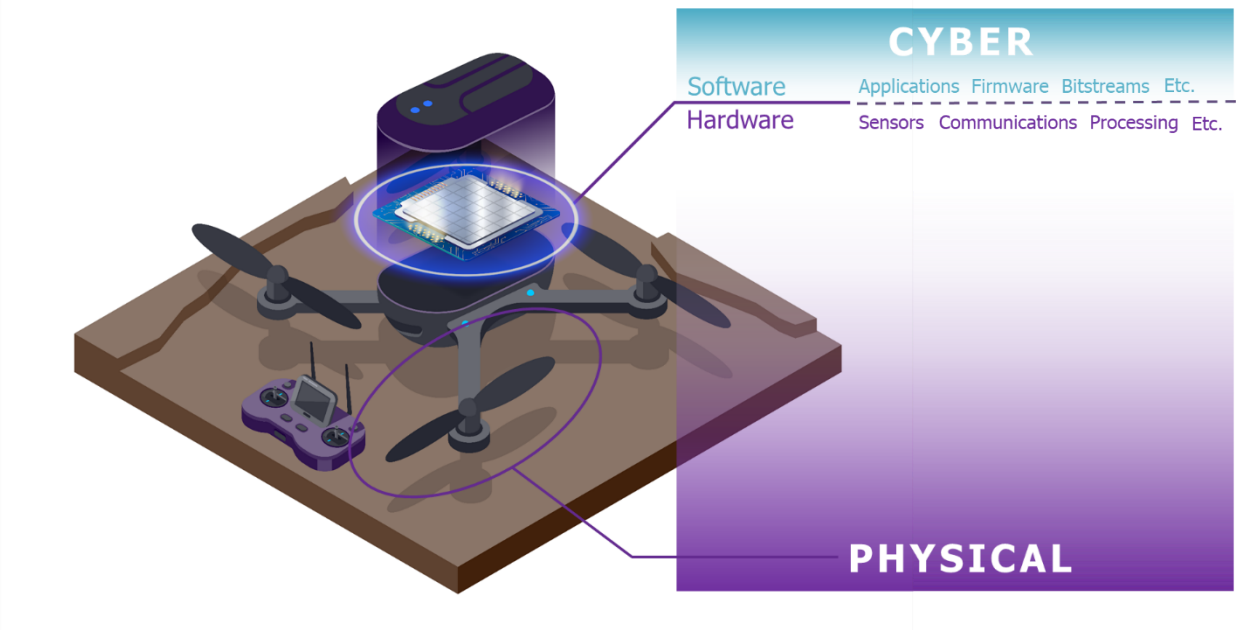

Figure 1. A quadcopter is an example of a cyber-physical system that operates in the physical world using hardware sensors to perceive the analog environment, digital software for processing, and actuators to interact with the environment.

The FIRE goals are driven by the proliferation of low-cost commercial-off-the-shelf (COTS) components (e.g., sensors, actuators, and algorithms) resulting in diverse classes of CPS including smart meters, medical devices, autonomous vehicles, and industrial control systems to name a few. Furthermore, agile development practices have shown that even highly complex systems such as a car can be remotely patched every few weeks. Innovative CPS vulnerability analysis tools and techniques are needed to keep pace with increased system diversity and decreased analysis timelines.

The FIRE program uses the following definitions:

- *Cyber Component*: Hardware or software that performs a unique function
- *Physical Component*: A part that interacts with the environment, e.g. motors, rotors
- *Hardware (HW)*: Electronic components, e.g., sensors, filters, communications, FPGAs (field programable gate arrays), and CPUs (central processing units)
- *Software (SW)*: Components used to reconfigure hardware such as FPGAs and CPUs
- *Cyber-Physical System (CPS)*: A system composed of cyber (hardware and software) components, physical components (such as rotors) that operate in the physical environment (see Figure 1)
- *Medium-complexity CPS*: A CPS consisting of ~1000 SW and ~100 HW components.
- *Plant*: The physical properties of a CPS; the totality of the physical components
- *Vulnerability*: A property that can lead to unexpected behavior(s)
- *Exploit*: Inputs and conditions that use a vulnerability to cause an observable unexpected behavior
- Patch: A change to a system that removes unexpected behaviors (vulnerabilities) while maintaining expected behaviors; patches might neither be appropriate nor possible until expected behaviors are exhaustively defined
- *Vulnerability Analysis (VA)*: The act of finding, exploiting, and patching (when possible and appropriate) vulnerabilities

The FIRE program has five (5) technical areas (TAs):

TA1 Modeling will seek to develop tools that can model entire systems (to include hardware, software, and physical) with enough fidelity to find, exploit, and patch vulnerabilities, and are fast enough to meet the overall one-month program goal.

TA2 Simulation will seek to develop simulators that have enough precision to model interactions between system components and are fast enough to meet the overall program goals.

TA3 Preparation will seek to develop tools that reduce the amount of time needed to prepare a system for analysis to include techniques to accurately identify components, connections, and/or board layouts.

TA4 Integration will seek to create the FIRE tool(s) that meet the overall one-month program metric by integrating TA1, TA2, and TA3 solutions.

TA5 Engineering Support Task will seek to work with government and Independent Verification and Validation (IV&V) teams to develop representative medium-complexity CPS with full data rights for TA1, TA2, TA3, and TA4 performers to test, evaluate, and demonstrate their solutions.

DARPA strongly prefers proposals that respond to either all of TA1 through TA4 or TA5. However individual proposals to TA1, TA2, TA3, or TA4, will also be considered if sufficient funding is available.

Scalable automated software vulnerability analysis techniques pioneered by previous DARPA programs (such as the DARPA Cyber Grand Challenge) are now standard practice. Large commercial organizations and multiple open-source projects (e.g., Continuous Fuzzing for Open Source Software - OSSFuzz) use techniques such as guided fuzzing and symbolic analysis to find software vulnerabilities and generate software exploits. Software patches to these exploits can be generated in cases where expected behaviors are exhaustively defined.

The FIRE program seeks to develop innovative tools that can scale automated vulnerability analysis beyond software systems and into CPS by overcoming the preparation, modeling, and simulation technical challenges.

Cyber-physical systems (such as the quadcopter depicted in Figure 1) operate in the physical world using hardware sensors to perceive the analog environment, digital software for processing, and actuators to interact with the environment. The same applies to cyber-physical vulnerability analysis (CPVA). Similar to how software vulnerability analysis depends on the accuracy of all aspects of software execution (including, but not limited to, protocols, system calls, and instruction set architectures), CPVA is expected to depend on the accuracy of all aspects of cyber-physical execution (including hardware, software, plant, and environment.) The FIRE program is only interested in tools for cyber-physical vulnerabilities, tools that address ONLY cyber vulnerabilities or ONLY physical vulnerabilities are outside of the scope of the program.

To illustrate, consider a simple COTS quadcopter composed of

- A hardware MEMS (Micro-Electro-Mechanical Systems) accelerometer to perceive its linear and angular accelerations; this sensor has a data corruption vulnerability due to acoustic interference[1]
- Motors and rotors to produce lift and controlled flight
- A software program to ensure stability by periodically monitoring accelerometer inputs and generating corresponding rotor outputs

A software-only vulnerability analysis will not be able to detect and recognize the MEMS vulnerability. The hardware sensor must also be modeled. Conversely, the sensor vulnerability might not result in a cyber-physical effect if the corruption is filtered or otherwise accounted for by the control software. That is, while the data corruption behavior is unexpected at the MEMS component level, it was expected and therefore accounted for at the CPS level. It is not a CPV.

[1] https://www.usenix.org/conference/usenixsecurity15/technical-sessions/presentation/son

Similarly, a drone that is resting on the ground is not useful for demonstrating an exploit that causes the system to descend.

CPVA requires context from hardware, software, plant, and environment. In the example, the quadcopter has a cyber-physical vulnerability. If the quadcopter uses the problematic MEMS accelerometer, there is no additional filtering, and the system is in flight. An exploit for this vulnerability might be a specific signal that causes the quadcopter to crash, and a patch might be a software filter to remove the RF interference while maintaining expected behaviors.

A medium-complexity cyber-physical system is expected to have tens to hundreds of hardware components and up to thousands of software components that perform unique functions. This includes systems ranging from smart meters to some industrial control systems and autonomous vehicles. The simple six degrees of freedom quadcopter mentioned above has only eleven hardware components (six sensors for each degree of freedom, four actuators, and one processor for software) with an unspecified number of software components.

B. Program Description

The FIRE program seeks innovative solutions to find, exploit, and patch vulnerabilities in medium-complexity CPS within a month of an analysis team receiving the physical system. This could be accomplished by overcoming three technical challenges: 1) modeling, 2) simulation, and 3) preparation. This may also require creating a new discipline that bridges mechanical engineering, computer science, electrical engineering, mathematics, and cybersecurity so that proper tradeoffs can be made when integrating the solutions into a single set of tools. The program metrics are defined in Figure 2.

	Phase 1a	Phase 1b	Phase 2a	Phase 2b
TA1 CPVA Accuracy[1]	90%	90%	90%	90%
TA2 Simulation Time[2]	10 seconds	10 seconds	1 second	1 second
TA3 Preparation time[3]	3 days	3 days	1 day	1 day
TA4 CPVA Development Time[4]	1 month	1 month	1 month	1 month
TA5 Engineering Support Task	10 software 2 hardware	100 software 10 hardware	100 software 50 hardware	1000 software 100 hardware

[1]CPVA Accuracy: the model's ability to predict an exploit's effect
[2]Simulation Time: the time needed to simulate one second of real time
[3]Preparation Time: the time needed to identify components, their inter-dependencies, analysis point locations, and how the analysis points can be used
[4]CPVA Development Time: the total time from receiving CPS to exploit including preparation

Figure 2. Program Metrics

Metrics will be evaluated using a specially designed test and evaluation platform (see TA5 description) with known cyber-physical vulnerabilities inserted by the IV&V team. This will serve as the ground truth. Previously unknown vulnerabilities found by performers and verified by IV&V will be added to the corpus for test and evaluation purposes. Since not all vulnerabilities can be successfully demonstrated to be correct and successfully patched, but all exploits can be successfully demonstrated, the FIRE program uses exploits as the basis for metrics. Patching tools

and techniques, while not directly measured, are still of interest to the FIRE program. Proposers are encouraged to identify additional metrics in their technical approaches.

DARPA may establish a government-run, incremental, and iterative development and operations (DevOps) pipeline to accelerate the creation, adoption, and delivery of FIRE tools into transition partner ecosystems. The pipeline will also enable collaboration between each of the TAs to facilitate earlier and easier integration. The pipeline will provide an environment where operational users, developers, and researchers can engage collaboratively in the creative process to converge on solutions that neither group(s) would conceive in isolation.

