



Broad Agency Announcement
Synthetic Quantum Nanostructures
(SynQuaNon)
Defense Sciences Office

HR001123S0050

August 11, 2023

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PART I: OVERVIEW INFORMATION

- **Federal Agency Name:** Defense Advanced Research Projects Agency (DARPA), Defense Sciences Office (DSO)
- **Funding Opportunity Title:** Synthetic Quantum Nanostructures (SynQuaNon)
- **Announcement Type:** Initial Announcement
- **Funding Opportunity Number:** HR001123S0050
- **Assistance Listing Number(s):** 12.910 Research and Technology Development
- **Dates** (All times listed herein are Eastern Time.)
 - Posting Date: August 11, 2023
 - Proposers Day: August 18, 2023. See Section VIII.A.
 - Abstract Due Date: August 25, 2022, 4:00 p.m.
 - FAQ Submission Deadline: September 29, 2022, 4:00 p.m. See Section VIII.B.
 - Full Proposal Due Date: October 10, 2023, 4:00 p.m.
- **Anticipated Individual Awards:** DARPA anticipates multiple awards.
- **Types of Instruments that May be Awarded:** Procurement contracts, cooperative agreements, or Other Transaction agreements for Prototypes. Award instruments will be limited to procurement contracts and Other Transactions for proposers whose proposed solution includes Controlled Unclassified Information (CUI).
- **Agency contacts**
 - **Technical Point of Contact (POC):** Mukund Vengalattore, Program Manager, DARPA/DSO
 - **BAA Email:** SynQuaNon@darpa.mil
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 - DARPA/DSO
 - ATTN: HR001123S0050
 - 675 North Randolph Street
 - Arlington, VA 22203-2114
 - **DARPA/DSO Opportunities Website:** <http://www.darpa.mil/work-with-us/opportunities>
- **Teaming Information:** See Section VIII.C for information on teaming opportunities.
- **Frequently Asked Questions (FAQ):** FAQs for this solicitation may be viewed on the DARPA/DSO Opportunities Website. See Section VIII.B for further information.
- **Security:** Unclassified.

PART II: FULL TEXT OF ANNOUNCEMENT

I. Funding Opportunity Description

This Broad Agency Announcement (BAA) constitutes a public notice of a competitive funding opportunity as described in Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016, as well as 2 C.F.R. § 200.203. Any resultant negotiations and/or awards will follow all laws and regulations applicable to the specific award instrument(s) available under this BAA, e.g., FAR 15.4 for procurement contracts.

A. Introduction

The Defense Sciences Office (DSO) at the Defense Advanced Research Projects Agency (DARPA) is soliciting innovative research proposals in the area of synthetic quantum materials that enable enhanced functionalities or novel capabilities for quantum information science (QIS). In particular, the SynQuaNon program aims to develop and benchmark novel routes to enhanced superconducting (SC) nanoelectronic devices based on electronic metamaterials.

It is anticipated that successful performers in this program will combine innovations in functional materials engineering with device-scale benchmarking and characterization to demonstrate quantum nanoelectronic devices with enhanced performance and improved size, weight, and power (SWaP) metrics. The range of devices that will be explored within this program as a testbed for novel quantum metamaterials includes, but is not limited to, SC qubits capable of operation at elevated temperatures and frequency regimes; single photon detectors and bolometers with beyond-state-of-the-art (SoA) sensitivity and timing resolution for sensing, imaging, and communications; and quantum-limited signal processing technologies for scalable computing, millimeter-wave communications, and quantum-enhanced sensing. Specifically excluded is research focused on the synthesis, characterization, or development of materials that do not have a viable path to scalable fabrication and integration within nanoelectronic device architectures. Also excluded is research that primarily results in evolutionary improvements to the existing state of practice.

B. Background

The phenomenology of superconductivity lies at the heart of a diverse range of quantum nanoelectronic technologies of importance to quantum information science.¹ Owing to the macroscopic coherence, dissipationless transport, and collective interactions inherent to the superconducting state, such technologies enable device modalities, operational regimes, and performance metrics far beyond their classical counterparts in applications including sensing of weak magnetic fields, photon detection across wide swaths of the electromagnetic spectrum, low noise signal processing architectures capable of performance at the quantum limits, and potential architectures for efficient, high-speed classical and quantum computation.²

¹ A. I. Braginski, *Superconductor electronics: Status and outlook*, J. Supercond. Novel Mag. **32**, 23 (2019).

² S. Anders et al, *European roadmap on superconductive electronics – status and perspectives*, Physica C, **470**, 2079 (2010).

While there has been extensive progress in SC technologies over decades, it remains the case that the widespread adoption of such technologies has been impeded by the need for cryogenic cooling, often to temperatures below 1 kelvin. This requirement of low operating temperatures arises from a multitude of factors: First, the vast majority of SC technologies are based on conventional superconducting materials (also referred to as Bardeen-Cooper-Schrieffer or BCS-type superconductors), which typically exhibit superconductivity only below a few degrees kelvin. This is due to the weak strength of the electron-phonon interaction that mediates superconductivity in these materials. Second, the operating temperatures of various superconducting QIS devices are further suppressed due to the need to mitigate impurities, parasitic effects, and material interface issues that lead to decoherence or sub-optimal performance. Third, despite immense resources expended in the quest for exotic ‘high-T_c’ superconducting materials such as the cuprates or the pnictides that might enable higher operating temperatures or novel capabilities, such efforts have yielded negligible contributions to viable SC technologies due to numerous issues, including poor quantum coherence, unknown or poorly understood microscopic mechanisms, poor thermal properties, lack of scalable synthesis or fabrication techniques, and poor device-level integrability.

The transformative potential of robust and reliable SC technologies continues to inspire large-scale efforts oriented toward developing new quantum materials.³ However, such efforts have tended to focus on isolated material attributes, e.g., superconducting transition temperature, often at the expense of the much larger set of scientific and technical considerations that lie between fundamental materials studies on a narrow set of properties and the eventual integration of such materials in technologically relevant, fabrication compatible, and scalable device architectures. As a result, the sequential transition from fundamental innovations in superconducting materials to viable quantum technologies has been, at best, circuitous and limited in utility due to cost, synthesis, or performance limitations.

In this backdrop, alternate approaches that amalgamate basic materials research with device-scale development can potentially enable a more focused route to the bottom-up functional engineering of designer quantum materials for applications to QIS.

C. Program Description/Scope

The SynQuaNon program aims to re-imagine the development of novel quantum electronic materials from a device-oriented perspective. Successful teams in this program will demonstrate the functional engineering of synthetic electronic materials that can enable enhanced or novel capabilities in QIS. In contrast to prior materials-focused approaches, these teams will validate and benchmark their proposed materials via the characterization of proof-of-concept quantum circuits or nanoelectronic device architectures that incorporate these proposed materials. This experimental program is anticipated to leverage simultaneous theoretical, modeling, and computational efforts in an accompanying funding opportunity investigating similar topics.⁴

³ M. Polini et al, *Materials and devices for fundamental quantum science and quantum technologies*, arXiv:2201.09260 (2022); N. P. de Leon et al, *Materials challenges and opportunities for quantum computing hardware*, *Science* 372, 6539 (2021).

