

Broad Agency Announcement Ultra-Wide BandGap Semiconductors (UWBGS) Microsystems Technology Office HR001123S0051 September 29, 2023

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ATTACHMENT 1: Cost Volume Proposer Checklist

ATTACHMENT 2: Proposal Summary Slide Template ATTACHMENT 3: General MTO Controlled Unclassified Information Guide (CUIG) ATTACHMENT 4: Other Transactions (OT) Certifications Template ATTACHMENT 5: DARPA Standard Cost Proposal Spreadsheet

# **PART I: OVERVIEW INFORMATION**

- Federal Agency Name: Defense Advanced Research Projects Agency (DARPA), Microsystems Technology Office (MTO)
- Funding Opportunity Title: Ultra-Wide BandGap Semiconductors (UWBGS)
- Announcement Type: Initial Announcement
- Funding Opportunity Number: HR001123S0051
- Assistance Listing Number: 12.910 Research and Technology Development
- **Dates:** (All times listed herein are Eastern Time)
  - o Posting Date: September 29, 2023
  - Proposers Day: October 5, 2023
  - Abstract Due Date: November 1, 2023
  - FAQ Submission Deadline: December 4, 2023
  - Proposal Due Date: December 15, 2023
  - Estimated period of performance start: July 2024
- **Concise description of the funding opportunity:** The UWBGS program will develop foundational, high-quality ultra-wide bandgap (UWBG) materials and electrical contacts necessary for realization of practical electronics that enable UWBG applications.
- Anticipated individual awards: Multiple awards are anticipated.
- Anticipated funding type: 6.2
- **Types of instruments that may be awarded:** Cooperative Agreement, Procurement Contract or Other Transaction
- Agency contact:
  - Dr. Thomas Kazior, Program Manager BAA Coordinator: HR001123S0051@darpa.mil DARPA/MTO ATTN: HR001123S0051
     675 North Randolph Street Arlington, VA 22203-2114

# PART II: FULL TEXT OF ANNOUNCEMENT

## I. Funding Opportunity Description

The Defense Advanced Research Projects Agency (DARPA) often selects its research efforts through the Broad Agency Announcement (BAA) process. This BAA is being issued, and any resultant selection will be made, using the procedures under Federal Acquisition Regulation (FAR) 6.102(d)(2) and 35.016 and 2 C.F.R. § 200.203. Any negotiations and/or awards for FAR-based procurement contracts will use procedures under FAR 15.4, Contract Pricing. Proposals received as a result of this BAA shall be evaluated in accordance with evaluation criteria specified herein through a scientific review process.

DARPA BAAs are posted on the System for Award Management (SAM) website, under the Contract Opportunities link, at https://sam.gov/, and, as applicable, the grants.gov website at http://www.grants.gov/. The following information is for those wishing to respond to the BAA.

The Microsystems Technology Office at DARPA seeks innovative proposals to develop foundational ultra-wide bandgap (UWBG) materials (substrate, device layers, and junctions) and low resistance electrical contacts necessary for realization of devices that enable UWBG applications. In particular, DARPA seeks proposals in the following areas: 1) low defect density, large area (100 mm diameter), epi-ready, UWBG substrates and 2) uniform, low defect density UWBG device layers with high doping efficiency, abrupt homo- and/or hetero-junctions with low junction defect density  $(10^{12}/cm^2)$ , and ultra-low resistance electrical contacts (2 x  $10^{-6}$  ohm-cm<sup>2</sup>). It is anticipated that the technical approaches to meet these goals will be different, and therefore, separate proposals are required for each Technical Area. Proposed research should investigate innovative approaches that enable revolutionary advances in materials, devices, circuits, and systems. Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

#### A. Background

Because of their unique material characteristics (ultra-large breakdown field strength, good current transport properties, high thermal conductivity, and large optical bandgap), UWBG materials (aluminum nitride – AlN, cubic boron nitride – c-BN, diamond) have the potential to revolutionize semiconductor electronics<sup>1</sup> (Figure 1). For example, UWBG materials offer the promise of the creation of high-performance devices for a variety of DoD and commercial applications, including: high-power radio frequency (RF) switches and limiters and high-power density RF amplifiers for radar and communications systems; high-voltage switches for power electronics; high-temperature electronics and sensors for extreme environments; and deep ultraviolet (UV) light emitting diodes (LEDs) and lasers. However, the poor quality (high-defect density and non-uniformity) of UWBG materials, junctions, and electrical contacts limit the performance of UWBG devices. Multiple technical challenges need to be overcome to bring the potential of UWBG devices to fruition.

<sup>&</sup>lt;sup>1</sup> Tsao, J., et al., "Ultrawide-Bandgap Semiconductors: Research Opportunities and Challenges," Advanced Electronic Materials, vol. 4, 2018.



Figure 1: Example of unique materials characteristics (high-breakdown field and thermal conductivity) of UWBG materials (AlN, cBN and diamond) compared to WBG (silicon carbide – SiC,gallium nitride - GaN) and narrow bandgap (gallium arsenide - GaAs, silicon - Si) semiconductors. The diameter of the circles is proportional to the material thermal conductivity. (Source: Naval Research Laboratory)

UWBG materials and devices are in their infancy<sup>1</sup> with the majority of work performed in university and research labs on "small" sample sizes with highly variable material quality (defect density) and poor doping efficiency. Further, electrical contacts exhibit unacceptably high resistance. As a result, device performance falls short of predictions based on material properties and the results are highly inconsistent due to variability in substrates and device layers. The UWBGS program will focus on the foundation of UWBG devices by increasing substrate diameter and quality, improving the material quality of device layers and junctions, and improving the electrical quality of metal contacts. Figure 2 shows a notional test diode highlighting the technical challenge areas and that can be used to measure improvements in material and contact quality.