1. TA1 Modeling: Scaling Complexity in Models while Maintaining Accuracy

Accurate models run the risk of losing accuracy once the complexity starts increasing. Software vulnerability analysis has traditionally focused on a small variety of systems (such as Windows, Linux, iOS, Android on x86, and ARM). Large corpora of software can be analyzed once models for this small set of systems is created – often by hand. This approach is not practical for CPS, where both hardware and software are reconfigurable. In addition to general purpose central processing units, CPS often contain digital signal processors (DSP), FPGAs, programmable logic controllers (PLC), etc. All of these components and their software-like programs will likely need to be modeled in order to properly support CPVA. Furthermore, hardware sensors, discrete electronic components, the physical characteristics of the plant and environment, any timing-sensitive behaviors, etc. might need to be modeled as well. Special consideration should be paid to modeling explicit and implied timing-sensitive behaviors of individual components as well as across HW, SW and physical components.

Since the modeling space is enormous, guided modeling tools and techniques are needed to balance model accuracy with performance. The model accuracy needed for finding vulnerabilities may be different from that needed for predicting the effects of an exploit on the actual system which may also be different from that needed to patch CPS. Proposals should describe these differences, if any, their implications to the CPVA workflow, and corresponding mitigating approaches in the technical proposal.

The FIRE program is interested in tools and techniques to perform vulnerability analysis with imperfect models, not tools and techniques to create perfect models for vulnerability analysis. The latter approach is likely not have the performance required to meet program goals. Potential approaches include, but are not limited to, falsification, adaptive partitioning, automated model inference and system identification, and abstract surrogates.

The program goal of TA1 is to develop tools and solutions to assist TA4 solutions in finding, exploiting, and patching (when possible and appropriate) CPVs within the overarching program metrics. The TA1 proposal should address:

- Models at different levels of abstractions such as component, sub-system and system levels
- Optimization strategies to utilize available time prior to when the CPS is received
- Situations where components might be damaged, inaccessible or incomplete (e.g., only one side of a two-way communication)
- The ability to continuously improve models over time and across systems

Proposers bidding to all TA1 through TA4 should consider inter-dependencies and impacts across all TAs. This includes, but is not limited to, information needed from TA3 performers,

dependencies on debug accesses from TA5 performers, and reliance on access to facilities for physical measurements if needed. TA1 proposers should also consider the impact of models and representations (e.g., data formats) on the overall CPVA goal. Different data formats may impact the performance of TA2 simulators and vice versa. TA1 proposers are encouraged to differentiate between model inaccuracy, imprecision, and errors as well as how to identify and fix them.

2. TA2 Simulation: Maintaining synchronization in simulations as the size of the system grows

Timing accuracy in simulations decreases as simulations increase in size and complexity. For example, timing jitter is an important consideration for embedded systems design and therefore may need to be accurately simulated. Furthermore, cyber-physical systems are composed of distributed concurrent hardware, software, and physical components operating in both discrete and continuous time domains, which make synchronizing time infeasible in general. Traditional simulation techniques used hardware-in-the-loop to overcome timing and synchronization, but this limits scaling to the number of physical systems that could be used in hardware-in-the-loop. The increased diversity and decreased timelines of system updates creates a need for more scalable and performant approaches.

Guided simulation tools and techniques are needed that can find the balanced zone of synchronizing just the components that need to be synchronized, with just the necessary time granularity and just the right timing disturbances in order to perform CPVA. Potential approaches include, but not limited to, dynamic temporal decoupling, limiting simulation time horizons, dynamic detection, and temporal logic(s).

An overarching goal of TA2 tools and solutions is to scale CPVA beyond the limits of hardware-in-the-loop analysis. The TA2 proposal should address:

- Simulators that enable analyses in virtual environments
- Scalability to available compute resources rather than physical systems
- Optimization strategies to utilize available time prior to when the CPS is received
- The ability to continuously improve simulations across time and across systems

Proposers bidding to all TA1 through TA4 should consider inter-dependencies and impacts across all TAs. For example, proposals should consider the differences between event ordering accuracy and timing accuracy since these can depend on TA1 and TA3 capabilities and can impact TA4 algorithms. Similarly, TA2 proposers are encouraged to differentiate between inaccuracies, imprecision, and errors, as well as how to identify and fix them. TA2 proposers are encouraged to consider the differences between clock domains such as those, at the hardware component, board, communications bus, control systems, and processor levels. They are also encouraged to consider the differences between clocks, events, interrupts, etc. These may pose unique challenges and opportunities and should be described in the technical proposal.

3. TA3 Preparation

The tangible nature of CPS imposes additional constraints that challenge existing analysis techniques. It is necessary, but not sufficient, to simply extract firmware/software from a CPS. The timing, data, and control dependencies between hardware and software components might need to be exposed before modeling and simulation can begin. After modeling and simulation has begun,

it may be necessary to continuously guide the exploit analysis by gathering information on and/or setting the CPS context (also known as the CPS state.)

The CPS context is expected to be component and CPS specific, which will require automated tools and techniques to uniquely identify the components, their inter-dependencies, and analysis points where the context can be gathered and/or set. At a minimum, TA3 solutions will provide a list of components (also known as a bill of materials), their inter-dependencies, candidate analysis points, and how the points can be used.

Potential approaches include, but are not limited to, multi-modal imaging, electro-magnetic emanations, and side channel analysis.

The overarching goal of TA3 is to provide the information necessary to enable TA1, TA2, and TA4 tools and solutions as early in the program as possible. However, it is important to focus on working towards the one-month FIRE program goal. TA3 involvement does not have to end after the minimum information has been provided. The TA3 proposal should address:

- Optimization strategies to utilize available time prior to when the CPS is received
- Data formats and interfaces so TA1, TA2, and TA4 tools can quickly ingest and act upon new TA3 information
- Providing staggered or incremental updates across the entire one-month analysis timeframe after satisfying the initial Preparation Time metric
- Analysis points for analog (e.g., oscilloscopes), digital (e.g., logic analyzers), and logical (e.g., breakpoints) means of gathering and setting CPS context

Proposers bidding to all TA1 through TA4 should consider inter-dependencies and impacts across all TAs. For example, strong proposals might consider the benefits of providing physical access to analysis tap points for TA1, TA2, and TA4 performers rather than simply identifying them. Strong proposals should consider first providing information such as a bill of materials, data sheets, software/firmware images, data dependencies, images, and high-level system description.

4. TA4 Integration: The CPVA Tool(s)

The overarching goal of the FIRE program is to find, exploit, and patch vulnerabilities in CPS within a month. It is expected that the CPVA tool(s) can be created by integrating and guiding preparation activities and tools for modeling and simulation towards finding, exploiting, and potentially patching vulnerabilities. Disjoint solutions and simple agile feedback mechanisms will likely not work. This multi-aspect optimization and search problem requires new algorithms and approaches for CPVA.

Traditional vulnerability analysis algorithms such as guided fuzzing, symbolic and concolic analysis, abstract interpretation, data and control flow, etc. will require refinements or entirely new variants for CPVA. Potential approaches include, but are not limited to, cyber-physical dependence graphs (similar to program dependence graphs), policy-guided analysis, trace-based analysis, hardware-on-the-loop analysis, and state estimation and homing.

The TA4 proposal should address:

- The breadth of possible CPS components that need to be analyzed and prioritizing research and development tasks accordingly

- The ability to perform a single analysis (e.g., track data) across multiple components such as when an analog signal reaches an antenna, is processed by a software defined radio, is further post processed by a DSP, passed to a PLC, and is then passed to a CPU
- Hybrid analysis algorithms that combine static and dynamic analysis concepts
- Differences between cyber-physical system contexts and traditional software-only system contexts that only include CPU and memory states
- How gathering and setting state is not only limited, but also driven by, available test points, probes, lab equipment, etc.
- Performance and scalability limitations due to potential need for physical systems such as for hardware-in-the-loop analysis
- Performing vulnerability analysis despite having damaged, inaccessible, or incomplete components, models, and/or simulators
- Programmability and extensibility of solutions to include both software and hardware (e.g., lab equipment)

Proposers bidding to all TA1 through TA4 should consider inter-dependencies and impacts across all TAs. Additionally, TA4 proposals are encouraged to consider the benefits of having interchangeable TA1, TA2, and TA3 approaches during program execution, and should describe strategies to achieve this in the technical approach.

TA4 proposers must consider inter-dependencies and impacts across all TAs. Strong proposals will, at a minimum, consider the technical, management, and schedule challenges to integration. These can include, but are not limited to, complementary TA1, TA2, and TA3, approaches, diversity and depth of expertise and experience, team organization, coordination, collaboration, internal milestones, and test and evaluation timelines.

TA4 proposals should include a notional workflow on how and when CPVA activities will take place over the course of the one-month program metric. TA4 proposals should describe the variety of laboratory and test equipment needed as well as the ability to orchestrate analysis through them. For proposers with access to the classified addendum, it is strongly recommended that TA4 proposals describe how these tools will be used in the classified use case.

TA4 performers will participate in demonstrations on real-world systems of interest. The performance in demonstration events may be taken into consideration for down-selects. Additional information can be found in the classified addendum. TA4 proposals should also consider potential impacts of personnel, facilities, and equipment to participating in demonstrations and how specific demonstration systems may impact personnel and tools.

5. TA5 Engineering Support Task: Evaluation and Testing

Evaluating the quality of vulnerability analysis tools is difficult without ground truth. In addition to solving the technical challenges and integrating the solutions into usable tools as outlined above, there also is a need to create representative medium-complexity CPS for test and evaluation (T&E) purposes. These T&E systems must not be restricted by data rights and must contain realistic cyber-physical vulnerabilities for CPVA without violating existing laws, statutes, or policies. At the same time, for potential transition purposes there is a need to perform CPVA on systems of DoD interest with real vulnerabilities. This requires additional protections and safeguards that

include, but are not limited to, creating surrogate systems and performing evaluations in secure environments. These surrogate systems will be used for demonstration purposes only.

The overarching goal of TA5 is to support the IV&V team in building, distributing, and supporting T&E systems and surrogate systems. There are two tracks of TA5 tasks and proposers are highly encouraged to propose to both tracks, although outstanding proposals to only one track may be considered.

a. Track A: Test and Evaluation Systems

In Track A, TA5 performers will develop an open, data-rights free, experimentation platform for cyber-physical vulnerability analysis. The FIRE program is interested in CPS systems that have available low-cost COTS components (such as a wide variety of sensors and actuators) to create a variety of missions and effects at a low cost. The potential experimentation platform should have a wide variety of test facilities that are readily available.

