



Research Announcement
Forward-Looking Experimentation (FLEX)
Microsystems Technology Office
DARPA-RA-23-02
August 9, 2023

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ATTACHMENT A: Proposal Template – Volume 1: Technical and Management

ATTACHMENT B: Proposal Summary Slide Template

ATTACHMENT C: Proposal Template – Volume 2: Cost Volume

ATTACHMENT D: Proposal Template – Volume 2: Cost Summary Spreadsheet,

ATTACHMENT E: Proposal Template – Volume 3: Administrative & National Policy Requirements Volume

PART I: OVERVIEW INFORMATION

- **Federal Agency Name:** Defense Advanced Research Projects Agency (DARPA), Microsystems Technology Office (MTO)
- **Funding Opportunity Title:** Forward-Looking Experimentation (FLEX)
- **Announcement Type:** Initial
- **Funding Opportunity Number:** DARPA-RA-23-02
- **Catalog of Federal Domestic Assistance Numbers (CFDA):** 12.910 Research and Technology Development
- **Dates:** (All times listed herein are Eastern Time)
 - Posting Date: August 9, 2023
 - FAQ Submission Deadline: July 26, 2024
 - Proposal Due Date: Proposals may be submitted on a rolling basis until 1:00 PM Eastern on August 9, 2024
 - RA Closing Date: August 9, 2024
 - Estimated period of performance start: 60 days from proposal submission
- **Anticipated individual awards:** Multiple awards are anticipated
- **Anticipated funding type:** 6.1
- **Types of instruments that may be awarded:** Cooperative agreements
- **Agency contact:**
 - Dr. Dev Palmer, Program Manager
DARPA/MTO
ATTN: DARPA-RA-23-02
675 North Randolph Street
Arlington, VA 22203-2114
 - RA Coordinator: DARPA-RA-23-02@darpa.mil

PART II: FULL TEXT OF ANNOUNCEMENT

I. Funding Opportunity Description

This Research Announcement (RA) constitutes a public notice of a competitive funding opportunity as described in 2 CFR § 200.203. Any resultant negotiations and/or awards will follow all laws and regulations applicable to the specific award instrument(s) available under this RA.

The Microsystems Technology Office at DARPA seeks fundamental research proposals for disruptive ideas in information and communication technologies (ICT) addressing the grand challenges for a data-driven future. Proposed research should investigate innovative approaches that enable revolutionary advances in science, devices, or systems. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

A. Background

The International Technology Roadmap for Semiconductors (ITRS), with its unwavering focus on scaling of semiconductor devices, provided a research framework produced by industry experts that served as valuable strategic guidance across the academic, government, and industry research communities for many decades until it was discontinued in 2016. DARPA-sponsored research in microelectronics took advantage of this framework for many decades, focusing primarily on semiconductor device scaling and integration. With Moore's Law approaching its physics-based limits and Dennard scaling having leveled off, attention has turned from the goals of the ITRS to a focus on applications including information and communications technologies (ICT). There are now many roadmaps, which in aggregate lack the focus and specificity needed to motivate and coordinate research across the community.

The critical issues facing our data-driven future were clearly articulated in the 2021 Decadal Plan for Semiconductors (<https://www.src.org/about/decadal-plan/>), co-authored by the Semiconductor Industry Association (SIA) and the Semiconductor Research Corporation (SRC). The report defines five seismic shifts in the industry that represent grand challenges to the continued exponential progress of the scientific and economic engine that is the semiconductor industry. Revolutionary ideas for long-range innovations in ICT are needed to address these challenges.

The goal of the Forward-Looking Experimentation (FLEX) program is to identify the direction and timing of key disruptive advances in ICT, accelerate technology exploration and generate intellectual property, develop next-generation researchers for the U.S. workforce, and build the foundation for future research programs.