Figure 2: Cross-section of notional UWBG test diode highlighting technical challenges.

UWBGS will address the following technical challenges, which must be overcome in order to make viable UWBG-based devices:

• *Technical Challenge 1: Creation of large area device quality UWBG substrates.* Substrates serve as the foundation of electronics. While low defect density UWBG substrates have been

demonstrated on small area samples, scaling to larger wafer sizes compatible with existing semiconductor wafer processing infrastructure (e.g., 100 mm diameter) results in UWBG substrates with unacceptably high defect density (e.g, diamond substrate dislocation density<sup>2</sup> >  $10^{8}$ /cm<sup>2</sup>; point defect density >  $10^{16}$ /cm<sup>3</sup>) due to high stress.

- *Technical Challenge 2A: Controlled incorporation of electrically active impurities (dopants) in UWBG materials.* Doping (incorporation of electrically active impurities that conduct current) is used to control the current conducting ability of semiconductors. The large activation energy of typical UWBG dopants, material defects, and/or the formation of defect/dopant complexes, reduce the efficiency of incorporation of electrically active dopants. For example, typical dopant incorporation efficiency for diamond is below 1%<sup>3</sup> and for AlN is below 10% and is highly variable.<sup>4</sup> The poor dopant incorporation efficiency results in unacceptably low material conductivity.
- Technical Challenge 2B: Creation of low defect and abrupt UWBG homo- and heterojunctions. Semiconductor junctions are a key element of all electronic devices, and their electronic properties are sensitive to structure, chemical composition, and defectivity. For example, UWBG homojunctions (junctions formed in similar materials) exhibit low-defect density but do not easily form abrupt junctions due to diffusion of dopants. Heterojunctions (junctions formed in dissimilar materials) can be realized with abrupt junctions, but exhibit high junction defect density (> 10<sup>12</sup>/cm<sup>2</sup>).<sup>5</sup> Lack of abruptness and/or high defect density of semiconductor junctions result in poor device performance, such as high junction capacitance, diode ideality factor, and leakage current.
- Technical Challenge 3: Achieving ultra-low resistance electrical contacts to UWBG materials. Low resistance electrical contacts are another key building block of electronic devices. The intrinsic high energy barrier to current flow between metal contacts and UWBG materials results in unacceptably high contact resistivity. For example, typical contact resistivity to diamond is 2 x 10<sup>-3</sup> ohm-cm<sup>2</sup>,<sup>6</sup> which is more than 1000X higher than contacts to mature semiconductor technologies (GaAs or Si). Existing approaches used in GaAs and Si, such as alloyed contact metallurgy, are not adequate to reduce this high barrier in UWBG materials and therefore new approaches are required to achieve low contact resistivity to UWBG materials required for high performance electronic devices.

#### **B.** Program Description

UWBGS will develop foundational, high-quality materials and electrical contacts necessary for realization of practical UWBG electronics and enable UWBG applications. Specifically, UWBGS will develop:

• High quality (low defect density), large area (100 mm in diameter) UWBG substrates, device layers with high doping efficiency and homo- and hetero-junctions

<sup>&</sup>lt;sup>2</sup> Arnault, J., et al., "Chemical Vapor Deposition Single-Crystal Diamond: A Review," Phys. Status Solidi, vol. 16, 2022.

<sup>&</sup>lt;sup>3</sup> Kato, H. et al., "N-type diamond growth by phosphorus doping on (0 0 1)-oriented surface," J. Phys. D, Vol. 40, 2007.

<sup>&</sup>lt;sup>4</sup> Ahmad, H., et al., "Realization of homojunction PN AlN diodes," J. Appl. Phys., vol. 131, 2022.

<sup>&</sup>lt;sup>5</sup> Kim, J., et al., "Wafer-Bonded p-n Heterojunction of GaAs and Chemomechanically Polished N-Polar GaN," IEEE Electron Device Letters, Vol. 34, No. 1, 2013.

<sup>&</sup>lt;sup>6</sup> Kato, Hiromitsu, et al. "Low specific contact resistance of heavily phosphorus-doped diamond film." Applied Physics Letters, Vol. 93, 2008.

- Dislocation density  $< 10^{3}$ /cm<sup>2</sup>; point defect density to  $< 10^{16}$ /cm<sup>3</sup>
- $\circ$  > 90% (0.9) normalized dopant incorporation efficiency and < 5% non-uniformity
- Abrupt junctions (< 100 nm) with low junction defect density (<  $10^{12}$ /cm<sup>2</sup>)
- Ultra-low resistance electrical contacts:  $< 2 \times 10^{-6}$  ohm-cm<sup>2</sup>

UWBGS will validate improvement in material and electrical contact quality by demonstrating high breakdown voltage diode test devices targeting near ideal electrical properties – diode ideality factor = 1.1 and a diode figure of merit,  $F_{co} = 1/2\pi R_{on}C_{off} = 1$  THz.

Under DARPA and government funded studies, recent innovations in UWBG substrates, device layer synthesis and electrical contacts have identified pathways to overcome these technical challenges.