⁴ DARPA-PA-23-03, <https://sam.gov/opp/7b5569bc369f408392e9c5306a928c28/view>

Within the SynQuaNon program, the fabrication of such proof-of-concept quantum nanoelectronic devices should not only serve as a testbed for materials characterization but also enable a holistic assessment of the compatibility of such materials within various device architectures. It is anticipated that this ‘bottom-up’ route to quantum device engineering will provide a better understanding of not just isolated material attributes that appear promising for superconductor-based quantum technologies but the host of accompanying factors⁵ that eventually determine the viability of the proposed materials to harness, tune, or enhance quantum effects within technologically relevant quantum devices.⁶

While the landscape of quantum materials with potential applications to superconducting technologies is vast, the SynQuaNon program is particularly interested in classes of functionally engineered electronic metamaterials.⁷ This program will leverage an increasingly sophisticated toolbox of theoretical models, materials synthesis,⁸ and nanofabrication⁹ techniques to demonstrate the use of topology, dimensionality, multifunctional interfacial physics, and nanoscale control of quantum properties¹⁰ for novel SC-based QIS devices.¹¹

Synthetic metamaterials within the scope of this program include nanopatterned electronic structures, Moiré materials,¹² and quantum heterostructures. Extensive theoretical studies on such synthetic structures have suggested the viability of metamaterial-based approaches to electronic band-engineering, enhanced thermal transport, novel topological effects, electronic control of transport properties, and phonon-mediated routes to enhanced superconductivity.¹³ These ideas offer a new perspective on the ability to control or enhance device-relevant

⁵ For example, see W. D. Oliver, *Superconducting Qubits*, Quantum Information Processing, Ed. D. P. Vincenzo (2013); A. Place et al, *New material platform for superconducting transmon qubits with coherence times exceeding 0.3 ms*, Nature Comm. 12, 1779 (2021); C. Wang et al, *Towards practical quantum computers: transmon qubit with a lifetime approaching 0.5 ms*, npj Quant. Info. 8, 3 (2022); C. Barone et al, *Effect of the substrate on the electrical transport and fluctuation processes in NbRe and NbReN ultrathin films for superconducting electronics applications*, Sci. Rep. 12, 1573 (2022).

⁶ S. K. Tolpygo, *Superconductor digital electronics: scalability and energy efficiency issues*, Low Temp. Phys. **42**, 361 (2016).

⁷ D. N. Basov et al, *Towards properties on demand in quantum materials*, Nature Mat. 16, 1077 (2017).

⁸ X. Zeng et al, *In situ epitaxial MgB₂ thin films for superconducting electronics*, Nature Mat. 1, 35 (2002); C. Kim et al, *Wafer-scale magnesium diboride thin films and devices with tunable high kinetic inductance*, arXiv:2305.15190 (2023).

⁹ S. K. Tolpygo et al, *Advanced fabrication processes for superconductor electronics: current status and new developments*, IEEE Trans. Appl. Super. **29**, 1 (2019).

¹⁰ J. Levy, *Correlated nanoelectronics and the second quantum revolution*, APL Mater. 10, 110901 (2022).

¹¹ N. I. Zheludev et al, *From metamaterials to metadevices*, Nature Mat. 11, 917 (2012).

¹² D. M. Kennes et al, *Moiré heterostructures as a condensed-matter quantum simulator*, Nature Phys. 17, 155 (2021); I. Martin, *Moiré superconductivity*, Ann. Phys. 417, 168118 (2020).

¹³ For example, see B. Lian et al, *Twisted bilayer Graphene: a phonon-driven superconductor*, Phys. Rev. Lett. 122, 257002 (2019); S. Peotta et al, *Superfluidity in topologically nontrivial flat bands*, Nature Comm. 6, 8944 (2015); C. Zhang et al, *Bipolaronic high-temperature superconductivity*, Phys. Rev. X 13, 011010 (2023); T. T. Heikkilä et al, *Thermal, Electric, and spin transport in superconductor/ferromagnetic-insulator structures*, Prog. Surf. Sci. 94, 100540 (2019); *Electron cooling by phonons in superconducting proximity structures*, D. Nikolic et al, Phys. Rev. B 102, 214514 (2020); O. -P. Saira, *Electrostatic control of quasiparticle transport in superconducting hybrid nanostructures*, (2013); V. N. Smolyaninova et al, *Using metamaterial nanoengineering to triple the superconducting critical temperature of bulk aluminum*, Sci. Rep. 5, 15777 (2015); B. Song et al, *Two-dimensional Anti-Van't Hoff/Le Bell Array AlB₆ with high stability, unique motif, triple Dirac cones, and superconductivity*, J. Am. Chem. Soc. 141, 3630 (2019).

functionalities in a manner not accessible within native or intrinsic materials.

Proposers to this program will be required to propose (i) the experimental realization of novel electronic metamaterials that lead to enhanced device-relevant properties and (ii) the experimental validation, benchmarking, and characterization of these metamaterials within QIS-relevant quantum circuits or nanoelectronic quantum device architectures. As the introduction mentions, the proposed metamaterials and devices should be compatible with scalable fabrication techniques. The requisite discussions to be included in the proposal are detailed in Section I.E, and the proposed schedule of technical efforts from the modeling and synthesis of the proposed metamaterials to a holistic characterization of the proposed quantum devices should follow the schedule shown in Section I.F.

Device-relevant material properties of interest to the SynQuaNon program include the control of electron-phonon interactions and its concomitant effect on the superconducting transition temperature, the control of thermal transport properties,¹⁴ and the enhancement of nonlinear effects within quantum circuits such as the kinetic (self-Kerr) effect.¹⁵ In turn, the control of these properties can lead directly to device-scale performance enhancements in a variety of SC-based quantum devices. For instance, an increased superconducting transition temperature can lead to elevated operating temperatures, enhanced scalability, higher operational frequencies, and improved SWaP metrics for scalable SC qubit architectures, architectures for SC-based digital computing, or quantum-limited amplifiers.¹⁶ Similarly, enhanced thermal properties can lead to novel functionalities, improved sensitivity, and improved temporal resolution in single-photon detectors, infrared and millimeter-wave bolometers, and other SC-based photon-detectors.¹⁷ Higher kinetic nonlinearities can enable new and compact qubit architectures, kinetic inductance-based quantum sensors, and quantum-limited amplifiers capable of operation in the millimeter-wave regime.¹⁸

The device-relevant material properties enumerated above are not intended to be a complete list. Performers are encouraged to propose any subset of the above material attributes or other

¹⁴ J. P. Pekola et al, *Colloquium: Quantum heat transport in condensed matter systems*, Rev. Mod. Phys. 93, 041001 (2021).