B. Program Description

The Forward-Looking Experimentation (FLEX) Research Announcement (RA) is soliciting innovative proposals addressing grand challenges in ICT. This RA seeks proposals for cooperative agreements only. Submissions for any other award instrument type may be

considered non-conforming with the RA and may not be reviewed. Proposals must address only one of the seven (7) Topic Areas (TA), and must identify the selected TA in the proposal cover page. Proposers are limited to submitting only one full proposal per TA under this announcement. Proposals are expected to explore technical solutions to address the TA's technical challenges, and create disruptive breakthroughs in critical areas. Proposals should clearly describe the relevance and impact of the proposed concept(s) for addressing the challenges identified in each TA, the current state-of-the-art technology, new insights to address the TA challenges, a credible research plan and schedule, and critical, quantitative milestones to be pursued over the research period.

The seven FLEX topic areas are:

1. **Cognition:** Cognitive computing systems will operate in the natural world on their own, make decisions by forming and extending models of the world they perceive around them, and interact with local human decision makers, and global distributed networks, to perform and achieve complex tasks. This theme will go beyond traditional deep learning to successfully build machine intelligent systems with both cognitive and autonomous characteristics. This theme aims to enable the next generation of collaborative human-AI systems through synergistic advances in algorithms, hardware motifs, algorithm-hardware co-design, and collective and collaborative intelligence.
2. **Communications and Connectivity:** Data generation and movement will be at the heart of the always-available, deeply integrated, and immersive systems of the future; bandwidth for machine-to-machine traffic will surpass human-to-machine, presenting new challenges and opportunities for systems and networks. This theme will uncover new technology approaches that enable high-bandwidth, energy-efficient connectivity for a range of future applications in wireless communications, system-to-system communications, and chip-to-chip communications. This theme seeks to flatten the computation-communication gap through a systems-driven, cross-layer, vertically integrated research program with the goal of realizing robust, scalable wireless edge to cloud connectivity at > 10 Tbps with sub-pJ/bit energy efficiencies, while enhancing bandwidth densities by $>100X$ over capacity-constrained channels.
3. **Intelligent Sensing to Action:** Future sensing systems must be highly efficient, reliable, and secure. They must take a holistic, application-specific approach to utilize and address the growing deluge of sensed data, with efficient devices and cognitive signal processing to synthesize data, make decisions, and take timely action. This theme seeks fundamental breakthroughs in analog hardware, to generate smarter world-machine interfaces that can sense, perceive, and reason. This theme will develop cognitive multi-spectral sensors that directly generate trustworthy insights from wideband multi-modal analog signals using closed-loop feedback control of the sensor hardware, and feature extraction algorithms that enable energy-efficient sensing-to-action.
4. **Systems and Architectures for Distributed Compute:** Distributed computing systems and Edge Intelligence are essential to every aspect of daily life. Future systems will need exponential performance improvements in energy efficiency, resilience, and security. Delivering the desired performance will require sustainable, scalable integration of a vast

array of new technologies, novel architectures, and devices for emergent workloads. This theme seeks to deliver breakthrough advances in distributed, energy-efficient general-purpose computing to enable heterogeneous systems of specialized accelerators. This theme will explore innovations in processing, storage, communication, and security/correctness technologies for scalable computing that will improve the performance and energy efficiency of diverse applications by 100x over the expected computer systems of 2030.