#### Technical Challenge 1: Creation of large area device quality UWBG substrates.

Potential novel growth processes (and growth reactor designs) to scale substrate diameter while maintaining low defect density (point defects and dislocations) include, but are not limited to:

- *Seed expansion techniques* such as epitaxial lateral overgrowth to expand substrate size while reducing defects
- *Seed tiling* to incrementally scale the diameter of low defect density seeds<sup>2</sup>
- Homo- or heteroepitaxial growth processes<sup>2</sup>
- *Innovations in nucleation layers,* (e.g. the use of metal layers to terminate defects in diamond layers<sup>7</sup> and patterning of nucleation layers<sup>8</sup>) to terminate dislocations
- *Innovations in reactor design, substrate holders, and growth processes/chemistry* to minimize thermal gradients and ensure a uniform growth rate, lowering the built-in stress<sup>9</sup>
- *Innovations in "wafering"* (wafer slicing, chemical-mechanical or plasma assisted polishing) to minimize surface roughness and subsurface damage<sup>10</sup>

# *Technical Challenge 2A: Controlled incorporation of electrically active impurities (dopants) in UWBG materials.*

UWBGS seeks to increase the carrier concentration of UWBG materials. Approaches may include, but are not limited to:

• *Novel epitaxial growth chemistry and growth processes,* to enable defect density reduction and controlled incorporation of electrically active charge carriers with high activation efficiency (e.g. Be-doped p-type AlN layers with high carrier density and improved doping efficiency<sup>4</sup>);

<sup>&</sup>lt;sup>7</sup> Ohmagari, S., et al., "Large reduction of threading dislocations in diamond by hot-filament chemical vapor deposition accompanying W incorporations," Appl. Phys. Lett., Vol. 113, 2018.

<sup>&</sup>lt;sup>8</sup> Ichikawa, K., et al., "High crystalline quality heteroepitaxial diamond using grid-patterned nucleation and growth on Ir," Diamond and Related Materials, Vol. 94, 2019.

<sup>&</sup>lt;sup>9</sup> Sergey V. Baryshev and Matthias Muehle, "Scalable Production and Supply Chain of Diamond using Microwave Plasma: a Mini-review," arXiv:2308.00223, 2023.

<sup>&</sup>lt;sup>10</sup> Luo, H., et al., "Polishing and planarization of single crystal diamonds: state-of-the-art and perspectives," Int. J. Extrem. Manuf., Vol. 3, 2021.

- *Ion implantation* to achieve high carrier density in UWBG materials (e.g. Si-implanted AIN<sup>11</sup>);
- *Innovations in epitaxial reactor design and substrate holders* to reduce defect formation, enhance dopant incorporation, and optimize doping uniformity.

*Technical Challenge 2B: Creation of low defect and abrupt UWBG homo- and hetero-junctions*. UWBGS seeks to improve the quality of UWBG homo- and hetero-junctions. Approaches may include, but are not limited to:

- *Layer bonding* of dissimilar materials to create novel heterostructures to overcome n- or pdoping limitations of individual UWBG materials or to integrate low resistance, narrower bandgap semiconductors with high breakdown field UWBG material<sup>12</sup>
- *Co-doping* to compensate for carriers and create steep doping gradients
- *Innovations in reactor design, substrate holders, and growth processes/chemistry* to enhance doping abruptness<sup>13</sup>

*Technical Challenge 3: Achieving ultralow resistance electrical contacts to UWBG materials.* UWBGS seeks to reduce the contact resistance of metals to UWBG materials. Approaches may include, but are not limited to:

- Novel electrical contact processes (e.g. nanostructured carbon interface layer on diamond layers<sup>14</sup>, compositional grading of AlGaN<sup>15</sup>), which add interface materials between contact metals and UWBG materials to facilitate the formation of a low resistance contact
- N+ regrown contact layers<sup>16</sup> to reduce barrier to current flow
- **Refractory metals** to improve contact robustness

It is envisioned that performers may need to perform growth reactor<sup>17</sup>, materials, and/or process modeling and simulation to guide material and electrical contact development, and that theoretical work may be needed to guide development experiments.

The UWBGS program will validate improvement in material and electrical contact quality by demonstrating proposer-defined, high breakdown voltage diode test devices which may be, but are not limited to: p-n junctions, PIN diodes and Schottky PIN diodes<sup>18</sup>. Diodes can consist of homo-

<sup>&</sup>lt;sup>11</sup> M. Hayden Breckenridge, et al., "High n-type conductivity and carrier concentration in Si-implanted homoepitaxial AlN," Appl. Phys. Lett. 118, 2021.

 $<sup>^{12}</sup>$  Jian, Z., et al., "Electrical and Structural Analysis of  $\beta$ -Ga2O3/GaN Wafer-Bonded Heterojunctions with a ZnO Interlayer," Advanced Electronic Materials, June 2023.

<sup>&</sup>lt;sup>13</sup> F. A. M. Koeck and R. J. Nemanich, "Residual gas analysis-controlled phosphorus doped diamond homoepitaxy utilizing a trimethylphosphine dopant source," Manuscript under review.

<sup>&</sup>lt;sup>14</sup> Koeck, F., et al., "Electrical contact considerations for diamond electron emission diodes," Diamond and Related Materials, Vol. 101, 2020.

<sup>&</sup>lt;sup>15</sup> Bajaj, S., et al., "AlGaN channel field effect transistors with graded heterostructure ohmic contacts," Applied Physics Letters, Vol. 109, 2016.

<sup>&</sup>lt;sup>16</sup> Douglas, E., et al., "Ohmic contacts to Al-rich AlGaN heterostructures," Physica Status Solidi, Vol. 214, No. 8, 2017.

<sup>&</sup>lt;sup>17</sup> Ashfold, M., et al., "Self-consistent modeling of microwave activated  $N_2/CH_4/H_2$  (and  $N_2/H_2$ ) plasma relevant to diamond chemical vapor deposition," Plasma Sources Sci. Technol., Vol. 31, 2022.