¹⁵ M. R. Vissers et al, *Frequency-tunable superconducting resonators via nonlinear kinetic inductance*, Appl. Phys. Lett. 107, 062601 (2015).

¹⁶ See, for example, I. I. Soloviev et al, *Miniaturization of Josephson Junctions for digital superconducting circuits*, Phys. Rev. Appl. 16, 044060 (2021); F. Faramarzi et al, *Initial design of a W-band superconducting kinetic inductance qubit*, IEEE Trans. Appl. Supercond. 31, 1, (2021).

¹⁷ See, for example, F. Paolucci et al, *Hypersensitive tunable Josephson escape sensor for gigahertz astronomy*, Phys. Rev. Appl. 14, 034055 (2020); R. Kokkonen et al, *Nanobolometer with ultralow noise equivalent power*, Comm. Phys. 2, 124 (2019); B. Karimi et al, *Reaching the ultimate limit of a quantum detector*, Nature Comm. 11, 367 (2020); J. P. Allmaras et al, *Demonstration of a thermally coupled row-column SNSPD imaging array*, Nano. Lett. 20, 2163 (2020); I. E. Zadeh et al, *Superconducting nanowire single-photon detectors: A perspective on evolution, state-of-the-art, future developments, and applications*, Appl. Phys. Lett. 118, 190502 (2021).

¹⁸ See, for example, W. Chien et al, *Large parametric amplification in kinetic inductance dominant resonators based on 3 nm-thick epitaxial superconductors*, Mater. Quant. Tech. 3, 025005 (2023); F. Giazotto et al, *Ultrasensitive proximity sensor with kinetic inductance readout*, Appl. Phys. Lett. 92, 162507 (2008); A. Anferov et al, *Millimeter-wave four-wave mixing via kinetic inductance for quantum devices*, Phys. Rev. Appl. 13, 024056 (2020); B. H. Eom et al, *A wideband, low-noise superconducting amplifier with high dynamic range*, Nature Phys. 8, 623 (2012);

attributes that can be tuned or enhanced within their proposed metamaterials. In the latter case, the proposal should justify how the proposed attributes will be modified within their metamaterials and how such modifications can lead to enhanced or novel device-level functionalities that are relevant to QIS. Further, in such cases, proposers should also specify metrics comparable to the enhancements beyond the current SoA listed in Tables 1, 2 of Section I. D.

Proposers are encouraged to propose testbed QIS device architectures such as the ones mentioned above to benchmark the capabilities of their proposed metamaterials so as to demonstrate the effect of such synthetic materials on QIS technologies in an unambiguous manner. As detailed in Section I.F, Phase I of this program will focus on using such device architectures to validate the material enhancements of the proposed metamaterials. During Phase II, teams will build upon the material-scale characterization and validation efforts to develop a device-scale understanding and demonstrate the manner in which material enhancements lead to enhanced device performance of their proposed QIS devices.

D. Program Structure

SynQuaNon is a 48-month program broken into two phases: a 24-month Phase I base period and a 24-month Phase II option. The program is structured as follows:

- Phase I (24 months) will focus on the validation of the SynQuaNon concept by demonstrating functional engineering of device-relevant electronic metamaterials. During this period, performers will:
 - Design, model, and synthesize their proposed synthetic quantum materials.
 - Design and model testbed QIS nanoelectronic device architectures for validating and benchmarking their proposed materials.
 - Fabricate testbed QIS nanoelectronic devices that incorporate the proposed metamaterials.
 - Demonstrate the proposed material enhancements via characterization measurements on their testbed devices per the Phase I metrics listed below. As stated in Section I.C, teams that propose quantum metamaterials that enable device-relevant enhancements other than the suggested material properties should propose comparable metrics beyond the current SoA.

Metamaterial property	SynQuaNon Phase I metrics
Superconducting transition temperature	≥ 3x beyond (bulk or intrinsic) SoA
Thermal conductivity	≥ 3x beyond (bulk or intrinsic) SoA

Normalized Kinetic Anharmonicity/photon ¹⁹	≥ 1.0
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Table 1 - Phase I Material enhancement metrics

Progress under the program will be assessed against the metrics enumerated above and by the potential capability of the proposed quantum materials and device architectures to demonstrate beyond-SoA performance in DoD-relevant QIS applications. Program reviews will occur at Months 11 and 20 to assess performer progress against Phase I metrics and facilitate DARPA’s Phase II selection decisions. Selection for Phase II will be contingent upon findings in Phase I and the availability of funds.

- Phase II (24 months) will build upon Phase I efforts to transition from the demonstration of microscopic material tunability and enhancement to mesoscopic device-scale tunability and performance enhancements. During this period, performers will:
 - Model, measure, and calibrate the proposed QIS devices enhanced via the incorporation of the quantum metamaterials.
 - Demonstrate enhanced operating temperatures and/or frequency regimes, improved SWaP-c metrics, or other beyond-SoA performance metrics as proposed for their proposed quantum devices.
 - Perform a holistic characterization of the proposed metamaterial-enhanced devices to benchmark device-scale properties (as applicable), such as coherence time, operational frequency regimes, cryogenic performance, gate fidelity, noise-equivalent power, noise temperature, etc.
 - Demonstrate the proposed material and device enhancements per the Phase II metrics listed below. Teams that propose material and device enhancements other than the suggested properties should propose comparable metrics beyond the current SoA.

Metamaterial property	SynQuaNon Phase II metrics
Superconducting transition temperature	$\geq 5x$ beyond (bulk or intrinsic) SoA
Thermal Conductivity	$\geq 5x$ beyond (bulk or intrinsic) SoA
Normalized Kinetic Anharmonicity/photon ²⁰	≥ 3.0

¹⁹ The kinetic nonlinearity is quantified here in terms of the frequency shift of a superconducting resonator per photon, normalized to the intrinsic linewidth (damping rate) of the resonator. Teams that intend to demonstrate enhanced kinetic nonlinearities on non-resonator based devices should quantify the anticipated nonlinearity in a commensurate manner.

²⁰ The kinetic nonlinearity is quantified here in terms of the frequency shift of a superconducting resonator per photon, normalized to the intrinsic linewidth (damping rate) of the resonator. Teams that intend to demonstrate enhanced kinetic nonlinearities on non-resonator based devices should quantify the anticipated nonlinearity in a commensurate manner.