5. **Intelligent Memory and Storage:** Global demand for memory and energy will grow exponentially - with data movement to and from memory and storage, becoming a major driver of energy consumption. Future applications will require fundamental changes in memory and storage paradigms, new memory technologies, and novel materials. This theme seeks to explore innovation in system and memory subsystem architectures towards the goal of achieving >1000X improvement in power, performance, area and/or cost (PPAC) while addressing reliability, availability and serviceability (RAS) and security requirements for memory and storage. This theme will explore fundamental innovations across the stack - from devices to architecture and systems - in order to support transparent and seamless integration of data-centric computing, with central processing unit (CPU)-centric computing and its software ecosystem.
6. **Advanced Monolithic and Heterogeneous Integration:** Radical improvements in 3D monolithic and heterogeneous integration are needed to achieve the performance density and efficiency required for future architectures and devices. This theme will drive fundamental technology breakthroughs for new logic and memory tiers, interconnects, and power and thermal infrastructure to connect the dots between architecture, devices, and manufacturing, enabling breakthrough system-level architectures that scale to manufacturing and assembly. This theme will enable unprecedented scaling of future systems through the development of new technologies that blur, merge, and eliminate the chip-package interface.
7. **High-performance Energy-Efficient Devices for Digital and Analog Applications:** Breakthroughs in the foundational technology building blocks—material, device, and interconnect—play a key role in enabling ultra-scalable distributed compute, communication, sensing, networking, memory, and storage systems to meet the demands of future workloads. This theme will deliver innovations in advanced active and passive devices and interconnect based on physics of new materials and unconventional syntheses, for orders of magnitude improvements in scaling, energy efficiency, area efficiency, power performance, throughput, latency, and functionalities. A broad, horizontal research agenda is needed to showcase novel materials with new functionalities and properties that can augment and/or surpass conventional semiconductor technologies. This theme will enable the next-generation materials discovery and innovation in processing, intimately guided by novel device concepts, design, and application-level benchmarking to achieve minimized energy-delay product per function.

C. Program Structure

The FLEX RA seeks proposals for a research effort consisting of a 12-month base period. If appropriate to the proposed technical approach, an additional 12-month option period may be

proposed. Funding for the base period shall not exceed \$250,000. Funding for the option period, if proposed, shall not exceed \$250,000, for a maximum level of \$500,000. If an option is proposed, the cost proposal must provide the pricing information for the option period; failure to include the proposed costs for the option period will result in the option not being included in the award. If included, the option may be exercised, at the Government's sole discretion, based on technical progress measured against the milestones defined in the RA and funding availability.

For planning and pricing purposes, a target start date of 60 days from proposal submission should be assumed. Travel costs should be limited to one trip to the Arlington, VA area for Key Personnel in each 12-month period. Additionally, while reasonable publication costs may be included, the majority of proposed costs should focus on the program goals and objectives.

D. Deliverables

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

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

II. Award Information

A. General Award Information

Multiple awards are anticipated. The number of individual awards under the RA 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;
- make awards without discussions with proposers;
- conduct discussions with proposers if it is later determined to be necessary;
- segregate portions of resulting awards into pre-priced options;
- accept proposals in their entirety or to select only portions of proposals for award;
- fund awards in increments with options for continued work at the end of one or more phases;
- request additional documentation once the award instrument has been determined (e.g., representations and certifications); and

- remove proposers from award consideration should the parties fail to reach agreement on award terms within a reasonable time or the proposer fails to provide requested additional information in a timely manner.

All awards resulting from proposals identified for negotiation will be cooperative agreements. Submissions for any other award instrument type may be considered non-conforming with the RA and may not be reviewed.

B. Fundamental Research

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

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

As of the date of publication of this solicitation, the Government expects that program goals as described herein may be met by proposers intending to perform fundamental research and does not anticipate applying publication restrictions of any kind to individual awards for fundamental research that may result from this solicitation. Notwithstanding this statement of expectation, the Government is not prohibited from considering and selecting research proposals that, while perhaps not qualifying as fundamental research under the foregoing definition, still meet the solicitation criteria for submissions. If proposals are selected for award that offer other than a fundamental research solution, the Government will either work with the proposer to modify the proposed statement of work to bring the research back into line with fundamental research or else the proposer will agree to restrictions in order to receive an award.