<sup>&</sup>lt;sup>18</sup> Dutta, M., et al., "Demonstration of Diamond-Based Schottky p-i-n Diode With Blocking Voltage > 500 V," IEEE Electron Device Letters, Vol. 37, No. 9, 2016.

junctions, hetero-junction, or superjunctions<sup>19</sup>. Proposers must provide a rationale for their choice of diode test structure including relevance to potential future applications and how the chosen diode test structure demonstrates that the technical challenges are being successfully addressed.

#### C. Program Structure

UWBGS is a 36-month, two-phase program with a 24-month Phase 1 (base) and 12-month Phase 2 (option) with two technical areas. At the end of Phase 1, options may be exercised, at the Government's sole discretion, based on technical progress and funding availability. It is anticipated that the number of performers may diminish as options are exercised for progression into Phase 2 of the program.

#### **D.** Technical Area(s)

The UWBGS program consists of one technical area (TA1) focused on UWBG substrate development and a second technical area (TA2) focused on UWBG device layers and electrical contacts. The technical areas are described more fully in the following text. Each TA is standalone. Proposers should not propose to more than one Technical Area in a single proposal. Proposers who wish to propose to both Technical Areas must submit a separate full proposal for each individual Technical Area.

#### **Technical Area 1: UWBG Substrates**

TA1 addresses technical challenge 1 and is focused on improving UWBG material quality (i.e., reducing defect density and surface roughness) while increasing substrate size (diameter). TA1 metrics are specified in Table 1. Note that Table 1 includes proposer-defined metrics for starting (state-of-the-art) substrate size, defect density, thermal conductivity, and surface roughness, all of which are based on the proposed UWBG material.

The goal in *Phase 1* (24 months) is to improve substrate quality (defect density and surface finish) while scaling substrate diameter to a minimum of 50 mm diameter. Proposers will fabricate high quality UWBG substrates and demonstrate 50 mm diameter or larger, single crystal substrates with low defect density. Proposers should describe their approach for substrate polishing to yield low surface roughness. Finally, proposers should discuss plans for assessing substrate quality, including characterization of dislocation density, point defect density, and surface roughness. Proposers may plan to use characterization/metrology techniques such as cathodoluminescence, x-ray topography, transmission electron microscopy (TEM), and atomic force microscopy (AFM).

The goal in *Phase 2* (12 months) is to scale substrate diameter to a minimum of 100 mm diameter while maintaining low defect density and good quality substrate surfaces, i.e., creating epi-ready UWBG substrates. Proposers will refine the Phase 1 growth and polishing techniques to fabricate UWBGS substrates that simultaneously meet or exceed the Phase 2 metrics. Proposers are expected to discuss technical challenges and risks associated with scaling substrates to 100 mm diameter or larger.

<sup>&</sup>lt;sup>19</sup> Xiao, M., et al., "Design and Simulation of GaN Superjunction Transistors With 2-DEG Channels and Fin Channel," IEEE Journal OF Emerging and Selected Topics in Power Electronics, Vol. 7, No. 3, 2019.

The metrics for TA1 are shown in Table 1.

Metric	Units	SOA	Phase 1	Phase 2
Size (1, 2)	mm	(1)	50	100
Defect Density Dislocation (3) Point defects (3, 4)	/cm <sup>2</sup> /cm <sup>3</sup>	(1) (1)	10 <sup>3</sup> 10 <sup>16</sup>	10 <sup>3</sup> 10 <sup>16</sup>
Thermal Conductivity (5)	W/m-K	X (1)	0.95X	0.95X
Surface roughness (6)	nm	(1)	0.2	0.2

Table 1. UWBGS TA1 Metrics

1. Proposer-defined ultra-wide bandgap material with minimum thermal conductivity of 300 W/m-K, with substrate diameter, defect density, thermal conductivity, and surface roughness based on proposer's baseline material

- 2. Substrate must be single crystal, 0.5 mm nominal thickness with proposer defined crystal orientation
- 3. Characterize using performer defined approach such as cathodoluminescence or x-ray topography
- 4. Point defects include vacancies, interstitials, and impurity atoms
- 5. Thermal conductivity in vertical and lateral directions at  $\leq 100$  °C
- 6. Average surface roughness (Ra) over a 100 μm scan on epi-ready side

While the number of potential UWBG substrate materials is large, UWBG materials with thermal conductivities less than 300 W/m-K are not within the scope of this solicitation.

#### **Technical Area 2: UWBG Device Layers and Electrical Contacts**

In TA2 performers must address technical challenges 2A, 2B, and 3. TA2 metrics are specified in Table 2, and proposers must show how all metrics will be met simultaneously. Note that Table 2 includes proposer-defined metrics for doping efficiency that are based on the proposed UWBG material system.

The goal in *Phase 1* (24 months) is to develop device layers and homo-/heterostructures with efficient and controlled introduction of electrically active carriers that achieves 60% of the theoretical doping efficiency for the proposed material, referred to as the normalized doping efficiency. Proposers are expected to define and provide supporting analysis for the theoretical doping efficiency for their proposed UWBG material. Phase 1 will also demonstrate low resistance electrical contacts ( $< 2 \times 10^{-5}$  ohm-cm<sup>2</sup>) and uniform diode test structures with diode ideality factor below 1.5 to validate the improvement in material and contact quality. Proposers should describe their approach for measuring material and electrical characteristics of device layers, junctions, electrical contacts, and test diodes (e.g. junction abruptness, ideality factor, diode figure of merit –  $F_{co}$ , junction defect density).

The goal in *Phase 2* (12 months) is to optimize doping of UWBG device layers and achieve 90% normalized doping efficiency. Phase 2 will further improve device layer electrical contact resistance ( $< 2 \times 10^{-6}$  ohm-cm<sup>2</sup>) and uniform diode test structures with diode ideality factor below 1.1 to validate the material structures and contacts.

The metrics for TA2 are shown in Table 2.