Nanoelectronic Device property	SynQuaNon Phase II metrics
Operational Temperature	≥ 10 beyond SoA
Operational Frequency Regime	≥ 15 beyond SoA

Table 2 - Phase II Material and Device enhancement metrics

E. Technical Area

As stated in Section I.C., the primary focus of the SynQuaNon program is the development of novel quantum metamaterials with enhanced device-relevant properties for applications to QIS. In addition, successful performers are expected to demonstrate such material enhancements via characterization of proof-of-concept QIS devices that incorporate their proposed metamaterials. This device-oriented approach to functional materials engineering serves multiple programmatic objectives:

- (i) It enables the assessment of various metamaterial approaches to functional engineering of quantum electronic properties that are relevant to QIS applications
- (ii) In contrast to ‘materials-oriented’ approaches, it enables the assessment of wafer-scale synthesis, fabrication, and integration of promising metamaterials into eventual quantum nanoelectronic device architectures of relevance to the DoD
- (iii) It enables a holistic assessment of the role of the metamaterials in determining device performance not only due to the specific functionally engineered attributes but due to other concomitant effects (e.g., interface issues, impurities, decoherence due to surface effects, etc.) that may arise from the incorporation of the metamaterial within a device architecture
- (iv) It enables a broader assessment of promising functionally engineered quantum metamaterials for specific QIS applications that may serve as the focus of future mission-oriented development

Proposers must consider these programmatic objectives when justifying their proposed metamaterials and device characterization approaches. Proposers must provide a description of their proposed quantum materials, synthesis techniques, and device architectures and include sufficient detail to enable assessment of the validity of their approach, the experimental feasibility of their proposed materials/devices to meet SynQuaNon program goals and metrics, and a clear statement of how the proposed metamaterials and device architectures will yield transformative benefits for QIS. At a minimum, proposals must include:

- A description of the proposed approach, the required research and development efforts, and a description of what will be developed and demonstrated during the period of the program. (This description should be accompanied by a schedule of tasks and milestones that will be accomplished during the period of performance.)
- Substantiation of the proposed metamaterial concept based on theoretical analysis, which may include ab initio models, simulations, or proof-of-concept data. (This analysis should include a discussion of why the proposed metamaterial would be capable of tuning,

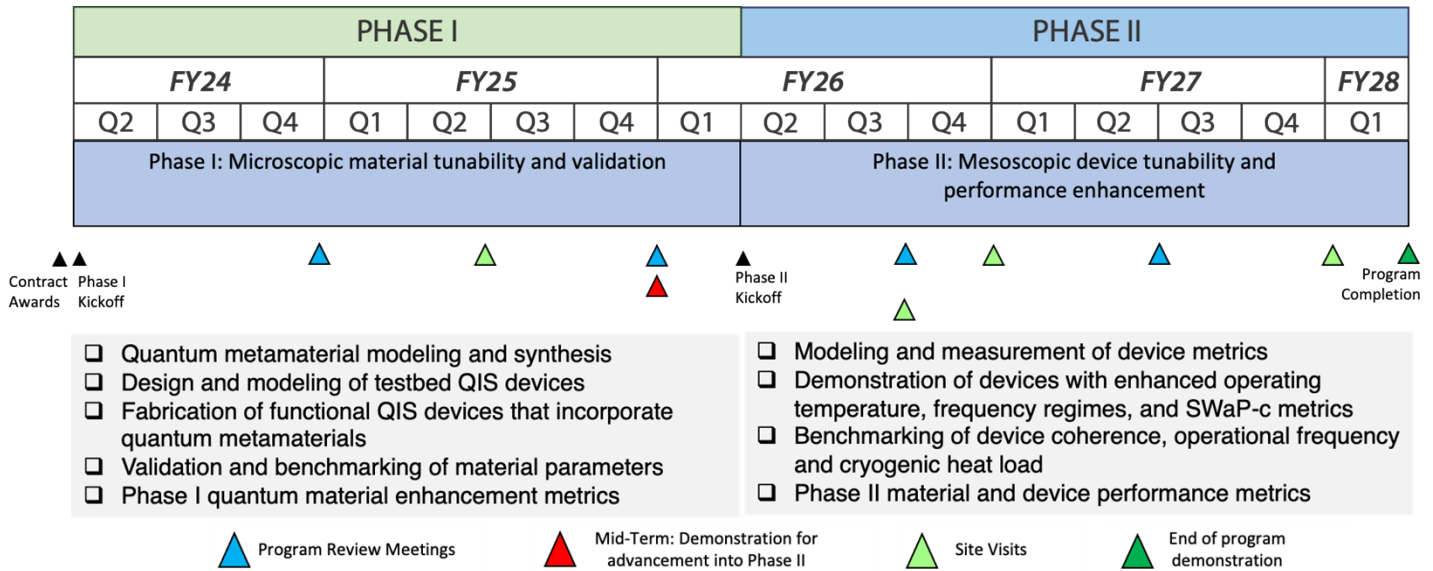
modifying, or enhancing the proposed device-relevant material properties. A comparison of the anticipated material-level enhancements against the relevant SoA in intrinsic or bulk materials currently used in similar QIS applications should be included.)

- A description of the proposed synthesis, nanostructuring, or fabrication process that will be used to develop the proposed metamaterials.
- An identification of risks associated with the material-scale physics (synthesis, process variability, scalability, contamination, oxidation, etc.). (Risk mitigation strategies must be adequately described with clear statements of how the proposed research plan addresses the dominant risks early in the program.)
- Substantiation of the proposed testbed nanoelectronic device(s) that will be used to characterize and benchmark metamaterial properties. (This description should include a clear analysis of the material-to-device connection, the device characterization measurements that will be used to validate the metamaterial enhancements and a broader discussion of the influence of the metamaterials on the proposed device performance. A comparison of the anticipated device-level enhancements against the relevant SoA in similar QIS applications should be included.)
- An identification of risks associated with the device-scale physics (fabrication, reproducibility, potential surface or interface issues, thermalization requirements, etc.). (Risk mitigation strategies must be adequately described with clear statements of how the proposed research plan addresses the dominant risks early in the program.)
- A discussion of why the proposed metamaterials and device architectures could yield transformative benefits for DoD-relevant QIS applications.
- A brief description of other potential benefits of the proposed metamaterials in the broader landscape of quantum circuit architectures relevant to QIS.
- Lastly, proposers must clearly delineate approaches and justifications for meeting the program goals and metrics.

F. Schedule/Milestones

SynQuaNon is structured to demonstrate, validate, and benchmark novel classes of quantum electronic metamaterials that enable beyond-SoA performance in a range of nanoelectronic devices with applications in QIS. Proposers should specify the research and technology development schedule for the full period of performance, split between Phase I and Phase II. The Statement of Work (SOW) must provide a detailed task breakdown, citing specific tasks and interim milestones and metrics, as applicable. Proposers should provide a technical and programmatic strategy that conforms to the entire program schedule and presents an aggressive plan to fully address all program goals, metrics, milestones, and deliverables. The task structure should be consistent across the proposed schedule, SOW, and cost volume.