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

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

- i. The above described information will be provided to the Government as part of the proposal response to the solicitation and will be reviewed and assessed prior to award. Generally, this information will be included in the Research and Related Senior/Key Personnel Profile (Expanded) form (SF-424) required as part the proposer's submission through Grants.gov.
 1. Instructions regarding how to fill out the SF-424 and its biographical sketch can be found through Grants.gov.
- ii. In accordance with USD(R&E) direction to mitigate undue foreign influence in DoD-funded science and technology, DARPA will assess all Senior/Key Personnel proposed to support DARPA grants and cooperative agreements for potential undue foreign influence risk factors relating to professional and financial activities. This will be done by evaluating information provided via the SF-424, and any accompanying or referenced documents, in order to identify and assess any associations or affiliations the Senior/Key Personnel may have with foreign strategic competitors or countries that have a history of intellectual property theft, research misconduct, or history of targeting U.S. technology for unauthorized transfer. DARPA's evaluation takes into consideration the entirety of the Senior/Key Personnel's SF-424, current and pending support, and biographical sketch, placing the most weight on the Senior/Key Person's professional and financial activities over the last 4 years. The majority of foreign entities lists used to make these determinations are publicly available. The DARPA Countering Foreign Influence Program (CFIP) "Senior/Key Personnel Foreign Influence Risk Rubric" details the various risk ratings and factors. The rubric can be seen at the following link:
<https://www.darpa.mil/attachments/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 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.

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. Historically Black Colleges and Universities, 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.

a) FFRDCs

FFRDCs may not propose to this RA in any capacity.

b) Government Entities

Government Entities (e.g., Government/National laboratories, military educational institutions, etc.) may not propose to this RA in any capacity.

c) Foreign Participation

Non-U.S. organizations may not propose to this RA in any capacity.

B. Organizational Conflicts of Interest

§200.112 Conflict of Interest and §200.318 General procurement standards:

In accordance with §200.112 and §200.318, proposers are required to identify and disclose all facts relevant to potential organizational conflicts of interest (OCI) involving the proposer's organization and any proposed team member (subrecipient, 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.

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 § 200.112 Conflict of interest disclosure requirement, a proposer must affirm whether the proposer or *any* proposed team member (subrecipient, 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 (subrecipient, consultant) providing the support; and
- An OCI mitigation plan

Government Procedures

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

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

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

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

C. Cost Sharing/Matching

Cost sharing will not be considered.

IV. Application and Submission Information

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

A. Address to Request Application Package

This announcement, any attachments, and any references to external websites herein constitute the total solicitation. No request for proposal or additional solicitation regarding this opportunity will be issued, nor is additional information available except as provided at the Grants.gov website (<http://www.grants.gov>), or referenced herein.

B. Content and Form of Application Submission

Proposals will consist of three volumes:

- Volume 1: Technical and Management Volume,
- Volume 2: Cost Volume, and
- Volume 3: Administrative and National Policy Requirements Volume.

To assist in proposal development, templates have been provided as attachments to the RA. **Full proposals must use the following attachments in addition to the Grants.gov application package.** All instructions regarding format and page count are contained within each Attachment.

- For Volume 1: Technical and Management Volume:
 - Attachment A: Proposal Template - Volume 1: Technical and Management
 - Attachment B: Proposal Summary Slide Template
- For Volume 2: Cost Volume
 - Attachment C: Proposal Template – Volume 2: Cost Volume
 - Attachment D: Proposal Template – Volume 2: Cost Summary Spreadsheet
- For Volume 3:
 - Attachment E: Proposal Template – Volume 3: Administrative & National Policy Requirements Volume

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.*

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.

Security Information

All proposals and supporting documentation must be unclassified, and all awards made under this RA will be unclassified. Only proposals determined to be proposing Fundamental Research can be deemed selectable. DARPA will not select proposals for negotiation of an award if the proposal is deemed to be non-fundamental, or otherwise requires Controlled Unclassified Information (CUI) restrictions.

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.

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. See Attachment E for details.