Metric	Units	SOA	Phase 1	Phase 2
Normalized doping efficiency (1, 2, 3, 4)		< 0.2	0.6	0.9
Material non- uniformity (5)	%	50	10	5
Electrical contact resistance (6, 7)	$\Omega$ -cm <sup>2</sup>	2 x 10 <sup>-3</sup>	2 x 10 <sup>-5</sup>	2 x 10 <sup>-6</sup>
Test diode ideality factor (8)		> 2	≤1.5	≤1.1
Test diode non- uniformity (9)	%	50	10	5
Test diode $F_{co}$ (10)	GHz	40	400	1000

#### Table 2: UWBGS TA2 Metrics

1. Normalized doping efficiency: measured doping efficiency / maximum theoretical doping efficiency for proposer selected UWBG material system

- 2. Doping efficiency: electrically conducting carriers / incorporated dopant atoms
- 3. n- and p-type dopants; controllable carrier concentration ranges as low as 10<sup>16</sup> and up to 10<sup>19</sup> cm<sup>-3</sup>, with minimum room temperature thermal conductivity of 50 W/m-K
- 4. Device layer point defect density (include vacancies, interstitials, and impurity atoms):  $< 1 \times 10^{16}$ /cm<sup>3</sup>
- 5. Proposer defined; for example, sheet resistivity measured across a minimum of a 25 mm diameter wafer in Phase 1 and a 50 mm diameter wafer in Phase 2; minimum 25 data points per wafer; measured on two or more wafers
- 6. Contact resistance to both n-type and p-type semiconductors
- 7. Contact resistance must not degrade (< 5% change in contact resistance) under 1000-hour bias stress test; measured on a minimum of 6 electrical contact test structures; proposer defined bias conditions; bias conditions must reflect a relevant operational environment in a real-world device.
- 8. Proposer defined homo- or hetero-junction diode with breakdown field strength of 4 MV/cm; diode must exhibit abrupt junctions (< 100 nm) with low junction defect density (< 10<sup>12</sup>/cm<sup>2</sup>)
- 9. Diode electrical characteristics (ideality factor, breakdown voltage, leakage current); measured across minimum 25 mm diameter wafer (Phase 1) and 50 mm diameter wafer (Phase 2), minimum 25 data points /wafer; measured on two or more wafers

10. Diode figure of merit  $F_{co} = 1/2\pi R_{on}C_{off}$ 

It is expected that, in Phase 2, TA2 performers will need to procure UWBG substrates that meet or exceed the TA1 substrate metrics.

DARPA expects to incorporate a government-sponsored independent verification and validation (IV&V) team into the program to evaluate TA1 and TA2 deliverables. To ensure consistency in characterization, performers are expected to coordinate with this IV&V team to define appropriate material, electrical contact, and diode test structures. Additionally, performers are expected to work with the IV&V team to identify associated material and electrical metrology techniques to characterize the materials, test structures, and diodes. Electrical contact robustness will be evaluated using a 1000-hour DC stress test measured on multiple electrical contact test structures (Table 2, footnote 7). Proposers should provide detailed information in their proposal on how they plan to develop and characterize the substrates, device layers, junctions, test structures, and test diodes under this program.

#### E. Schedule/Milestones

The UWBGS program structure is shown in Figure 1. UWBGS is a 36-month program with an anticipated start in July 2024. Program kickoff and quarterly review sessions or technical interchange meetings are mandatory and represent an opportunity to interact with the Government on planned work, specifics of the technical approaches, and any technical or programmatic items of concern.

The performers will construct a research program to meet or exceed all the metrics outlined in the metrics table. The program plan should include:

- Program kickoff meeting to be held in-person at program start in Arlington, Virginia
- Quarterly Program Reviews, either via teleconference or at the performer's site at the discretion of DARPA
- Design Reviews, held via teleconference, for high breakdown voltage diode test devices and associated test structures
- Interim and end of phase delivery of appropriate substrates, device layers, and diode test structures, and associated test data for the IV&V team



#### Figure 3. UWBGS Program Structure and Schedule

#### F. Deliverables

It is expected that any resultant awards will require performers to deliver a detailed spend plan at program kickoff and execution of subsequent option awards, quarterly technical reports, monthly technical status updates, and monthly financial reports including updated expenditures. It is further expected that performers shall prepare and submit briefing materials and participate in quarterly progress reviews, either via teleconference or at the performer's site at the discretion of DARPA. All performers shall participate in and support an in-person kickoff meeting and in-person program-wide reviews held at least annually and scheduled at the Program Manager's discretion.

For TA1, performers will be expected to deliver a minimum of five (5) UWBG substrates at the end of each phase for IV&V by government subject matter experts (SMEs).

For TA2, performers will be expected to deliver a minimum of two (2) wafers with device layers and material, electrical contact resistance and diode test structures at the end of each phase for IV&V by government SMEs.

Performers will also be expected to define interim metrics/milestones every 6 months as indicated in Figure 3 for both TAs. In addition, performers are expected to deliver one or more interim substrates (TA1) and wafers with device layers, test structures and test devices (TA2) every six months, starting 12 months after kick-off, for evaluation by government SMEs.

All hardware deliverables must include associated test data reporting either status against interim metrics or showing that the end of phase metrics have been achieved. To ensure consistency in characterization, the performer, in consultation and collaboration with the government IV&V team, will identify appropriate materials characterization approaches for the performer's material system. In addition, performer will consult with government IV&V team to design and fabricate appropriate contact resistance and diode test structures, and generate a test plan. This includes

appropriate on-wafer test structures. End of Phase 1 deliverables will be expected to be received by the government no less than six (6) weeks before end of phase to allow time for IV&V.