TA5 Track A proposals should consider:

- Balancing the need to provide physical test articles for TA1, TA2, TA3, and TA4 performers without biasing towards specific approaches
- Anticipating different types of vulnerabilities, effects, and patches that may need to be implemented and how they impact the overall system design
- Extensible architectures that can represent multiple CPS types such as rotorcraft unmanned aerial systems (UAS), space, ground, sea, undersea, medical, industrial control systems, etc.
- The ability to upgrade and update systems rather than building entirely new systems for each delivery in order to meet program schedules
- The need for IV&V to verify vulnerabilities, exploits, and patches found by TA1 through TA4 performers to include both known vulnerabilities inserted by IV&V and unknown vulnerabilities that must be verified by IV&V
- Safety considerations such as moving surfaces, electro-magnetic emanations, and noise

TA5 proposers should consider software and hardware interfaces with other TAs. TA5 cost proposals should provide a per-unit cost estimate for the proposed test and evaluation platform. They also should estimate the cost of an expected minimum number of 50 (fifty) systems for the program.

b. Track B: Surrogate Systems

Proposers bidding on TA5 Track B must have a security clearance and be cleared. In addition to T&E systems, the FIRE program is interested in TA5 proposals that can work with government team(s) to build surrogates of real-world systems of interest for demonstration purposes. These systems may have real-world vulnerabilities, both known and unknown, for real systems and therefore TA5 proposers must have the security clearances, facilities, and capabilities to perform this work. Additional information can be found in the classified addendum.

C. Program Structure

FIRE is a 42-month, two-phase program that comprises five technical areas (TAs.) The goal of each phase is listed below:

- Phase 1a (18 months, Base): Validate the feasibility of the approaches

- Phase 1b (6 months, Option 1): Perform real-world demonstration of the approaches
- Phase 2a (12 months, Option 2): Scale the approaches to medium-complexity systems
- Phase 2b (6 months, Option 3): Perform final demonstrations

FIRE tool(s) will be demonstrated on systems of increasing complexity, and will be evaluated by a government IV&V team. The IV&V team will insert exploitable vulnerabilities into the test and evaluation systems developed by TA5 performers for TA1-TA4 performers.

Proposers must propose to all phases and all options and their proposal must address the metrics for each phase. Options may be exercised, at the Government's sole discretion, based on technical progress against the metrics and milestones defined in the BAA and funding availability. Performers are expected to provide continuous integration and continuous delivery pipelines that enable government independent verification and validation (IV&V) to rapidly test and validate the performer tools**.**

DARPA may establish a government-run, incremental, and iterative DevOps pipeline to accelerate the creation, adoption, and delivery of FIRE tools into transition partner ecosystems. The pipeline will also enable collaboration between each of the TAs to facilitate earlier and easier integration. The pipeline will provide an environment where operational users, developers, and researchers can engage collaboratively in the creative process to converge on solutions that neither group(s) would conceive in isolation. To this end, in-person technical exchanges, hackathons, and virtual technical exchanges may be planned once development environments become operational. As capabilities mature, pilot tests with operational user communities of significant size and diversity may be conducted to assess the viability and generality of the approaches.

D. Schedule/Milestones

The government will specify the locations for quarterly program reviews, demonstrations, and kickoff/PI meetings. For budgeting purposes, assume the quarterly program reviews will alternate between Arlington, VA, and Philadelphia, PA.

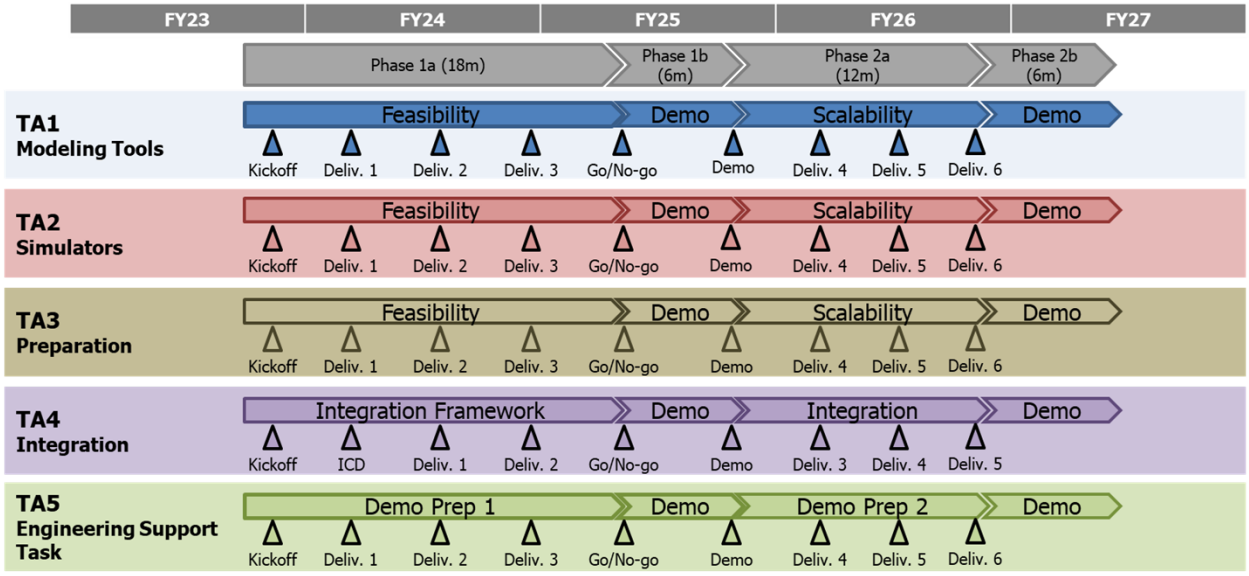

Figure 3. Program schedule and milestones.

Major Milestones:

- Kickoff – 1 month Post Contract Award (PCA)
- Quarterly program reviews, every 3 months PCA
- EOP1 – 18 months PCA
- Demo 1 – 24 months PCA

TA1 & TA2 & TA3 Major Milestones:

- Delivery 1 of tools – 6 months PCA
- Delivery 2 of tools – 10 months PCA
- Delivery 3 of tools – 14 months PCA
- Delivery 4 of tools – 28 months PCA
- Delivery 5 of tools – 32 months PCA
- Delivery 6 of tools – 36 months PCA

TA4 Major Milestones:

- Interface Control Document/Application Programming Interface – 3 months PCA
- Delivery 1 of tools – 10 months PCA
- Delivery 2 of tools – 14 months PCA
- Delivery 3 of tools – 28 months PCA
- Delivery 4 of tools – 32 months PCA
- Delivery 5 of tools – 36 months PCA

TA5 Major Milestones:

- Delivery 1 of demonstration platform – 6 months PCA
- Delivery 2 of demonstration platform – 10 months PCA
- Delivery 3 of demonstration platform – 14 months PCA
- Delivery 4 of demonstration platform – 28 months PCA
- Delivery 5 of demonstration platform – 32 months PCA
- Delivery 6 of demonstration platform – 36 months PCA

E. Deliverables

Proposers are encouraged to discuss how their tools and deliverables could leverage the DevOps pipeline, provide feedback on additional technology the DevOps pipeline needs to support transition, and integrate with relevant government transition partners.

Proposers are responsible for providing the following deliverables:

- Slide Presentations – Annotated slide presentations are due 24 hours before the program kick-off meeting and after each review.
- Monthly Financial Reporting – Each team must submit monthly expenditure reports and any associated deliverables within fifteen (15) calendar days after the end of each month.
- Monthly Technical Status Report – A quarterly technical status report is due ten (10) calendar days after the end of each quarter. The report must describe technical progress made, progress towards TA metrics, resources expended, and any issues that require the attention of the government team.

- Quarterly Program Review – Each team will attend a quarterly program review that provides technical status, resources expended, and progress towards metrics.
- Phase and Final Technical Reporting – End-of-phase reports are due at the conclusion of each phase. A separate Final Technical Report is due at the end of the period of performance. The unclassified reports will concisely summarize the effort conducted and provide any lessons learned during the development of the technology.
- Software – All computer software developed or utilized during the program must be delivered as source and executable code. The source versions and source code for the target computer systems, as well as any build scripts or other technical information required for the Government to compile and configure all delivered source code must also be included. Delivered software under this effort is to be maintainable and modifiable with no reliance on any non-delivered computer programs or documentation. Software is expected to be delivered utilizing continuous delivery and integration methods. At the end of each phase, software deliverables must also include unit tests to help the Government quickly determine whether the software is running as expected.
- Software Documentation – Software documentation deliverables are due ten (10) calendar days after the delivery of each software. Documentation must describe the source code, build system, hardware description language specifications, system diagrams, part numbers, and any other data necessary to build, maintain, and produce copies of the software.
- Hardware – All hardware procured or developed under the program will be delivered to the Government. The delivery should include sufficient documentation to be completely operable, maintainable, and modifiable with no-reliance on any non-delivered hardware or hardware documentation. The delivery should also include unit tests to help the Government quickly determine whether the hardware is running as expected.

F. Government Furnished Equipment/Property/Information

DARPA does not intend to provide specialized equipment, facilities, or support to the performers. Government furnished property of demonstration and test and evaluation systems is expected throughout the program. These demonstration systems are separate from the test and evaluation systems used to measure metrics. This is primarily for TA4 and TA5 performers. Please see the classified addendum for additional information on the demonstration systems.

G. Intellectual Property

Transitioning the capabilities and providing tools that foster and enable a greater community in cyber-physical capabilities is a core tenant of the FIRE program. It is strongly desired that the end intellectual property is provided with Unlimited rights or with Government Purpose Rights (GPR) at a minimum. It is further encouraged to provide data rights that enable sharing, such as through open-source licenses, to provide a foundation for the community to continuously expand and grow the tools.

II. Award Information

A. General Award Information

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

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

1. **Awards under this BAA will be made to proposers on the basis of the evaluation criteria listed below (see section labeled "Application Review Information" Sec. V.), and program balance to provide overall value to the Government. The Government reserves the right to request any additional, necessary documentation once it makes the award instrument determination. Such additional information may include but is not limited to Representations and Certifications (see Section VI.B.4 "**

Further information on Controlled Unclassified Information identification, marking, protecting and control, to include processing on Non-DoD Information Systems, is incorporated herein and can be found at www.darpa.mil/work-with-us/additional-baa.

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

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

In accordance with 10 U.S.C. § 4022(f), the Government may award a follow-on production contract or Other Transaction (OT) for any OT awarded under this solicitation if: (1) that participant in the OT, or a recognized successor in interest to the OT, successfully completed the entire prototype project provided for in the OT, as modified; and (2) the OT provides for the award of a follow-on production contract or OT to the participant, or a recognized successor in interest to the OT.

In all cases, the Government contracting officer shall have sole discretion to select award instrument type, regardless of instrument type proposed, and to negotiate all instrument terms and

conditions with selectees. DARPA will apply publication or other restrictions, as necessary, if it determines that the research resulting from the proposed effort will present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Any award resulting from such a determination will include a requirement for DARPA permission before publishing any information or results on the program. For more information on publication restrictions, see the section below on Fundamental Research

B. Fundamental Research

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

> 'Fundamental research' means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons.

As of the date of publication of this solicitation, the Government expects that program goals as described herein may be met by proposed efforts for fundamental research and non-fundamental research. Some proposed research may present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Based on the anticipated type of proposer (e.g., university or industry) and the nature of the solicited work, the Government expects that some awards will include restrictions on the resultant research that will require the awardee to seek DARPA permission before publishing any information or results relative to the program.