Program Schedule



A target start date of March 2024 may be assumed for planning purposes. Schedules will be synchronized across performers, as required, and monitored/revised as necessary throughout the program.

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

- To continue integration and development across the program, foster collaboration between teams, and disseminate program developments, a two-day Principal Investigator (PI) meeting will be held approximately every six months with locations split between the east and west coasts of the United States. For budgeting purposes, plan for eight two-day meetings over the course of 48 months: four meetings in the Washington, D.C., area and four meetings in the San Francisco, California, area.
- Regular teleconference meetings will be scheduled with the Government team for progress reporting, problem identification, and mitigation. Proposers should anticipate at least one site visit per phase by the DARPA Program Manager, during which they will have the opportunity to demonstrate progress towards agreed-upon milestones.

G. Deliverables

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

- Comprehensive quarterly technical reports are due within ten days of the end of the given quarter, describing progress made on the specific milestones as required in the SOW.
- A phase completion report submitted within 30 calendar days of the end of each phase, summarizing the research done.
- Other negotiated deliverables specific to the objectives of the individual efforts. These may include registered reports; experimental protocols; publications; data management plan; intermediate and final versions of software libraries, code, and

APIs, including documentation and user manuals; and/or a comprehensive assemblage of design documents, models, modeling data and results, and model validation data.

- Reporting as outlined in Section VI.C.

H. Other Program Objectives and Considerations

1. Collaboration

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

II. Award Information

A. General Award Information

DARPA anticipates multiple awards.

The level of funding for individual awards made under this BAA will depend on the quality of the proposals received and the availability of funds. Awards will be made to proposers²¹ whose proposals are determined to be the most advantageous to the Government, all evaluation factors considered. See Section V for further information.

The Government reserves the right to:

- select for negotiation all, some, one, or none of the proposals received in response to this solicitation;
- make awards without discussions with proposers;
- conduct discussions with proposers if it is later determined to be necessary;
- segregate portions of resulting awards into pre-priced options;
- accept proposals in their entirety or select only portions of proposals for award;
- fund awards in increments with options for continued work at the end of one or more

²¹ As used throughout this BAA, “proposer” refers to the lead organization on a submission to this BAA. The proposer is responsible for ensuring that all information required by a BAA--from all team members--is submitted in accordance with the BAA. “Awardee” refers to anyone who might receive a prime award from the Government, including recipients of procurement contracts, cooperative agreements, or Other Transactions. “Subawardee” refers to anyone who might receive a subaward from a prime awardee (e.g., subawardee, consultant, etc.).

- phases;
- request additional documentation once the award instrument has been determined (e.g., representations and certifications); and
 - remove proposers from award consideration should the parties fail to reach agreement on award terms within a reasonable time or the proposer fails to provide requested additional information in a timely manner.

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

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

In accordance with 10 U.S.C. § 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 \(ed.gov\)](https://www.ed.gov/collegeforeigngiftreport)
 3. The U.S. Department of Commerce, Bureau of Industry and Security, List of Parties of Concern: <https://www.bis.doc.gov/index.php/policy-guidance/lists-of-parties-of-concern>
 4. Georgetown University’s Center for Security and Emerging Technology (CSET) Chinese Talent Program Tracker:
<https://chinatalenttracker.cset.tech>
 5. Director of National Intelligence (DNI) “World Wide Threat Assessment of the US Intelligence Community”: [2021 Annual Threat Assessment of the U.S. Intelligence Community \(dni.gov\)](https://www.dni.gov/2021-annual-threat-assessment)
 6. Various Defense Counterintelligence and Security Agency (DCSA) products regarding targeting of US technologies, adversary targeting of academia, and the exploitation of academic experts: <https://www.dcsa.mil/>
- (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. 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, with specific details, that the proposed work, expertise, and facilities are 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. **FFRDC proposals that do not include these elements may be deemed non-conforming and removed from consideration.**

FFRDCs interested in participating in the SynQuaNon program or proposing to this BAA should first contact the Technical Point of Contact (POC) listed in Part I prior to the Abstract due date listed in Part I to discuss eligibility.

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.

Government Entities interested in participating in the SynQuaNon program or proposing to this BAA should first contact the Technical Point of Contact (POC) listed in Part I prior to the Abstract due date listed in Part I to discuss eligibility.

2. 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.

3. Other Applicants

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

B. Organizational Conflicts of Interest

FAR 9.5 Requirements

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

Agency Supplemental OCI Policy

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

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

Government Procedures

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

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

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

Include any OCIs affirmations and disclosures in Attachment G: VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS.

C. Cost Sharing/Matching

Cost sharing is not required; however, it will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument (e.g., OTs under the authority of 10 U.S.C. § 4021). Cost sharing is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

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

IV. Application and Submission Information

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

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

Abstracts and full proposals that are not found to be applicable to the SynQuaNon BAA as defined above may be deemed non-conforming²² and removed from consideration. All abstracts and full proposals must provide sufficient information to assess the validity/feasibility

²² "Conforming" is defined as having been submitted in accordance with the requirements outlined herein.

of their claims as well as comply with the requirements outlined herein for submission formatting, content and transmission to DARPA. **Abstracts and full proposals that fail to do so may be deemed non-conforming and removed from consideration. Proposers will be notified of non-conforming determinations via letter.**

A. Address to Request Application Package

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

B. Content and Form of Application Submission

1. Abstract Information and Formatting

As stated above, proposers are strongly encouraged to submit an abstract in advance of a full proposal to minimize effort and reduce the potential expense of preparing an out of scope proposal. All proposers are required to use Attachment A: ABSTRACT SUMMARY SLIDE TEMPLATE and Attachment B: ABSTRACT TEMPLATE provided with this solicitation on <https://sam.gov/> and <http://www.grants.gov>. Attachment A: ABSTRACT SUMMARY SLIDE TEMPLATE described herein must be in .ppt, .pptx or .pdf format and should be attached as a separate file to this document.

The abstract provides a synopsis of the proposed project by including the following information:

- The proposed technical approach
- The technical rationale supporting the ability to achieve the metrics
- The technical and programmatic risks
- The makeup of the technical team (including the facilities and any proposed subcontractors)
- High-level cost and schedule
- Availability of proposed staff

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

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

2. Full Proposal Information and Formatting

a. Proposal Volumes

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

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

- **Volume 1**
 - Attachment C: PROPOSAL SUMMARY SLIDE TEMPLATE
 - Attachment D: PROPOSAL TEMPLATE VOLUME 1: TECHNICAL & MANAGEMENT
- **Volume 2²³**
 - Attachment E: PROPOSAL TEMPLATE VOLUME 2: COST
 - Attachment F: MS Excel™ DARPA COST PROPOSAL SPREADSHEET
- **Volume 3**
 - Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS

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

- **Volume 1**
 - Attachment C: PROPOSAL SUMMARY SLIDE TEMPLATE
 - Attachment D: PROPOSAL TEMPLATE VOLUME 1: TECHNICAL & MANAGEMENT
- **Volume 2^{24*}**
 - Attachment F: MS Excel™ DARPA COST PROPOSAL SPREADSHEET
- **Volume 3**
 - Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS

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

- **Direct Labor (sections A and B)** - Detail the total number of persons and their level of commitment for each position listed as well as which specific tasks (as described in the SOW) they will support.
- **Equipment (section C)** - Provide an explanation for listed requested equipment exceeding \$5,000, properly justifying why it is required to meet the objectives of the

²³ All costs included in Volume 2 Attachments E and F must be expressed in US Dollars (USD).