#### G. Government Furnished Equipment/Property/Information

No Government Furnished Equipment, Property, or Information is expected to be provided for the effort solicited in this BAA.

#### H. Intellectual Property

Any use of proposer-defined intellectual property (patents, proprietary information, etc.) should be clearly marked as such within the proposal. Include all proprietary claims to the results, prototypes, intellectual property, or systems supporting the effort and/or necessary for the use of the research, results and/or prototype. It is desired that all technical data generated by the UWBGS program be provided as deliverables to the Government with Unlimited Rights, or as applicable, Government Purpose Rights (GPR), and all hardware designs and documentation with a minimum of GPR. If there are no proprietary claims, this should be stated. For forms to be completed regarding intellectual property, see Section IV.B.10 and Section IV.B.1, "Section III. Other Transaction Request", if applicable.

### **II.** Award Information

#### A. General Award Information

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

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

The Government reserves the right to request any additional, necessary documentation once it makes the award instrument determination. Such additional information may include but is not limited to Representations and Certifications (see Section VI.B.2., "Representations and Certifications"). The Government reserves the right to remove proposers from award consideration should the parties fail to reach agreement on award terms, conditions, and/or cost/price within a reasonable time, and the proposer fails to timely provide requested additional information. Proposals identified for negotiation may result in a procurement contract, grant, cooperative agreement, or other transaction, depending upon the nature of the work proposed, the required degree of interaction between parties, whether or not the research is classified as Fundamental Research, and other factors.

Proposers looking for innovative, commercial-like contractual arrangements are encouraged to consider requesting Other Transactions. To understand the flexibility and options associated with Other Transactions, consult <u>http://www.darpa.mil/work-with-us/contract-</u>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.
  - In accordance with USD(R&E) direction to mitigate undue foreign influence in ii. 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:
  - Executive Order 13959 "Addressing the Threat From Securities Investments That Finance Communist Chinese Military Companies": <u>https://www.govinfo.gov/content/pkg/FR-2020-11-17/pdf/2020-25459.pdf</u>
  - 2. The U.S. Department of Education's College Foreign Gift and Contract Report: <u>College Foreign Gift Reporting (ed.gov)</u>

- 3. The U.S. Department of Commerce, Bureau of Industry and Security, List of Parties of Concern: <u>https://www.bis.doc.gov/index.php/policy-guidance/lists-of-parties-of-concern</u>
- 4. Georgetown University's Center for Security and Emerging Technology (CSET) Chinese Talent Program Tracker: <u>https://chinatalenttracker.cset.tech</u>
- 5. Director of National Intelligence (DNI) "World Wide Threat Assessment of the US Intelligence Community": <u>2021 Annual Threat Assessment of</u> <u>the U.S. Intelligence Community (dni.gov)</u>
- 6. Various Defense Counterintelligence and Security Agency (DCSA) products regarding targeting of US technologies, adversary targeting of academia, and the exploitation of academic experts: <u>https://www.dcsa.mil/</u>
- (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 nonprofit 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
  - 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 <a href="http://www.darpa.mil/work-with-us/additional-baa">http://www.darpa.mil/work-with-us/additional-baa</a>.

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 that the proposed work is not otherwise available from the private sector. (2) FFRDCs must provide a letter, on official letterhead from their sponsoring organization, that (a) cites the specific authority establishing their eligibility to propose to Government solicitations and compete with industry, and (b) certifies the FFRDC's compliance with the associated FFRDC sponsor agreement's terms and conditions. These conditions are a requirement for FFRDCs proposing to be awardees or subawardees.

FFRDCs interested in participating in the UWBGS 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 UWBGS effort 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.

#### c) Authority and Eligibility

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

#### 2. Other Applicants

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

#### B. Organizational Conflicts of Interest

#### FAR 9.5 Requirements

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

#### Agency Supplemental OCI Policy

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

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

- The name of the DARPA office receiving the support;
- The prime contract number;
- Identification of proposed team member (subawardee, consultant) providing the support; and

• An OCI mitigation plan in accordance with FAR 9.5.

#### Government Procedures

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

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

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

#### C. Cost Sharing/Matching

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

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

# IV. Application and Submission Information

#### A. Address to Request Application Package

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

#### **B.** Content and Form of Application Submission

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

#### 1. Abstract Format

Proposers are strongly encouraged to submit an abstract in advance of a full proposal. Abstracts should follow the format described below in this section. The cover sheet should be clearly marked "ABSTRACT" and the total length of Section II should not exceed 4 pages

Proposers should not propose to more than one Technical Area in a single abstract. Proposers who wish to propose to more than one Technical Area must submit a separate abstract for each individual Technical Area.

#### Section I. Administrative

A. Cover sheet to include:

- (1) BAA number (HR001123S0051);
- (2) Technical area(s);
- (3) Lead Organization submitting abstract;
- (4) Type of organization, selected among the following categories: Large Organization, Small Disadvantaged Organization, Other Small Organization, HBCU, MI, Other Educational, Other Nonprofit;
- (5) Proposer's internal reference number (if any);
- (6) Other team members (if applicable) and type of organization for each;
- (7) Proposal title;
- (8) Technical point of contact to include: Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail;
- (9) Administrative point of contact to include:
  Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail;
- (10) Total funds requested from DARPA, and the amount of cost share (if any); AND
- (11) Date proposal abstract was submitted.

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

#### Section II. Abstract Details

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

#### A. Innovative Claims

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

#### **B.** Technical Approach

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

#### C. Deliverables

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

#### **D.** Cost and Schedule

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

#### 2. Full Proposal Format

All full proposals must be in the format given below. Proposals shall consist of two volumes: Volume I – Technical and Management Proposal (3 sections), and Volume II – Cost Proposal (4 sections). The submission of other supporting materials along with the proposals is strongly discouraged and will not be considered for review. Section II of Volume I, Technical and Management Proposal, shall not exceed 20 pages. The page limitation for full proposals includes all figures, tables, and charts. There is no page limit for Volume II, Cost Proposal.