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

(a) The University or non-profit research institution performer or recipient must establish and maintain an internal process or procedure to address foreign talent programs, conflicts of commitment, conflicts of interest, and research integrity. The academic or non-profit research performer or recipient must also utilize due diligence to identify Foreign Components or participation by Senior/Key Personnel in Foreign Government Talent Recruitment Programs and agree to share such information with the Government upon request.

    i. The above described information will be provided to the Government as part of the proposal response to the solicitation and will be reviewed and assessed prior to award. Generally, this information will be included in the Research and Related Senior/Key Personnel Profile (Expanded) form (SF-424) required as part the proposer's submission through Grants.gov.

1. Instructions regarding how to fill out the SF-424 and its biographical sketch can be found through Grants.gov.

ii. In accordance with USD(R&E) direction to mitigate undue foreign influence in DoD-funded science and technology, DARPA will assess all Senior/Key Personnel proposed to support DARPA grants and cooperative agreements for potential undue foreign influence risk factors relating to professional and financial activities. This will be done by evaluating information provided via the SF-424, and any accompanying or referenced documents, in order to identify and assess any associations or affiliations the Senior/Key Personnel may have with foreign strategic competitors or countries that have a history of intellectual property theft, research misconduct, or history of targeting U.S. technology for unauthorized transfer. DARPA's evaluation takes into consideration the entirety of the Senior/Key Personnel's SF-424, current and pending support, and biographical sketch, placing the most weight on the Senior/Key Person's professional and financial activities over the last 4 years. The majority of foreign entities lists used to make these determinations are publicly available. The DARPA Countering Foreign Influence Program (CFIP) "Senior/Key Personnel Foreign Influence Risk Rubric" details the various risk ratings and factors. The rubric can be seen at the following link: https://www.darpa.mil/attachments/092021DARPACFIPRubric.pdf

iii. Examples of lists that DARPA leverages to assess potential undue foreign influence factors include, but are not limited to:

1. Executive Order 13959 "Addressing the Threat From Securities Investments That Finance Communist Chinese Military Companies": https://www.govinfo.gov/content/pkg/FR-2020-11-17/pdf/2020-25459.pdf
2. The U.S. Department of Education's College Foreign Gift and Contract Report: College Foreign Gift Reporting (ed.gov)
3. The U.S. Department of Commerce, Bureau of Industry and Security, List of Parties of Concern: https://www.bis.doc.gov/index.php/policy-guidance/lists-of-parties-of-concern
4. Georgetown University's Center for Security and Emerging Technology (CSET) Chinese Talent Program Tracker: https://chinatalenttracker.cset.tech
5. Director of National Intelligence (DNI) "World Wide Threat Assessment of the US Intelligence Community": 2021 Annual Threat Assessment of the U.S. Intelligence Community (dni.gov)
6. Various Defense Counterintelligence and Security Agency (DCSA) products regarding targeting of US technologies, adversary targeting of academia, and the exploitation of academic experts: https://www.dcsa.mil/

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

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

i. Upon conclusion of the negotiations, if DARPA determines, despite any proposed mitigation terms (e.g. mitigation plan, alternative research personnel), the participation of any Senior/Key Research Personnel still represents high risk to the program, or proposed mitigation affects the Government's confidence in proposer's capability to successfully complete the research (e.g., less qualified Senior/Key Research Personnel) the Government may determine not to award the proposed effort. Any decision not to award will be predicated upon reasonable disclosure of the pertinent facts and reasonable discussion of any possible alternatives while balancing program award timeline requirements.

(d) Failure of the academic or non-profit research performer or recipient to reasonably exercise due diligence to discover or ensure that neither it nor any of its Senior/Key Research Personnel involved in the subject award are participating in a Foreign Government Talent Program or have a Foreign Component with an a strategic competitor or country with a history of targeting U.S. technology for unauthorized transfer may result in the Government exercising remedies in accordance with federal law and regulation.

i. If, at any time, during performance of this research award, the academic or non-profit research performer or recipient should learn that it, its Senior/Key Research Personnel, or applicable team members or subtier performers on this award are or are believed to be participants in a Foreign Government Talent Program or have Foreign Components with a strategic competitor or country with a history of targeting U.S. technology for unauthorized transfer , the performer or recipient will notify the Government Contracting Officer or Agreements Officer within 5 business days.

1. This disclosure must include specific information as to the personnel involved and the nature of the situation and relationship. The Government will have 30 business days to review this information and conduct any necessary fact-finding or discussion with the performer or recipient.

2. The Government's timely determination and response to this disclosure may range anywhere from acceptance, to mitigation, to termination of this award at the Government's discretion.

3. If the University receives no response from the Government to its disclosure within 30 business days, it may presume that the Government has determined the disclosure does not represent a threat.

ii. The performer or recipient must flow down this provision to any subtier contracts or agreements involving direct participation in the performance of the research.

(e) Definitions

i. Senior/Key Research Personnel

1. This definition would include the Principal Investigator or Program/Project Director and other individuals who contribute to the scientific development or execution of a project in a substantive, measurable way, whether or not they receive salaries or compensation under the award. These include individuals whose absence from the project would be expected to impact the approved scope of the project.
2. Most often, these individuals will have a doctorate or other professional degrees, although other individuals may be included within this definition on occasion.

ii. Foreign Associations/Affiliations

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

iii. Foreign Government Talent Recruitment Programs

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

e. Many, but not all, of these programs aim to incentivize the targeted individual to physically relocate to the foreign state. Of particular concern are those programs that allow for continued employment at U.S. research facilities or receipt of U.S. Government research funding while concurrently receiving compensation from the foreign state.

3. Foreign Government Talent Recruitment Programs DO NOT include:

a. Research agreements between the University and a foreign entity, unless that agreement includes provisions that create situations of concern addressed elsewhere in this section,

b. Agreements for the provision of goods or services by commercial vendors, or

c. Invitations to attend or present at conferences.

iv. Conflict of Interest

1. A situation in which an individual, or the individual's spouse or dependent children, has a financial interest or financial relationship that could directly and significantly affect the design, conduct, reporting, or funding of research.

v. Conflict of Commitment

1. A situation in which an individual accepts or incurs conflicting obligations between or among multiple employers or other entities.

2. Common conflicts of commitment involve conflicting commitments of time and effort, including obligations to dedicate time in excess of institutional or funding agency policies or commitments. Other types of conflicting obligations, including obligations to improperly share information with, or withhold information from, an employer or funding agency, can also threaten research security and integrity and are an element of a broader concept of conflicts of commitment.

vi. Foreign Component

1. Performance of any significant scientific element or segment of a program or project outside of the U.S., either by the University or by a researcher employed by a foreign organization, whether or not U.S. government funds are expended.

2. Activities that would meet this definition include, but are not limited to:

a. Involvement of human subjects or animals;

b. Extensive foreign travel by University research program or project staff for the purpose of data collection, surveying, sampling, and similar activities;

c. Collaborations with investigators at a foreign site anticipated to result in co-authorship;

d. Use of facilities or instrumentation at a foreign site;

e. Receipt of financial support or resources from a foreign entity; or

f. Any activity of the University that may have an impact on U.S. foreign policy through involvement in the affairs or environment of a foreign country.

3. Foreign travel is not considered a Foreign Component.

vii. Strategic Competitor

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

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

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

III. Eligibility Information

A. Eligible Applicants

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

All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities, Small Businesses, Small Disadvantaged Businesses and Minority Institutions are encouraged to submit proposals and join others in submitting proposals; however, no portion of this announcement will be set aside for these organizations' participation due to the impracticality of reserving discrete or severable areas of this research for exclusive competition among these entities.

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

a) FFRDCs

FFRDCs are subject to applicable direct competition limitations and cannot propose to this solicitation in any capacity unless they meet the following conditions. (1) FFRDCs must clearly demonstrate that the proposed work is not otherwise available from the private sector. (2) FFRDCs must provide a letter, on official letterhead from their sponsoring organization, that (a) cites the

specific authority establishing their eligibility to propose to Government solicitations and compete with industry, and (b) certifies the FFRDC's compliance with the associated FFRDC sponsor agreement's terms and conditions. These conditions are a requirement for FFRDCs proposing to be awardees or subawardees.

b) Government Entities

Government Entities (e.g., Government/National laboratories, military educational institutions, etc.) are subject to applicable direct competition limitations. Government Entities must clearly demonstrate that the work is not otherwise available from the private sector and provide written documentation citing the specific statutory authority and contractual authority, if relevant, establishing their ability to propose to Government solicitations and compete with industry. This information is required for Government Entities proposing to be awardees or subawardees.

c) Authority and Eligibility

At the present time, DARPA does not consider 15 U.S.C. § 3710a to be sufficient legal authority to show eligibility. While 10 U.S.C.§ 4892 may be the appropriate statutory starting point for some entities, specific supporting regulatory guidance, together with evidence of agency approval, will still be required to fully establish eligibility. DARPA will consider FFRDC and Government Entity eligibility submissions on a case-by-case basis; however, the burden to prove eligibility for all team members rests solely with the proposer.

2. Other Applicants

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

B. Organizational Conflicts of Interest

FAR 9.5 Requirements

In accordance with FAR 9.5, proposers are required to identify and disclose all facts relevant to potential OCIs involving the proposer's organization and *any* proposed team member (subawardee, consultant). Under this Section, the proposer is responsible for providing this disclosure with each proposal submitted to the solicitation. The disclosure must include the proposer's, and as applicable, proposed team member's OCI mitigation plan. The OCI mitigation plan must include a description of the actions the proposer has taken, or intends to take, to prevent the existence of conflicting roles that might bias the proposer's judgment and to prevent the proposer from having unfair competitive advantage. The OCI mitigation plan will specifically discuss the disclosed OCI in the context of each of the OCI limitations outlined in FAR 9.505-1 through FAR 9.505-4.

Agency Supplemental OCI Policy

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

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

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

Government Procedures

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

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

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

C. Cost Sharing/Matching

Cost sharing is not required; however, it will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument. Cost sharing is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

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

D. Other Eligibility Criteria

1. Collaborative Efforts

The FIRE program seeks to research and develop innovative CPVA tools that require integration, which has its own risks. One way to mitigate integration risks is to encourage teaming between TAs1-4 to develop a single integrated proposal. However, all TA1, TA2, TA3, and TA4 proposers regardless of individual or teamed must address integration challenges, risks, and mitigations in the technical proposals. To ensure success in the program and assist in teaming, Associate Contractor Agreements will be required. Please refer to Section VII.C Associate Contractor Agreements.

2. Proposing to Multiple TAs

DARPA strongly prefers proposals that respond to either all of TA1 through TA4 or TA5. However individual proposals to TA1, TA2, TA3, or TA4, will also be considered if sufficient funding is available. Proposers, including primes, subcontractors, and consultants, to TA5 and any other TA

need to provide a firewall between TA5 technical teams and the other TAs. The firewall language must exist in all conflicting proposals.