²⁴ All costs included in Volume 2 Attachment F and those submitted in Section L of the SF 424 Research & Related Budget form via Grants.gov must be expressed in US Dollars (USD).

program.

- **Travel (section D)** - Provide the purpose of the trip, number of trips, number of days per trip, departure and arrival destinations, number of people, etc. Only travel required to achieve the program goals and metrics will be allowed.
- **Participant/Trainee Support Costs (section E)** - Provide details on Tuition/ Fees/ Health Insurance, Stipends, Travel and Subsistence costs.
- **Other Direct Costs (section F)** - Provide a justification for the items requested and an explanation of how the estimates were obtained.

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>.

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

b. DARPA Embedded Entrepreneur Initiative (EEI)

Awardees pursuant to this solicitation may be eligible to participate in the DARPA Embedded 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 to amend the statement of work to add negotiated EEI tasks, provide funding, and specify a milestone schedule which will include measurable steps necessary to build, refine, and execute a Go-to-Market strategy aimed at delivering new capabilities for national defense. Milestone examples are available at: <https://www.darpa.mil/work-with-us/contract-management>.

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

3. Proprietary Information

Proposers are responsible for clearly identifying proprietary information. Submissions containing proprietary information must have the cover page and each page containing such information clearly marked with a label such as “Proprietary” or “Company Proprietary.” NOTE: “Confidential” is a classification marking used to control the dissemination of U.S. Government National Security Information as dictated in Executive Order 13526 and should not be used to identify proprietary business information.

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

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

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

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

DoD considers “technical information” to be technical data or computer software, as those terms are defined in Defense Federal Acquisition Regulation Supplement clause 252.227-7013, "Rights in Technical Data - Noncommercial Items" (48 CFR 252.227-7013). Examples of technical information include research and engineering data; engineering drawings and associated lists; specifications, standards, process sheets, manuals, technical reports, technical orders, catalog-item identifications, data sets, studies and analyses and related information; and computer software code. Note that such technical information may or may not be controlled (i.e., CTI), depending on whether it has military or space application.

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

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

CTI is to be marked “DISTRIBUTION C. Distribution authorized to U.S. Government agencies

and their contractors; Critical Technology; [current date]. Other requests for this document shall be referred to DARPA, DSO” in accordance with Department of Defense Instruction 5203.24, “Distribution of Statements on Technical Documents.”

5. Security Information

DARPA anticipates that submissions received under this BAA will be unclassified. However, should a proposer wish to submit classified information, an *unclassified* email must be sent to the BAA mailbox requesting submission instructions from the DARPA/DSO Program Security Officer (PSO).

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

C. Submission Dates and Times

Proposers are warned that submission deadlines as outlined herein are in Eastern Time and will be strictly enforced. When planning a response to this solicitation, proposers should take into account that some parts of the submission process may take from one (1) business day to one month to complete (e.g., registering for a SAM.gov Unique Entity Identifier (UEI) number or Taxpayer Identification Number (TIN)).

DARPA will acknowledge receipt of *complete* submissions via email and assign identifying numbers that should be used in all further correspondence regarding those submissions. If no confirmation is received within two (2) business days, please contact the BAA Administrator at SynQuaNon@darpa.mil to verify receipt.

1. Abstracts

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

2. Full Proposals

Full proposal packages as detailed in Section IV.B.2 above, and, as applicable, proprietary subawardee cost proposals and classified appendices to unclassified proposals, must be submitted per the instructions outlined herein *and received by DARPA* no later than the due date and time listed in Part One: Overview Information. Proposals received after this time and date may not be reviewed.

D. Funding Restrictions

Not applicable.

E. Other Submission Requirements

1. Unclassified Submission Instructions

Proposers must submit all parts of their submission package using the same method; submissions cannot be sent in part by one method and in part by another method nor should duplicate submissions be sent by multiple methods. Email submissions will not be accepted. **Failure to comply with the submission procedures outlined herein may result in the submission being deemed non-conforming and withdrawn from consideration.**

a. Abstracts

DARPA/DSO will employ an electronic upload submission system (<https://baa.darpa.mil/>) for all UNCLASSIFIED abstracts sent in response to this solicitation. *Abstracts must not be submitted via Grants.gov or email.* Note: If an account has recently been created for the DARPA BAA website, this account may be reused. Accounts are typically disabled and eventually deleted following 75-90 days of inactivity – if you are unsure when the account was last used, it is recommended that you create a new account. 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 (by clicking “Create New Account” 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. Note: Even if a submitter’s organization has an existing registration, each user submitting a proposal must create their own Organization Registration.

All abstracts submitted electronically through DARPA’s BAA website must be uploaded as zip archives (i.e., files with a .zip or .zipx extension). The final zip archive should be no greater than 100 MB in size. Only one zip archive will be accepted per submission - subsequent uploads for the same submission will overwrite previous uploads, and submissions not uploaded as zip archives will be rejected by DARPA.

Proposers using the DARPA BAA website may encounter heavy traffic on the submission deadline date; proposers should start this process as early as possible. Technical support for the DARPA BAA Submission website is available during regular business hours, Monday – Friday, 9:00 a.m. – 5:00 p.m. Requests for technical support must be emailed to BAAT_Support@darpa.mil with a copy to SynQuaNon@darpa.mil. Questions regarding submission contents, format, deadlines, etc. should be emailed to SynQuaNon@darpa.mil. Questions/requests for support sent to any other email address may result in delayed/no response.

b. Proposals Requesting a Procurement Contract or Other Transaction

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

i. Electronic Upload

DARPA/DSO encourages proposers to submit UNCLASSIFIED proposals via the DARPA BAA Submission website at <https://baa.darpa.mil>. Note: If an account has recently been created for the DARPA BAA website, this account may be reused. Accounts are typically disabled and eventually deleted following 75-90 days of inactivity – if you are unsure when the account was

last used, it is recommended that you create a new account. 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 (by clicking “Create New Account” 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. Note: Even if a submitter’s organization has an existing registration, each user submitting a proposal must create their own Organization Registration.