Proposers should not propose to more than one Technical Area in a single proposal. Proposers who wish to propose to more than one Technical Area must submit a separate full proposal for each individual Technical Area.

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

#### a. Volume I, Technical and Management Proposal

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

#### Section I. Administrative

A. Cover sheet to include:

- (1) BAA number (HR001123S0051);
- (2) Technical area(s);
- (3) Lead Organization submitting proposal;
- (4) Type of organization, selected among the following categories: Large Organization, Small Disadvantaged Organization, Other Small Organization, HBCU, MI, Other Educational, Other Nonprofit;
- (5) Proposer's internal reference number (if any);
- (6) Other team members (if applicable) and type of organization for each;
- (7) Proposal title;
- (8) Technical point of contact to include:

Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail;

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

#### B. Official transmittal letter.

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

#### Section II. Detailed Proposal Information

#### A. Executive Summary

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

#### **B.** Technical Approach

This section is the centerpiece of the proposal and should succinctly summarize the innovative claims for the proposed research and clearly describe the proposed approach without using any jargon. This section should demonstrate that the proposer has a clear understanding of the state-of-the-art and should provide sufficient justification for the feasibility of the proposed approach(es). This section should include a detailed technical rationale, technical approach, and constructive plan for accomplishment of technical goals in support of innovative claims and deliverable creation. This section must include:

- Rationale for choice of UWBG substate (TA1), device layers (TA2) and test diode (TA2)
- Analysis (including assumptions) and/or test data to support all claims (TA1, TA2)
- Analysis (including all assumptions and supporting data) showing that all metrics can be simultaneously achieved in each technical area and in each phase (TA1, TA2)
- Rationale for proposer defined metrics (in Tables 1 and 2)
- Rationale for proposer defined interim metrics/milestones (TA1, TA2)
- Detailed description of approach for substrate polishing to yield low surface roughness (TA1)
- Detailed information on how they plan to develop and characterize the substrates, device layers, junctions, test structures and test diodes (TA1, TA2)
- Detailed plan for assessing substrate quality, including characterization of dislocation density, point defect density, and surface roughness (TA1)
- Supporting analysis for the theoretical doping efficiency for their proposed UWBG material (TA2)

• Ratonale and descripton of (test conditions for) electrical contact robustness test (TA2)

#### C. Statement of Work (SOW)

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

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

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

#### D. Schedules and measurable milestones

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

#### E. Results and Technology Transfer

Description of the results, products, transferable technology, and expected technology transfer. This should also address mitigation of life-cycle and sustainment risks associated with transitioning intellectual property for U.S. military applications, if applicable. See also Section IV.B.11, "Intellectual Property." If there are no proprietary claims, this should be stated. This section should include potential applications for UWBG materials and devices that would motivate program expansion as well as potential tech transition/insertion opportunities.

#### F. Risk Analysis and Mitigation Plan

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

#### G. Ongoing Research

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

#### H. Proposer Accomplishments

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

#### I. National Security Impact Statement

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

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

#### J. Facilities and Equipment

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

#### K. Teaming

Describe the formal teaming arrangements which will be used to execute this effort. Describe the programmatic relationship between investigators and the rationale for choosing this teaming strategy. Present a coherent organization chart for the program team which includes, as applicable: (1) the programmatic relationship of team member; (2) the unique capabilities of team members; (3) the task of responsibilities of team members; (4) the teaming strategy among the team members; (5) the principal investigator (PI), co-PI, and program manager (if applicable) for each team member to include subcontractor's PI, co-PI, and program manager; and (6) the key personnel along with the amount of effort to be expended by each person during each year.

#### Section III. Additional Information

Information in this section may include a brief bibliography of relevant technical papers and research notes (published and unpublished) which document the technical ideas upon which the proposal is based. Copies of not more than three (3) relevant prior papers may be included in the submission.

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

All proposers, including FFRDCs, must submit the following:

#### Section I. Administrative

Cover sheet to include:

- (1) BAA number (HR001123S0051);
- (2) Technical area(s);
- (3) Lead Organization submitting proposal;
- (4) Type of organization, selected among the following categories:

Large Organization, Small Disadvantaged Organization, Other Small Organization, HBCU, MI, Other Educational, Other Nonprofit;

- (5) Proposer's internal reference number (if any);
- (6) Other team members (if applicable) and type of organization for each;
- (7) Proposal title;
- (8) Technical point of contact to include:

Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), electronic mail (if available);

(9) Administrative point of contact to include:

Salutation, last name, first name, street address, city, state, zip code (+4), telephone, fax (if available), and electronic mail (if available);

(10) Award instrument requested:

Cost-Plus-Fixed Fee (CPFF), Cost-contract—no fee, cost sharing contract—no fee, or other type of procurement contract (*specify*), Cooperative Agreement, or Other Transaction;

(11) Place(s) and period(s) of performance;

(12) Total proposed cost separated by basic award and option(s), if any, by calendar year and by government fiscal year;

(13) Name, address, and telephone number of the proposer's cognizant Defense Contract Management Agency (DCMA) administration office (*if known*);

(14) Name, address, and telephone number of the proposer's cognizant Defense Contract Audit Agency (DCAA) audit office (*if known*);

(15) Date proposal was prepared;

(16) DUNS number;

(17) TIN number;

(18) CAGE Code;

(19) Subcontractor Information;

(20) Proposal validity period (120 days is recommended); AND

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

# Attachment 1, the Cost Volume Proposer Checklist, <u>must</u> be included with the coversheet of the Cost Proposal.

#### Section II. Detailed Cost Information (Prime and Subcontractors)

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

Total program cost broken down by major cost items:

#### A. Direct Labor

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

#### **B.** Indirect Costs

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

#### C. Travel

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

#### **D.** Other Direct Costs

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

#### E. Material/Equipment

(i) An itemization of any information technology (IT) purchase, as defined by FAR 2.101 – Documentation supporting the reasonableness of the proposed equipment costs(vendor quotes, past purchase orders/purchase history, detailed engineering estimates, etc.) shall be provided, including a letter stating why the proposer cannot provide the requested resources from its own funding for prime and all sub-awardees.