3. Ability to Support Classified Development

FIRE proposers for TA4 must demonstrate that by the beginning of Phase 2, that personnel and facilities involved in demonstrations will be able to accredited to TS//SCI. TA5 proposers for the Track B: Surrogate System task must demonstrate a detailed plan for personnel, facilities (i.e., accreditations, DD 254, SCIF construction), and procedures for developing and furnishing demonstration systems by six (6) months after contract at the TS//SCI level.

IV. Application and Submission Information

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

A. Address to Request Application Package

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

B. Content and Form of Application Submission

All submissions, including abstracts and proposals must be written in English with type not smaller than 12 point font. Smaller font may be used for figures, tables, and charts. Copies of all documents submitted must be clearly labeled with the DARPA BAA number, proposer organization, and proposal title/proposal short title.

1. Abstract Format

Proposers are strongly encouraged to submit an abstract in advance of a full proposal. Abstracts should follow the format described below in this section. The cover sheet should be clearly marked "ABSTRACT" and the total length of Section II should not exceed four (4) pages if proposing to a single TA. For each additional TA being proposed, proposers may add an additional two (2) pages for Section II. For example, proposing to TAs 1-4, a Section II page count should not exceed ten (10) pages. TA5 must submit a standalone abstract with a total length of Section II that should not exceed 4 pages. Note the cover sheet does not count towards page count.

Section I. Administrative

A. Cover sheet to include:

(1) BAA number (HR001123S0025);
(2) Technical area(s) being submitted to;
(3) Lead Organization submitting abstract;
(4) Type of organization, selected among the following categories:
Large Organization, Small Disadvantaged Organization, Other Small Organization, HBCU, MI, Other Educational, Other Nonprofit;
(5) Proposer's internal reference number (if any);
(6) Other team members (if applicable) and type of organization for each;
(7) Proposal title;

(8) Technical point of contact to include:
Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail;
(9) Administrative point of contact to include:
Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail;
(10) Total funds requested from DARPA, and the amount of cost share (if any); AND
(11) Date proposal abstract was submitted.

(Note: An official transmittal letter is not required when submitting a Proposal Abstract.)

Section II. Abstract Details

This section provides an overview of the proposed work as well as an introduction to the associated technical and management issues.

A. Executive Summary

Summarize the technical approach, anticipated performance, and expected outcomes of the proposed effort. The executive summary should be concise and to the point. Tables, graphs, and diagrams can be used as supplemental material along with narrative to convey the information.

B. Claims

Summary of innovative claims for the proposed research. This section is the centerpiece of the abstract and should succinctly describe the uniqueness and benefits of the proposed approach relative to the current state-of-art alternate approaches.

C. Technical Approach

Technical rationale, technical approach, and constructive plan for accomplishment of technical goals in support of innovative claims and deliverable production.

D. Deliverables

Deliverables associated with the proposed research and the plans and capability to accomplish technology transition and commercialization.

E. Cost and Schedule

Provide a cost estimate for resources (e.g. labor, materials) and any subcontractors over the proposed timeline of the project, broken down by Government fiscal year.

2. Full Proposal Format

All full proposals must be in the format given below. Proposals shall consist of two volumes: Volume I – Technical and Management Proposal (3 sections), and Volume II – Cost Proposal (4 sections). The submission of other supporting materials along with the proposals other than those specifically referenced as being applicable to Volume II, is strongly discouraged and will not be considered for review. Section II of Volume I, Technical and Management Proposal, shall not exceed 15 pages if proposing to a single TA. For each additional TA being proposed, proposers may add an additional eight (8) pages for Section II. For example, proposing to TAs 1-4, a Section II page count shall not exceed 39 pages. TA5 must submit a standalone proposal with a Section II

page count that shall not exceed 15 pages. The page limitation for full proposals includes all figures, tables, and charts. There is no page limit for Volume II, Cost Proposal.

Proposed TAs	**Technical Volume Maximum Page Count**
TAs1-4 (joint)	39
TA1, TA2, TA3, TA4, or TA5 (individual)	15
Any two combinations of TAs 1-4	23 (15 base +8 for the additional TA)
Any three combinations of TAs 1-4	31(15 base + 8 for the two additional TAs)

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

a. Volume I, Technical and Management Proposal

The following Volume I subsections are examples of language used in a BAA which should be revised to fit the needs of the program.

Section I. Administrative

A. Cover sheet to include:

(1) BAA number (HR001123S0025);
(2) Technical area(s);
(3) Lead Organization submitting proposal;
(4) Type of organization, selected among the following categories:
Large Organization, Small Disadvantaged Organization, Other Small Organization, HBCU, MI, Other Educational, Other Nonprofit;
(5) Proposer's internal reference number (if any);
(6) Other team members (if applicable) along with the organization's name, principal investigator (PI), co-PI, program manager (if applicable) and type of organization for each;
(7) Proposal title;
(8) Technical point of contact to include:
Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail;
(9) Administrative point of contact to include:
Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail;
(10) Total funds requested from DARPA by phase and government fiscal year, and the amount of cost share (if any); A sample table is included below:

	GFY23	GFY24	GFY25	GFY26	GFY27	Total
Phase 1a						
Phase 1b						
Phase 2a						
Phase 2b						

AND

(11) Date proposal was submitted.

B. Official transmittal letter.

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

Section II. Detailed Proposal Information

A. Executive Summary

Summarize the technical approach, anticipated performance, and expected outcomes of the proposed effort. The executive summary should be concise and to the point. Tables, graphs, and diagrams can be used as supplemental material along with narrative to convey the information.

B. Technical Approach

This section is the centerpiece of the proposal and should succinctly summarize the innovative claims for the proposed research and clearly describe the proposed approach without using any jargon. This section should demonstrate that the proposer has a clear understanding of the state-of-the-art and should provide sufficient justification for the feasibility of the proposed approach(es). This section should include a detailed technical approach, technical rationale, and constructive plan for accomplishment of technical goals in support of innovative claims and deliverable creation. This section should include an innovative claims table. The table describing the innovative claims of the proposer technical approach. This table should include a title of the innovative claim, a short description of the innovative claim, a comparison to the state of the art, and (if applicable) who will be performing the innovative claim. The technical approach should describe a way to meet the program metrics. The technical rationale should provide evidence that the technical approach is feasible and valid. The technical rationale can include theory or experimental data to provide evidence towards the technical approach. The constructive plan for accomplishment should tie with the program metrics, schedule, and measurable milestones.

C. Schedules and Measurable Milestones

Schedules and measurable milestones for the proposed research. (Note: Measurable milestones should capture key development points in tasks and should be clearly articulated and defined in time relative to start of effort.) Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options. Additionally, proposals should clearly explain the technical approach(es) that will be employed to meet or exceed each program metric and provide ample justification as to why the approach(es) is/are feasible. The milestones must not include proprietary information.

D. Ongoing Research

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

E. Results and Technology Transfer

Description of the results, products, transferable technology, and expected technology transfer. This should also address mitigation of life-cycle and sustainment risks associated with transitioning intellectual property for U.S. military applications, if applicable. See Section 0 Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. § 637(d)) and FAR 19.702(a)(1),

each proposer who is a large business concern and seeking a procurement contract that has subcontracting possibilities is required to submit a subcontracting plan with their proposal. The plan format is outlined in FAR 19.704. As of the date of publication of this BAA, per FAR 19.702, the threshold for submission of a small business subcontracting plan is $750,000 (total contract amount including options).

Intellectual Property. If there are no proprietary claims, this should be stated.

F. Risk Analysis and Mitigation Plan

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

G. Proposer Accomplishments

Discussion of proposer's previous accomplishments and work in closely related research areas.

H. National Security Impact Statement

To reduce the potential for unintended foreign access to critical U.S. national security technologies developed under this effort, proposals shall describe:

- How the proposed work contributes to U.S. national security and U.S. technological capabilities. The proposer may also summarize previous work that contributed to U.S. national security and U.S. technological capabilities.
- Plans and capabilities to transition technologies developed under this effort to U.S. national security applications and/or to U.S. industry. The proposer may also discuss previous technology transitions to the benefit of U.S. interests.
- Any plans to transition technologies developed under this effort to foreign governments or to companies that are foreign owned, controlled or influenced. The proposer may also discuss previous technology transition to these groups.
- How the proposer will assist its employees and agents performing work under this effort to be eligible to participate in the U.S. national security environment.

I. Facilities and Equipment

Description of the facilities and equipment that would be used for the proposed effort and how they will support meeting program metrics.

J. Teaming

Describe the formal teaming arrangements which will be used to execute this effort. Identify key personnel and their time commitment to the FIRE program. Describe the programmatic relationship between investigators and the rationale for choosing this teaming strategy. Present a coherent organization chart and integrated management strategy for the program team. For each person, indicate: (1) name, (2) affiliation, (3) current security clearance level, (4) abbreviated listing of all technical area tasks they will work on with roles, responsibilities, and percent time indicated, (5) discussion of the proposers' previous accomplishments, relevant expertise, and/or unique capabilities.

Appendix I. Statement of Work (SOW) (does not count towards page count)

In plain English, clearly define the technical tasks/subtasks to be performed, their durations, and dependencies among them. The page length for the SOW will be dependent on the amount of the effort. The SOW must not include proprietary information. For each task/subtask, provide:

1. A general description of the objective (for each defined task/activity);
2. A detailed description of the approach to be taken to accomplish each defined task/activity;
3. Identification of the primary organization responsible for task execution (prime, sub, team member, by name, etc.);
4. The completion criteria for each task/activity - a product, event or milestone that defines its completion;
5. Define all deliverables (reporting, data, reports, software, etc.) to be provided to the Government in support of the proposed research tasks/activities; AND
6. Clearly identify any tasks/subtasks (prime or subcontracted) that will be accomplished by a subcontractor and the associated classification of the work.

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

Appendix II. Security Management (does not count towards page count)

Describe security management architecture and/or approach for the proposed effort. Detail unique additional security requirements information system certification expertise for controlled unclassified information (CUI) or classified processing, OPSEC, program protection planning, test planning, transportation plans, work being performed at different classification levels, and/or utilizing test equipment not approved at appropriate classification level. Proposer's must detail a credible plan to establishing a secure working environment within a timely manner that is consistent with their schedules and measurable milestones.

Proposers must establish and describe a protection plan outlining what protections will be put in place and how information will be secured and reported to DARPA for if and when sub-contractors or uncleared personnel (to include foreign nationals) of all TAs find vulnerabilities as outlined in the FIRE CUI Guide and USCCI 5200-03 SCG.

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.