C. Submission Dates and Times

a. Full Proposal Date

Full proposals will be accepted on a rolling basis, but must be submitted to DARPA on or before 1:00 PM, Eastern Time, August 9, 2024, in order to be considered. Proposals received after this deadline will not be reviewed.

b. 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 DARPA-RA-23-02 summary will be a link to the FAQ. Submit your question/s by e-mail to DARPA-RA-23-02@darpa.mil. In order to receive a response sufficiently in advance of the proposal due date, send your question/s on or before 1:00 PM., Eastern Time, July 26, 2024.

c. 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 RA may not be reviewed. Proposers are warned that submission deadlines as outlined herein are in Eastern Time and will be strictly enforced. When planning a response to this solicitation, proposers should take into account that some parts of the submission process may take from one business day to one month to complete (e.g., registering for a Unique Entity ID (UEI) number or Taxpayer Identification Number (TIN)).

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 DARPA-RA-23-02. Submissions may not be submitted by fax or e-mail; any so sent will be disregarded.

d. Other Submission Requirements:

Proposers 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.

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

V. Application Review Information**A. Evaluation Criteria**

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

a. 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.

b. 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.

c. Cost Realism

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

B. Review and Selection Process**a. Review Process**

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.

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.

b. Handling of Sensitive Competitive Information

DARPA policy is to treat all submissions under this RA as sensitive competitive information 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. In accordance with Agency policy and guidelines, 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.

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.

C. 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.

D. 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

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 award 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

and Administrative POCs identified on the proposal coversheet. If a proposal has been selected for award negotiation, the Government will initiate those negotiations following the notification.

B. 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. Electronic Systems

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

All proposers must be registered in SAM per 2 CFR § 25.110. See <https://www.darpa.mil/work-with-us/grantsagreements> for further information. International entities can register in SAM by following the instructions in this link:

https://www.fsd.gov/sys_attachment.do?sys_id=c08b64ab1b4434109ac5ddb6bc4bcbb8.

NOTE: new registrations can take an average of 10-14 business days to process in SAM. SAM registration requires the following information:

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

b. Wide Area Work Flow (WAWF)

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

c. 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>).

d. 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.

VII. Agency Contacts

Administrative, technical or contractual questions should be sent via e-mail to DARPA-RA-23-02@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. Dev Palmer, Program Manager
DARPA/MTO
ATTN: DARPA-RA-23-02
675 North Randolph Street
Arlington, VA 22203-2114
RA Coordinator: DARPA-RA-23-02@darpa.mil

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

VIII. Other Information

A. University Student and Researcher Funding

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 (due to termination or down-select) before the planned program completion, DARPA may continue to fund, for no more than two semesters (or equivalent), the documented costs to employ or sponsor Ph.D. students and/or post-doctoral researchers. Should such a circumstance arise, the following will take place:

- 1) The Government will provide appropriate notification to the University participant by the Agreements Office or through the prime performer.
- 2) The University must make reasonable efforts to find alternative research or employment opportunities for these students and researchers.
- 3) Before any costs will be paid, the University must submit documentation describing their due diligence efforts in finding alternative arrangements that is certified by a University official.
- 4) In addition to this documentation, the affected students and researchers must submit statements of work describing what research activities they will pursue during the period of funding and the final deliverable they will submit when the funding is complete.

- 5) In determining these costs, DARPA will rely on information from the University's original proposal unless specific circumstances warrant requesting updated proposals. In no circumstances will this funding be provided when the program is ended because of suspected or actual fraud or negligence.

DARPA Down-Select Definition:

DARPA often structures programs in phases or options that include specific objectives and a designated period of performance. This may result in potentially issuing multiple awards to maximize the number of innovative approaches. This approach allows the Government to monitor progress and enables programmatic decision points based, at a minimum, against stated evaluation criteria, metrics, funding availability, and program goals and objectives. As a result, select performers may advance via award of a subsequent phase or through exercise of a planned option period.