All unclassified proposals submitted electronically through DARPA’s BAA website must be uploaded as zip archives (i.e., files with a .zip or .zipx extension). The final zip archive should be no greater than 100 MB in size. Only one zip archive will be accepted per submission - subsequent uploads for the same submission will overwrite previous uploads, and submissions not uploaded as zip archives will be rejected by DARPA.

Proposers using the DARPA BAA website may encounter heavy traffic on the submission deadline date; proposers should start this process as early as possible. Technical support for the DARPA BAA Submission website is available during regular business hours, Monday – Friday, 9:00 a.m. – 5:00 p.m. Requests for technical support must be emailed to BAAT_Support@darpa.mil with a copy to SynQuaNon@darpa.mil. Questions regarding submission contents, format, deadlines, etc. should be emailed to SynQuaNon@darpa.mil. Questions/requests for support sent to any other email address may result in delayed/no response.

ii. Direct Mail/Hand-carry

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

c. Proposals Requesting a Cooperative Agreement

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

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

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

To evaluate compliance with Title IX of the Education Amendments of 1972 (20 U.S.C. § 1681 et.seq.), the Department of Defense (DoD) is collecting certain demographic and career

information to be able to assess the success rates of women who are proposed for key roles in applications in science, technology, engineering or mathematics disciplines. In addition, the National Defense Authorization Act (NDAA) for FY 2019, Section 1286, directs the Secretary of Defense to protect intellectual property, controlled information, key personnel, and information about critical technologies relevant to national security and limit undue influence, including foreign talent programs by countries that desire to exploit United States' technology within the DoD research, science and technology, and innovation enterprise. This requirement is necessary for all research and research-related educational activities. The DoD is using the two forms below to collect the necessary information to satisfy these requirements. Detailed instructions for each form are available on Grants.gov.

Form 2: The Research and Related Senior/Key Person Profile (Expanded) form, available on the Grants.gov website at https://apply07.grants.gov/apply/forms/sample/RR_KeyPersonExpanded_3_0-V3.0.pdf, will be used to collect the following information for all senior/key personnel, including Project Director/Principal Investigator and Co-Project Director/Co-Principal Investigator, whether or not the individuals' efforts under the project are funded by the DoD. The form includes 3 parts: the main form administrative information, including the Project Role, Degree Type and Degree Year; the biographical sketch; and the current and pending support. The biographical sketch and current and pending support are to be provided as attachments:

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

Additional senior/key persons can be added by selecting the “Next Person” button at the bottom of the form. Note that, although applications without this information completed may pass Grants.gov edit checks, if DARPA receives an application without the required information,

DARPA may determine that the application is incomplete and may cause your submission to be rejected and eliminated from further review and consideration under the solicitation. DARPA reserves the right to request further details from the applicant before making a final determination on funding the effort.

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

i. Electronic Upload

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

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

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

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

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

ii. Direct Mail/Hand-carry

Proposers electing to submit cooperative agreement proposals via direct mail or hand-carried must provide one paper copy and one electronic copy on CD or DVD of the full proposal package. Proposers must complete the SF 424 R&R form (Application for Federal Assistance, Research and Related) provided at Grants.gov as part of the opportunity application package for

this BAA and include it in the proposal submission. All parts of the proposal package must be mailed or hand-carried to the address noted in Section VII below.

V. Application Review Information

A. Evaluation Criteria

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

- **Overall Scientific and Technical Merit**

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

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

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

- **Cost and Schedule Realism**

The proposed costs and schedule are realistic for the technical and management approach and accurately reflect the technical goals and objectives of the solicitation. All proposed labor, material, and travel costs are necessary to achieve the program metrics, 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). The proposed schedule aggressively pursues performance metrics in an efficient time frame that accurately accounts for the anticipated workload.

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 proposals that contain cost share, the proposer has provided sufficient rationale as to the appropriateness of the cost share arrangement relative to the objectives of the proposed solution (e.g. high likelihood of commercial application, etc.).

B. Review and Selection Process

DARPA will conduct a scientific/technical review of each conforming proposal. Conforming proposals comply with all requirements detailed in this solicitation; proposals that fail to do so may be deemed non-conforming and may be removed from consideration. Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons.

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

1. Handling of Source Selection Information

DARPA policy is to treat all submissions as source selection information (FAR 2.101 and 3.104), and to only disclose their contents to authorized personnel. Restrictive notices notwithstanding, submissions may be handled by support contractors for administrative purposes and/or to assist with technical evaluation. All DARPA support contractors performing this role are expressly prohibited from performing DARPA-sponsored technical research and are bound by appropriate nondisclosure agreements. Subject to the restrictions set forth in FAR 37.203(d), DARPA may also request input on technical aspects of the proposals from other non-Government consultants/experts who are strictly bound by the appropriate non-disclosure requirements.

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

C. Countering Foreign Influence Program (CFIP)

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

See Section II.B(a) – (c) for additional information on the CFIP process.

D. Federal Awardee Performance and Integrity Information (FAPIIS)

Following the review and selection process described above, but prior to making an award above

the simplified acquisition threshold (FAR 2.101), DARPA is required²⁵ to review and consider any information available through the designated integrity and performance system (currently FAPIIS). Selectees have the opportunity to comment on any information about themselves entered in the database. DARPA will consider any comments and other information in FAPIIS or other systems prior to making an award.

VI. Award Administration Information

A. Selection Notices

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

B. Administrative and National Policy Requirements

1. Solicitation Provisions and Award Clauses, Terms and Conditions

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

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

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

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

All proposers must be registered in SAM unless exempt per FAR 4.1102. FAR 52.204-7, "System for Award Management" and FAR 52.204-13, "System for Award Management Maintenance" are incorporated into this solicitation. See <http://www.darpa.mil/work-with-us/additional-baa> for further information.

International entities can register in SAM by following the instructions in this link: https://www.fsd.gov/sys_attachment.do?sys_id=c08b64ab1b4434109ac5ddb6bc4bcb8.

NOTE: New registrations can take an average of 7-10 business days to process in SAM. SAM

²⁵ Per 41 U.S.C. § 2313, as implemented by FAR 9.103 and 2 CFR § 200.205.

registration requires the following information:

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

3. Representations and Certifications

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

In addition, all proposers are required to submit for all award instrument types supplementary DARPA-specific representations and certifications at the time of proposal submission. See <http://www.darpa.mil/work-with-us/reprs-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.

4. Intellectual Property

Proposers should note that the Government does not own the intellectual property or technical data/computer software developed under Government contracts. The Government acquires the right to use the technical data/computer software. Regardless of the scope of the Government's rights, awardees may freely use their same data/software for their own commercial purposes (unless restricted by U.S. export control laws or security classification). Therefore, technical data and computer software developed under this solicitation will remain the property of the awardees, though DARPA will have, at a minimum, Government Purpose Rights (GPR) to technical data and computer software developed through DARPA sponsorship.