Section III. Additional Information (does not count towards page count)

Information in this section may include a brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas upon which the

proposal is based. 1 electronic copy of each reference in the bibliography should be included in the submission.

b. Volume II, Cost Proposal – {No Page Limit}

All proposers, including FFRDCs, must submit the following:

Section I. Administrative

Cover sheet to include:

(1) BAA number (HR001123S0025);
(2) Technical area(s);
(3) Lead Organization submitting proposal;
(4) Type of organization, selected among the following categories:
Large Organization, Small Disadvantaged Organization, Other Small Organization, HBCU, MI, Other Educational, Other Nonprofit;
(5) Proposer's internal reference number (if any);
(6) Other team members (if applicable) along with the organization's name, principal investigator (PI), co-PI, program manager (if applicable) and type of organization for each;
(7) Proposal title;
(8) Technical point of contact to include:
Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail (if available);
(9) Administrative point of contact to include:
Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), and electronic mail (if available);
(10) Award instrument requested:
Cost-Plus-Fixed Fee (CPFF), Cost-contract—no fee, cost sharing contract—no fee, or other type of procurement contract (*specify*), Cooperative Agreement, or Other Transaction;
(11) Place(s) and period(s) of performance;
(12) Total proposed cost separated by basic award and option(s), if any, by calendar year and by government fiscal year; A sample table is provided below:

	GFY23	GFY24	GFY25	GFY26	GFY27	Total
Phase 1a						
Phase 1b						
Phase 2a						
Phase 2b						

(13) Name, address, and telephone number of the proposer's cognizant Defense Contract Management Agency (DCMA) administration office (*if known)*;
(14) Name, address, and telephone number of the proposer's cognizant Defense Contract Audit Agency (DCAA) audit office (*if known*);
(15) Date proposal was prepared;
(16) DUNS number;
(17) TIN number;
(18) CAGE Code;
(19) Subcontractor/sub-awardee Information;
(20) Proposal validity period (120 days is recommended); AND

(21) Any Forward Pricing Rate Agreement, other such approved rate information, or such documentation that may assist in expediting negotiations (if available).

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

Section II. Detailed Cost Information (Prime and Subcontractors)

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

Total program cost broken down by major cost items:

A. Direct Labor

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

B. Indirect Costs

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

C. Travel

Provide the purpose of the trip, number of trips, number of days per trip, departure and arrival destinations, number of people, etc.;

D. Other Direct Costs

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

E. Material/Equipment

(i) An itemization of any information technology (IT) purchase, as defined by FAR 2.101 – Documentation supporting the reasonableness of the proposed equipment costs(vendor quotes, past purchase orders/purchase history, detailed engineering estimates, etc.) shall be provided, including a letter stating why the proposer cannot provide the requested resources from its own funding for prime and all sub-awardees. If the effort is classified SAP and the offeror proposes use of a SAP IT system other than the current DARPA approved SAP IT systems solution, and DARPA approves in writing use of a SAP IT system that is unique or different from the current DARPA approved SAP IT systems solution, then: 1) successful offerors are required to track and provide all SAP IT costs associated with such unique SAP IT system solution, and 2) any such costs, to include costs for associated cybersecurity manpower, shall be reported at least annually to the DARPA Program Manager by Oct 1st of each year for inclusion in the DARPA Annual SAP report. Those costs should also include costs associated with the SAP IT Destruction, disposition, and sanitization processes required in the DoD CIO

Memorandum of April 20, 2020[2]. NOTE: If the proposed SAP IT system for use is the DARPA approved SAP IT systems solution only, then no separate tracking or reporting of costs by the contractor for SAP IT is required. (If effort includes SAP, this section above must be included).

(ii) A priced Bill-of-Material (BOM) clearly identifying, for each item proposed, the quantity, unit price, the source of the unit price (i.e., vendor quote, engineering estimate, etc.), the type of property (i.e., material, equipment, special test equipment, information technology, etc.), and a cross-reference to the Statement of Work (SOW) task/s that require the item/s. At time of proposal submission, any item that exceeds $2,000 must be supported with basis-of-estimate (BOE) documentation such as a copy of catalog price lists, vendor quotes or a written engineering estimate (additional documentation may be required during negotiations, if selected).

(iii) If seeking a procurement contract and items of Contractor Acquired Property are proposed, exclusive of material, the proposer shall clearly demonstrate that the inclusion of such items as Government Property is in keeping with the requirements of FAR Part 45.102. In accordance with FAR 35.014, "Government property and title," it is the Government's intent that title to all equipment purchased with funds available for research under any resulting contract will vest in the acquiring nonprofit institution (e.g., Nonprofit Institutions of Higher Education and Nonprofit Organizations whose primary purpose is the conduct of scientific research) upon acquisition without further obligation to the Government. Any such equipment shall be used for the conduct of basic and applied scientific research. The above transfer of title to all equipment purchased with funds available for research under any resulting contract is not allowable when the acquiring entity is a for-profit organization; however, such organizations can, in accordance with FAR 52.245-1(j), be given priority to acquire such property at its full acquisition cost.

F. Consultants

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

G. Subcontracts

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

All proprietary subcontractor proposal documentation, prepared at the same level of detail as that required of the prime, which cannot be uploaded to the DARPA BAA website (https://baa.darpa.mil, BAAT) or Grants.gov as part of the proposer's submission, shall be

[2] The title of this memorandum is CUI and the memo is classified SECRET//HANDLE VIA SPECIAL ACCESS CHANNELS ONLY. This memorandum may be provided under separate cover.

made immediately available to the Government, upon request, under separate cover (i.e., mail, electronic/email, etc.), either by the proposer or by the subcontractor organization. This does not relieve the proposer from the requirement to include, as part of their submission (via BAAT or Grants.gov, as applicable), subcontract proposals that do not include proprietary pricing information (rates, factors, etc.).

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

H. Cost-Sharing

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

I. Fundamental Research

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

Note 1:

(a) "Cost or Pricing Data" as defined in FAR 15.403-4 shall be required if the proposer is seeking a procurement contract per the referenced threshold, but please see the exceptions in (c) and (d) below. Further, please note that adequate price competition is not considered to exist under this BAA, as all proposers are proposing unique solutions that are not in accordance with a common work statement.

(b) Per DFARS 215.408(5), DFARS 252.215-7009, Proposal Adequacy Checklist, applies to all proposers/proposals seeking a FAR-based award (contract).

(c) In accordance with DFARS 215.403-1(4)(D), DoD has waived cost or pricing data requirements for nonprofit organizations (including educational institutions) on cost-reimbursement-no-fee contracts. In such instances where the waiver stipulated at DFARs 215.403-1(4)(D) applies, proposers shall submit information other than cost or pricing data to the extent necessary for the Government to determine price reasonableness and cost realism; and cost or pricing data from subcontractors that are not nonprofit organizations when the subcontractor's proposal exceeds the cost and pricing data threshold at FAR 15.403-4(a)(1).

(d) Per Section 873 of the FY2016 National Defense Authorization Act (Pub L. 114-92), "Pilot Program For Streamlining Awards For Innovative Technology Projects," as modified by Sections 896 of the NDAA for FY 2017 (Pub. L. 114-328) and 832 of the NDAA for FY 2021 (Pub. L. 116-283), small businesses and nontraditional defense contractors (as defined therein) are alleviated from submission of certified cost and pricing data for new contract awards valued at less than $7,500,000. In such instances where this "waiver" applies, proposers seeking a FAR-based contract shall submit information other than certified cost or pricing data to the extent necessary for the Government to determine price reasonableness and cost realism; and certified cost or pricing data from subcontractors that are not small businesses or nontraditional defense contractors when such subcontract proposals exceed the cost and pricing data threshold at FAR 15.403-4(a)(1)

Note 2:

Proposers requesting an Other Transaction who meet the definition of "nontraditional defense contractor," as defined at 10 U.S. Code § 2302(9), should submit information similar to "data other than certified cost or pricing data," as defined at FAR 2.101, to the maximum extent possible to allow for the Government to evaluate cost realism. Proposers (to include subcontractors) who do not meet the definition of a nontraditional defense contractor (who are, therefore, considered a traditional defense contractor) shall submit "data other than certified cost or pricing data." It is incumbent on a proposer requesting an Other Transaction to provide an adequate amount of cost information needed in order for the Government to be able to evaluate cost realism. Failure to provide an adequate amount of cost information will result in the proposal being deemed non-conforming.

Note 3:

Proposers are required to provide the aforementioned cost breakdown as an editable MS Excel spreadsheet, inclusive of calculations formulae, with tabs (material, travel, ODC's) provided as necessary. The Government also requests and recommends that the Cost Proposal include MS Excel file(s) that provide traceability between the Bases of Estimate (BOEs) and the proposed costs across all elements and phases. This includes the calculations and adjustments that are utilized to generate the Summary Costs from the source labor hours, labor costs, material costs, etc. input data. It is requested that the costs and Subcontractor proposals be readily traceable to the Prime Cost Proposal in the provided MS Excel file(s) – although this is not a requirement, providing information in this manner will assist the Government in understanding what is being proposed both technically and in terms of cost realism. NOTE: If the PDF submission differs from the Excel submission, the PDF will take precedence.

Note 4:

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**.

*University proposers requesting a grant, cooperative agreement, or Other Transaction for Research do not need to use the MS Excel™ DARPA Standard Cost Proposal Spreadsheet. Instead, a proposed budget and justification may be provided using the SF-424 Research & Related Budget forms provided via https://www.grants.gov.

Any questions pertaining to use of the DARPA Standard Cost Proposal Spreadsheet, to include permitted changes and prohibited changes thereto, should be directed to costproposal@darpa.mil. Please read the instructions provided within the DARPA Standard Cost Proposal Spreadsheet, "General" tab, to include the General Spreadsheet Instruction document embedded therein. It is very important that proposers not make changes to the format of the spreadsheet where specifically instructed not to do so.

Section III. Other Transaction Request, if applicable

All proposers requesting an Other Transaction (OT) must include a detailed list of payment milestones (Milestone Plan). Each milestone must include the following:

- Milestone description
- Completion/Exit criteria (to include identifying all associated data deliverables excluding those specifically providing project status)
- Due date
- Payment/funding schedule (to include, if cost share is proposed, awardee and Government share amounts)
- For each data deliverable, identify the proposed Government data rights (keeping in mind how each data deliverable will need to be used by the Government given the goals and objectives of the proposed project)

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

Section IV. Other Cost Information

Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates.

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

The proposer should include supporting cost and pricing information in sufficient detail to substantiate the summary cost estimates and should include a description of the method used to estimate costs and supporting documentation.

Cost proposals submitted by FFRDC's (prime or subcontractor) will be forwarded, if selected for negotiation, to their sponsoring organization contracting officer for review to confirm that all required forward pricing rates and factors have been used.

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. Security Information

a. Program Security Information

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 Section IV.C of this BAA.

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.

c. Unclassified Submissions

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

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

d. Both Classified and Unclassified Submissions

For a proposal that includes both classified and unclassified information, the proposal may be separated into an unclassified portion and a classified portion. The proposal should include as

much information as possible in the unclassified portion and use the classified portion ONLY for classified information. The unclassified portion can be submitted through the DARPA BAA Website, per the instructions in Section IV.C below. The classified portion must be provided separately, according to the instructions outlined in the 'Classified Submissions' section below.

e. Classified Submissions

For classified proposals, applicants will ensure all industrial, personnel, and information systems processing security requirements are in place and at the appropriate level (e.g., Facility Clearance Level (FCL), Automated Information Security (AIS), Certification and Accreditation (C&A), and any Foreign Ownership Control and Influence (FOCI) issues are mitigated prior to submission. Additional information on these subjects can be found at https://www.dcsa.mil.

The effort being solicited by this BAA is classified or otherwise involves access to, or generation of, classified information. Security classification guidance via a Security Classification Guide (SCG) and/or DD Form 254, "DoD Contract Security Classification Specification," is provided as an attachment to the BAA. (NOTE: If the guidance will be provided at a later time, indicate when guidance will be provided and from whom).

If the DD Form 254 or SCG is classified Confidential, Secret, Confidential/Special Access Program (SAP), or Secret/SAP, they can only be mailed to the requester's classified mailing address which must be provided to the Technical Office Program Security Officer or their staff. A DD Form 254 or SCG that is classified as Sensitive Compartmented Information (SCI), collateral Top Secret, or Top Secret/SAP must be hand-carried back to proposer locations via appropriately cleared and authorized couriers.

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

If a submission contains Classified National Security Information as defined by Executive Order 13526, the information must be appropriately and conspicuously marked with the proposed classification level and declassification date. Similarly, when the classification of a submission is in question, the submission must be appropriately and conspicuously marked with the proposed classification level and declassification date. Submissions requiring DARPA to make a final classification determination shall be marked as follows:

> "CLASSIFICATION DETERMINATION PENDING. Protect as though classified _____ *(insert the recommended classification level, e.g., Top Secret, Secret or Confidential)*."

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

Submissions containing both classified information and CUI must be appropriately and conspicuously marked with the proposed classification level as well as ensuring CUI is marked in accordance with DoDI 5200.48.

Proposers submitting classified information must have, or be able to obtain prior to contract award, cognizant security agency approved facilities, information systems, and appropriately cleared/eligible personnel to perform at the classification level proposed. All proposer personnel performing Information Assurance (IA)/Cybersecurity related duties on classified Information

Systems shall meet the requirements set forth in DoD Manual 8570.01-M (Information Assurance Workforce Improvement Program).

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

When a proposal includes a classified portion, and when able according to security guidelines, we ask that proposers send an e-mail to FIREProgram@darpa.mil as notification that there is a classified portion to the proposal. When sending the classified portion via mail according to the instructions, proposers should submit three (3) hard copies of the classified portion of their proposal and two (2) CD-ROMs containing the classified portion of the proposal as a single searchable Adobe PDF file. Please ensure that all CDs are well-marked. Each copy of the classified portion must be clearly labeled with HR001123S0025, proposer organization, proposal title (short title recommended), and Copy _ of _.

Confidential and Secret Information

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

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

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

  OR

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

  Defense Advanced Research Projects Agency
  ATTN: Program Security Officer, MTO
  Reference: HR001123S0025
  675 North Randolph Street
  Arlington, VA 22203-2114

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

  Defense Advanced Research Projects Agency
  Security & Intelligence Directorate, Attn: CDR

675 North Randolph Street
Arlington, VA 22203-2114

Top Secret Information

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

Sensitive Compartmented Information (SCI)

SCI must be marked, managed and transmitted in accordance with DoDM 5105.21 Volumes 1 - 3. Questions regarding the transmission of SCI may be sent to the DARPA Technical Office PSO via the BAA mailbox or by contacting the DARPA Special Security Officer (SSO) at 703-812-1970.

Successful proposers may be sponsored by DARPA for access to SCI. Sponsorship must be aligned to an existing DD Form 254 where SCI has been authorized. Questions regarding SCI sponsorship should be directed to the DARPA Personnel Security Office at 703-526-4543.

Special Access Program (SAP) Information

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

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

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

NOTE: prior to drafting the submission, if use of SAP Information Systems is to be proposed, proposers must first obtain an Authorization-to-Operate from the DARPA Technical Office PSO (or other applicable DARPA Authorization Official) using the Risk Management Framework (RMF) process outlined in the Joint Special Access Program (SAP) Implementation Guide (JSIG), Revision 3, dated October 9, 2013 (or successor document).

SAP IT disposition procedures must be approved in accordance with the DoD CIO Memorandum of April 20, 2020[3].

[3] The title of this memorandum is CUI and the memo is classified SECRET//HANDLE VIA SPECIAL ACCESS CHANNELS ONLY. This memorandum may be provided under separate cover.

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

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

DFARS 252.204-7000, "Disclosure of Information"

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

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

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

Compliance with the above requirements includes the mandate for proposers to implement the security requirements specified by National Institute of Standards and Technology (NIST) Special Publication (SP) 800-171, "Protecting Controlled Unclassified Information in Nonfederal Information Systems and Organizations" (see https://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.

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. Approved Cost Accounting System Documentation

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

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

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

9. Small Business Subcontracting Plan

Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. § 637(d)) and FAR 19.702(a)(1), each proposer who is a large business concern and seeking a procurement contract that has subcontracting possibilities is required to submit a subcontracting plan with their proposal. The plan format is outlined in FAR 19.704. As of the date of publication of this BAA, per FAR 19.702,

the threshold for submission of a small business subcontracting plan is $750,000 (total contract amount including options).

10. Intellectual Property

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

a. For Procurement Contracts

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

Technical Data Computer Software To be Furnished With Restrictions	Summary of Intended Use in the Conduct of the Research	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(NARRATIVE)	(LIST)	(LIST)	(LIST)

b. For All Non-Procurement Contracts

Proposers responding to this BAA requesting a Cooperative Agreement, Technology Investment Agreement, or Other Transaction for Prototypes shall follow the applicable rules and regulations governing these various award instruments, but, in all cases, should appropriately identify any potential restrictions on the Government's use of any Intellectual Property contemplated under the award instrument in question. This includes both Noncommercial Items and Commercial Items. Proposers are encouraged use a format similar to that described in Paragraph a. above. If no restrictions are intended, then the proposer should state "NONE."

11. Patents

Include documentation proving your ownership of or possession of appropriate licensing rights to all patented inventions (or inventions for which a patent application has been filed) that will be utilized under your proposal for the DARPA program. If a patent application has been filed for an invention that your proposal utilizes, but the application has not yet been made publicly available and contains proprietary information, you may provide only the patent number, inventor name(s), assignee names (if any), filing date, filing date of any related provisional application, and a summary of the patent title, together with either: (1) a representation that you own the invention, or (2) proof of possession of appropriate licensing rights in the invention.

12. 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.

13. Funding Restrictions

Not applicable.

C. Submission Information

DARPA will acknowledge receipt of all submissions and assign an identifying control number that should be used in all further correspondence regarding the submission. DARPA intends to use electronic mail correspondence regarding HR00123S0025. Submissions may not be submitted by fax or e-mail; any so sent will be disregarded.

Submissions will not be returned. An electronic copy of each submission received will be retained at DARPA and all other non-required copies destroyed. A certification of destruction may be requested, provided the formal request is received by DARPA within 5 days after notification that a proposal was not selected.

All administrative correspondence and questions on this solicitation, including requests for clarifying information on how to submit an abstract or full proposal to this BAA should be directed to FIREProgram@darpa.mil. DARPA intends to use electronic mail for correspondence regarding HR001123S0025. Proposals and abstracts may not be submitted by fax or e-mail; any so sent will be disregarded. DARPA encourages use of the Internet for retrieving the BAA and any other related information that may subsequently be provided.

1. Submission Dates and Times

a. Abstract Due Date

Abstracts must be submitted to DARPA/MTO on or before 04:00 PM, Eastern Time, 31 March 2023. Abstracts received after this time and date may not be reviewed.

b. Full Proposal Date

Full proposals must be submitted to DARPA/MTO on or before 04:00 PM, Eastern Time, 19 May 2023, in order to be considered during the single round of selections. Proposals received after this deadline will not be reviewed.

Failure to comply with the submission procedures may result in the submission not being evaluated.

c. Frequently Asked Questions (FAQ)

DARPA will post a consolidated Question and Answer (FAQ) document on a regular basis. To access the posting go to: http://www.darpa.mil/work-with-us/opportunities. Under the HR001123S0025 summary will be a link to the FAQ. Submit your question/s by e-mail to FIREProgram@darpa.milmailto:DARPA-BAA-. In order to receive a response sufficiently in advance of the proposal due date, send your question/s on or before 04:00 p.m., Eastern Time, 21 April, 2023.

2. Abstract Submission Information

Proposers are strongly encouraged to submit an abstract in advance of a full proposal in order to provide potential proposers with a rapid response and to minimize unnecessary effort in proposal preparation and review. DARPA will acknowledge receipt of the submission and assign a control number that should be used in all further correspondence regarding the abstract.

All abstracts sent in response to HR001123S0025 shall be submitted via DARPA's BAA Website (https://baa.darpa.mil). Visit the website to complete the two-step registration process. Submitters

will need to register for an Extranet account (via the form at the URL listed above) and wait for two separate e-mails containing a username and temporary password. After accessing the Extranet, submitters may then create an account for the DARPA BAA website (via the "Register your Organization" link along the left side of the homepage), view submission instructions, and upload/finalize the abstract. Proposers using the DARPA BAA Website may encounter heavy traffic on the submission deadline date; it is highly advised that submission process be started as early as possible.

All abstracts submitted electronically through the DARPA BAA Submission website must be uploaded as zip files (.zip or .zipx extension). The final zip file should only contain the document(s) requested herein and must not exceed 50 MB in size. Only one zip file will be accepted per abstract; abstracts not uploaded as zip files will be rejected by DARPA.

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

Please note that the DoD-issued certificate associated with the BAA website is not recognized by all commercial certificate authorities, resulting in untrusted connection errors/messages. You can either bypass the warning (possibly by adding https://baa.darpa.mil to your listed of trusted sites, or darpa.mil as a trusted domain), or visit DISA's site to download the Root Certificate Authority (CA): https://public.cyber.mil/from-iase/.
Technical support for DARPA's BAA Website may be reached at BAAT_Support@darpa.mil, and is typically available during regular business hours, (9:00 AM - 5:00 PM EST Monday - Friday).

Note: DO NOT SUBMIT ABSTRACTS TO GRANTS.GOV.

3. Proposal Submission Information

The typical proposal should express a consolidated effort in support of one or more related technical concepts or ideas. Disjointed efforts should not be included into a single proposal. Proposals not meeting the format described in the BAA may not be reviewed.

a. For Proposers Requesting Cooperative Agreements:

Proposers requesting cooperative agreements may only submit proposals through one of the following methods: (1) electronic upload per the instructions at www.grants.gov/applicants/apply-for-grants.html; 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.

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

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

- Period of performance for the other research projects.