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

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

a. Intellectual Property Representations

All proposers must provide a good faith representation of either ownership or possession of appropriate licensing rights to all other intellectual property to be used for the proposed project. Proposers must provide a short summary for each item asserted with less than unlimited rights that describes the nature of the restriction and the intended use of the intellectual property in the conduct of the proposed research. See Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

b. Patents

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

c. Procurement Contracts

i. Noncommercial Items (Technical Data and Computer Software)

Proposers requesting a procurement contract must list all noncommercial technical data and computer software that it plans to generate, develop, and/or deliver, in which the Government will acquire less than unlimited rights and to assert specific restrictions on those deliverables. In the event a proposer does not submit the list, the Government will assume that it has unlimited rights to all noncommercial technical data and computer software generated, developed, and/or delivered, unless it is substantiated that development of the noncommercial technical data and computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and computer software generated, developed, and/or delivered, proposers should identify the data and software in question as subject to GPR. In accordance with DFARS 252.227-7013, "Rights in Technical Data - Noncommercial Items," and DFARS 252.227-7014, "Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation," the Government will automatically assume that any such GPR restriction is limited to a period of 5 years, at which time the Government will acquire unlimited rights unless the parties agree otherwise. The Government may use the list during the evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer, as may be necessary, to evaluate the proposer's assertions. **Failure to provide full information may result in a determination that the proposal is non-conforming.** A template for complying with this request is provided in Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

ii. Commercial Items (Technical Data and Computer Software)

Proposers requesting a procurement contract must list all commercial technical data and commercial computer software that may be included in any noncommercial deliverables contemplated under the research project and assert any applicable restrictions on the Government's use of such commercial technical data and/or computer software. In the event a proposer does not submit the list, the Government will assume there are no restrictions on the Government's use of such commercial items. The Government may use the list during the evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer to evaluate the proposer's assertions. **Failure to provide full information may result in a determination that the proposal is non-conforming.** A template for complying with this request is provided in Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

d. Other Types of Awards

Proposers requesting an award instrument other than a procurement contract shall follow the applicable rules and regulations governing those award instruments, but in all cases should appropriately identify any potential restrictions on the Government's use of any intellectual property contemplated under those award instruments. This includes both noncommercial items and commercial items. The Government may use the list as part of the evaluation process to assess the impact of any identified restrictions and may request additional information from the proposer, to evaluate the proposer's assertions. **Failure to provide full information may result in a determination that the proposal is non-conforming.** A template for complying with this request is provided in Attachment G: PROPOSAL TEMPLATE VOLUME 3: ADMINISTRATIVE & NATIONAL POLICY REQUIREMENTS, Section 4.

5. Program-generated Data

Data are increasingly the key product of research and engineering endeavors. To ensure the reproducibility of results and access to source data for future research, awardees will be required to maintain and deliver any data generated during award performance ("program-generated data") that is needed to accomplish these goals. Awardees shall be expected to document both the proprietary and non-proprietary products of their research to ensure the retention and potential reusability of this information. This may include:

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

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

6. Human Subjects Research (HSR)/Animal Use

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

7. Electronic Invoicing and Payments

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

8. Electronic and Information Technology

All electronic and information technology acquired or created through this BAA must satisfy the accessibility requirements of Section 508 of the Rehabilitation Act (29 U.S.C. § 749d) and FAR 39.2.

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

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

DFARS 252.204-7000, “Disclosure of Information”

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

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

The full text of the above solicitation provision and contract clauses can be found at

<http://www.darpa.mil/work-with-us/additional-baa#NPRPAC>.

Compliance with the above requirements includes the mandate for proposers to implement the security requirements specified by National Institute of Standards and Technology (NIST) Special Publication (SP) 800-171, “Protecting Controlled Unclassified Information in Nonfederal Information Systems and Organizations” (see <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-171r2.pdf>) and DoDI 8582.01 that are in effect at the time the solicitation is issued.

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

C. Reporting

1. Technical and Financial Reports

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

2. Patent Reports and Notifications

All resultant awards will contain a mandatory requirement for patent reports and notifications to be submitted electronically through i-Edison (<https://www.nist.gov/iedison>).

VII. Agency Contacts

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

- **Technical POC:** Mukund Vengalattore, Program Manager, DARPA/DSO
- **BAA Email:** SynQuaNon@darpa.mil
- **BAA Mailing Address:**

DARPA/DSO
ATTN: HR001123S0050
675 North Randolph Street
Arlington, VA 22203-2114

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

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

VIII. Other Information

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.

A. Proposers Day

The SynQuaNon Proposers Day will be held on August 18, 2023 from 10:00 a.m. to 5:00 p.m. in Arlington, VA. The event will be webcast for those who would like to participate remotely. See DARPA-SN-23-86 posted at <https://sam.gov/> for all details. Participation in the SynQuaNon Proposers Day or viewing the webcast is voluntary and is not required to propose to this solicitation.

Lightning Talks

Attendees at the SynQuaNon Proposers Day may be afforded the opportunity to give a brief, 3-minute oral presentation during the webcast outlining their interests and capabilities. The purpose of these presentations is to facilitate teaming discussions among the attendees. Upon registering, attendees may indicate if they would like to give an oral presentation. Due to limited availability, DARPA will accept submissions on a first-come, first-served basis and does not guarantee that these requests to brief will be fulfilled. Submitted briefing materials should use the template provided via the registration website and are limited to a single, PDF-format slide, which should be appropriate for public release, as they will be shared with the session via webcast. The slide must be submitted to SynQuaNon@darpa.mil by 4:00 p.m. on August 16, 2023. DARPA will contact submitters upon receipt of their slide with additional guidance for the webcast.

Sidebars

There will be an opportunity to meet individually with the Program Manager, Dr. Mukund Vengalattore following the webcast. Eight-minute individual sidebar meetings will be held during Proposers Day between 2:45p.m. – 5:00 p.m.. Attendees may request an individual/team (limited to four [4] people per team) session via the registration website. Requests must be received no later than the registration cutoff date. Individual meetings will be scheduled on a first-come, first-served, and space-available basis and limited to two per institution.

B. Frequently Asked Questions (FAQs)

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

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

C. Collaborative Efforts/Teaming

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

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

All profiles must be emailed to SynQuaNon@darpa.mil no later than 4:00 p.m. August 21, 2023. Following the deadline, the consolidated teaming profiles will be sent via email to the proposers who submitted a valid profile. Specific content, communications, networking, and team formation are the sole responsibility of the participants. Neither DARPA nor the DoD endorses the information and organizations contained in the consolidated teaming profile document, nor does DARPA or the DoD exercise any responsibility for improper dissemination of the teaming profiles. Teams need not be finalized at the time of abstract submission.