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

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

Grants.gov requires proposers to complete a one-time registration process before a proposal can be electronically submitted. If proposers have not previously registered, this process can take between three business days and four weeks. For more information about registering for Grants.gov, see www.darpa.mil/work-with-us/additional-baa. See the Grants.gov registration checklist at http://www.grants.gov/web/grants/register.html for registration requirements and instructions.

Once Grants.gov has received a proposal submission, Grants.gov will send two email messages to advise proposers as to whether or not their proposals have been validated or rejected by the system; IT MAY TAKE UP TO TWO DAYS TO RECEIVE THESE EMAILS. The first email will confirm receipt of the proposal by the Grants.gov system; this email only confirms receipt, not acceptance, of the proposal. The second will indicate that the application has been successfully validated by the system prior to transmission to the grantor agency or has been rejected due to errors. If the proposal is validated, then the proposer has successfully submitted their proposal. If the proposal is rejected, the proposed must be corrected and resubmitted 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, the proposer will receive a third email from Grants.gov. To avoid missing deadlines, proposers should submit their proposals in advance of the final proposal due date with sufficient time to receive confirmations and correct any errors in the submission process through Grants.gov. For more information on submitting proposals to Grants.gov, visit the Grants.gov submissions page at:
http://www.grants.gov/web/grants/applicants/apply-for-grants.html.

Proposers electing to submit cooperative agreement proposals as hard copies must complete the same forms as indicated above.

b. For Proposers Requesting Technology Investment Agreements

Proposers requesting Technology Investment Agreements (TIA) awarded under 10 U.S.C.§ 4021 must include the completed form indicated below. This requirement only applies only to those who expect to receive a TIA as their ultimate award instrument.

The National Defense Authorization Act (NDAA) for FY 2019, Section 1286, directs the Secretary of Defense to protect intellectual property, controlled information, key personnel, and information about critical technologies relevant to national security and limit undue influence, including

foreign talent programs by countries that desire to exploit United States' technology within the DoD research, science and technology, and innovation enterprise. This requirement is necessary for all research and research-related educational activities. The DoD is using the form below to collect the necessary information to satisfy these requirements.

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

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

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

c. For Proposers Requesting Contracts or Other Transaction Agreements

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

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

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

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

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

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

d. Classified Submission Information

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

4. Other Submission Requirements

Not applicable.

V. Application Review Information

A. Evaluation Criteria

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

1. Overall Scientific and Technical Merit

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

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.

2. Potential Contribution and Relevance to the DARPA Mission

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

The proposer clearly demonstrates its plans and capabilities to contribute to U.S. national security and U.S. technological capabilities. The evaluation will consider the proposer's plans and capabilities to transition proposed technologies to U.S. national security applications and to U.S. industry. The evaluation may consider the proposer's history of transitioning or plans to transition technologies to foreign governments or to companies that are foreign owned, controlled, or influenced. The evaluation will also consider the proposer's plans and capabilities to assist its employees and agents to be eligible to participate in the U.S. national security environment.

3. Cost Realism

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

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

4. Realism of Proposed Schedule

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

B. Review and Selection Process

1. Review Process

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

DARPA will conduct a scientific/technical review of each conforming proposal. Conforming proposals comply with all requirements detailed in this 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.

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

It is the policy of DARPA to ensure impartial, equitable, comprehensive proposal evaluations based on the evaluation criteria listed above and to select the source (or sources) whose offer meets the Government's technical, policy, and programmatic goals. Pursuant to FAR 35.016, the primary basis for selecting proposals for acceptance shall be technical, importance to agency programs, and fund availability. In order to provide the desired evaluation, qualified Government personnel will conduct reviews and (if necessary) convene panels of experts in the appropriate areas.

2. Handling of Source Selection Information

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

Subject to the restrictions set forth in FAR 37.203(d), input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants/experts who are strictly bound by the appropriate non-disclosure requirements.

3. Federal Awardee Performance and Integrity Information (FAPIIS)

Per 41 U.S.C. 2313, as implemented by FAR 9.103 and 2 CFR § 200.205, prior to making an award above the simplified acquisition threshold, DARPA is required to review and consider any information available through the designated integrity and performance system (currently FAPIIS). Awardees have the opportunity to comment on any information about themselves entered in the database, and DARPA will consider any comments, along with other information in FAPIIS or other systems prior to making an award.

4. Countering Foreign Influence Program (CFIP)

DARPA's CFIP is an adaptive risk management security program designed to help protect the critical technology and performer intellectual property associated with DARPA's research projects by identifying the possible vectors of undue foreign influence. The CFIP team will create risk assessments of all proposed Senior/Key Personnel selected for negotiation of a fundamental

research grant or cooperative agreement award. The CFIP risk assessment process will be conducted separately from the DARPA scientific review process and adjudicated prior to final award.

VI. Award Administration Information

A. Selection Notices

1. Abstracts

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.

2. Proposals

As soon as the evaluation of a proposal is complete, the proposer will be notified that (1) the proposal has been selected for funding pending contract negotiations, in whole or in part, or (2) the proposal has not been selected. These official notifications will be sent via email to the Technical POC identified on the proposal coversheet.

B. Administrative and National Policy Requirements

1. Meeting and Travel Requirements

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

2. Solicitation Provisions and Award Clauses, Terms and Conditions

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

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

Further information on Controlled Unclassified Information identification, marking, protecting and control, to include processing on Non-DoD Information Systems, is incorporated herein and can be found at www.darpa.mil/work-with-us/additional-baa.

4. 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.

A small business joint venture offeror must submit, with its offer, the representation required in paragraph (c) of FAR solicitation provision 52.212-3, Offeror Representations and Certifications-Commercial Products and Commercial Services, and paragraph (c) of FAR solicitation provision 52.219-1, Small Business Program Representations, in accordance with 52.204-8(d) and 52.212-3(b) for the following categories: (A) Small business; (B) Service-disabled veteran-owned small business; (C) Women-owned small business (WOSB) under the WOSB Program; (D) Economically disadvantaged women-owned small business under the WOSB Program; or (E) Historically underutilized business zone small business.

Proposers requesting an Other Transaction are required to complete the Other Transaction Certifications document provided as Attachment 4 to the BAA.

5. Terms and Conditions

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

C. Reporting

The number and types of reports will be specified in the award document, but will include as a minimum monthly technical and financial status reports. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed on before award. Reports and briefing material will also be required as appropriate to document progress in accomplishing program metrics. A Final Report that summarizes the project and tasks will be required at the conclusion of the performance period for the award, notwithstanding the fact that the research may be continued under a follow-on vehicle.

D. Electronic Systems

1. Wide Area Work Flow (WAWF)

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

2. i-Edison

The award document for each proposal selected for funding will contain a mandatory requirement for invention disclosures (and associated elections, confirmatory instruments, etc.) and patent reports to be submitted electronically through i-Edison (https://public.era.nih.gov/iedison).

3. Vault

The award document for each proposal selected for funding will contain a mandatory requirement for technical and status reports to be submitted electronically through DARPA's Vault (or similar) web-based tool.

4. DARPA Embedded Entrepreneurship Initiative (EEI)

Awardees pursuant to this solicitation may be eligible to participate in the DARPA Embedded Entrepreneurship Initiative (EEI) during the award's period of performance. EEI is a limited scope program offered by DARPA, at DARPA's discretion, to a small subset of awardees. The goal of DARPA's EEI is to increase the likelihood that DARPA-funded technologies take root in the U.S.

and provide new capabilities for national defense. EEI supports DARPA's mission "to make pivotal investments in breakthrough technologies and capabilities for national security" by accelerating the transition of innovations out of the lab and into new capabilities for the Department of Defense (DoD). EEI investment supports development of a robust and deliberate Go-to-Market strategy for selling technology product to the government and commercial markets and positions DARPA awardees to attract U.S. investment. The following is for informational and planning purposes only and does not constitute solicitation of proposals to the EEI.

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

EEI Application Process:

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

DARPA Commercial Strategy will then contact the performer, assess fitness for EEI, and in consultation with the DARPA technical office, determine whether to invite the performer to participate in the EEI. Factors that are considered in determining fitness for EEI include DoD/Government need for the technology; competitive approaches to enable a similar capability or product; risks and impact of the Government's being unable to access the technology from a sustainable source; Government and commercial markets for the technology; cost and affordability; manufacturability and scalability; supply chain requirements and barriers; regulatory requirements and timelines; Intellectual Property and Government Use Rights, and available funding.

Invitation to participate in EEI is at the sole discretion of DARPA and subject to program balance and the availability of funding. EEI participants' awards may be subsequently modified bilaterally to amend the Statement of Work to add negotiated EEI tasks, provide funding, and specify a milestone schedule which will include measurable steps necessary to build, refine, and execute a

Go-to-Market strategy aimed at delivering new capabilities for national defense. Milestone examples are available at: https://www.darpa.mil/work-with-us/contract-management.

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

VII. Agency Contacts

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

The technical POC for this effort is:
Dr. Lok Yan
DARPA/MTO
ATTN: HR001123S0025
675 North Randolph Street
Arlington, VA 22203-2114
BAA Email: FIREProgram@darpa.mil

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

VIII. Other Information

A. Proposers Day

The FIRE Program Proposers Day will be held on March 16, 2023 in McLean, VA. Advance registration is required for both the physical meeting and the webcast. See DARPA-SN-23-38 posted at https://sam.gov for all details. Attendance at the FIRE Program Proposers Day is not required to propose to this solicitation.

B. University Student and Research

In order to ensure that U.S. scientific and engineering students will be able to continue to make strategic technological advances, DARPA is committed to supporting the work and study of Ph.D students and post-doctoral researchers that began work under a DARPA-funded program awarded through an assistance instrument. Stable and predictable federal funding enables these students to continue their scientific and engineering careers.

To that end, should a DARPA funded program (awarded through a grant or cooperative agreement with a university or a Research Other Transaction pursuant to 10 U.S.C. § 4021 where the university is a participant) end before the negotiated period of performance, DARPA will continue to fund, for no more than two semesters (or equivalent), stipend costs to Ph.D students and/or post-doctoral researchers. The stipend amount will be determined at the time of award based on the costs included for such participants in the University's original proposal. Universities are expected to make reasonable efforts to find alternative research opportunities for these participants before stipend funding is provided in this situation. This additional funding will not be provided in cases where an assistance award option is not exercised or any other scenario in which the University was aware at the time of award that the period of performance might not continue after a designated programmatic decision (i.e. a down-selection or inclusion of a subsequent programmatic phase).

C. Associate Contract Agreements

This same or similar language will be included in procurement contract awards against HR001123S0025. Awards other than FAR based contracts will contain similar agreement language:

(a) It is recognized that success of the FIRE research effort depends in part upon the open exchange of information between the various Associate Contractors involved in the effort. This language 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 ACA, 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 FIRE 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 provision. 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 Agreements Officer/Procuring 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 38 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 FIRE 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 hereunder which require access to proprietary information belonging to the Associate Contractor, a provision which shall conform substantially to the language of this ACA, including this paragraph (e).

(f) Associate Contractors for the FIRE research effort include: Each performer with other performers.