(ii) A priced Bill-of-Material (BOM) clearly identifying, for each item proposed, the quantity, unit price, the source of the unit price (i.e., vendor quote, engineering estimate, etc.), the type of property (i.e., material, equipment, special test equipment, information technology, etc.), and a cross-reference to the Statement of Work (SOW) task/s that require the item/s. At time of proposal submission, any item that exceeds \$2,000 must be supported

with basis-of-estimate (BOE) documentation such as a copy of catalog price lists, vendor quotes or a written engineering estimate (additional documentation may be required during negotiations, if selected).

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

#### F. Consultants

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

#### G. Subcontracts

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

All proprietary subcontractor proposal documentation, prepared at the same level of detail as that required of the prime, which cannot be uploaded to the DARPA BAA website (<u>https://baa.darpa.mil</u>, BAAT) or Grants.gov as part of the proposer's submission, shall be made immediately available to the Government, upon request, under separate cover (i.e., mail, electronic/email, etc.), either by the proposer or by the subcontractor organization. This does not relieve the proposer from the requirement to include, as part of their submission (via BAAT or Grants.gov, as applicable), subcontract proposals that do not include proprietary pricing information (rates, factors, etc.).

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

#### H. Cost-Sharing

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

#### I. Fundamental Research

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

Note 1:

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

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

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

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

#### <u>Note 2:</u>

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

#### <u>Note 3:</u>

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

#### Note 4:

The Government requires that proposers\* use the provided MS Excel<sup>TM</sup> 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 <u>http://www.darpa.mil/work-with-us/contract-management</u> (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<sup>TM</sup> DARPA Standard Cost Proposal Spreadsheet. Instead, a proposed budget and justification may be provided using the SF-424 Research & Related Budget forms provided via <u>https://www.grants.gov</u>.

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

#### Section III. Other Transaction Request, if applicable

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

• Milestone description

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

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

#### Section IV. Other Cost Information

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

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

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

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

#### 3. Proprietary Information

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

#### 4. Security Information

#### a. Program Security Information

Proposers should include with their proposal any proposed solution(s) to program security requirements unique to this program. Common program security requirements include but are

not limited to: operational security (OPSEC) contracting/sub-contracting plans; foreign participation or materials utilization plans; program protection plans (which may entail the following) manufacturing and integration plans; range utilization and support plans (air, sea, land, space, and cyber); data dissemination plans; asset transportation plans; classified test activity plans; disaster recovery plans; classified material / asset disposition plans and public affairs / communications plans.

#### 2. Controlled Unclassified Information (CUI)

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

#### a. CUI Proposal Markings

If an unclassified submission contains CUI or the suspicion of such, as defined by Executive Order 13556 and 32 CFR Part 2002, the information must be appropriately and conspicuously marked CUI in accordance with DoDI 5200.48. Identification of what is CUI about this DARPA program will be detailed in the General MTO Controlled Unclassified Information Guide (CUIG) and is provided as Attachment 3 to the BAA.

#### b. CUI Submission Requirements

Unclassified submissions containing CUI may be submitted via DARPA's BAA Website (https://baa.darpa.mil) in accordance with Section IV.C.2. of this BAA.

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

#### c. Unclassified Submissions

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

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

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

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

DFARS 252.204-7000, "Disclosure of Information"

DFARS 252.204-7008, "Compliance with Safeguarding Covered Defense Information Controls" DFARS 252.204-7012, "Safeguarding Covered Defense Information and Cyber Incident Reporting"

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

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

https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-171r2.pdf) and DoDI 8582.01 that are in effect at the time the solicitation is issued.

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

#### 6. Human Subjects Research (HSR)/Animal Use

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

#### 7. Approved Cost Accounting System Documentation

Proposers that do not have a Cost Accounting Standards (CAS) compliant accounting system considered adequate for determining accurate costs that are negotiating a cost- type procurement contract must complete an SF 1408. For more information on CAS compliance, see <a href="http://www.dcaa.mil/cas.html">http://www.dcaa.mil/cas.html</a>. To facilitate this process, proposers should complete the SF 1408 found at <a href="http://www.gsa.gov/system/files/SF1408-14e.pdf">http://www.dcaa.mil/cas.html</a>. To facilitate this process, proposers should complete the SF 1408 found at <a href="http://www.gsa.gov/system/files/SF1408-14e.pdf">http://www.gsa.gov/system/files/SF1408-14e.pdf</a> and submit the complete form with the proposal. To complete the form, check the boxes on the second page, then provide a narrative explanation of your accounting system to supplement the checklist on page one. For more information, see <a href="http://www.dcaa.mil/preaward\_accounting\_system\_adequacy\_checklist.html">http://www.dcaa.mil/preaward\_accounting\_system\_files/SF1408-14e.pdf</a> and submit the complete form with the proposal. To complete the form, check the boxes on the second page, then provide a narrative explanation of your accounting system to supplement the checklist on page one. For more information, see <a href="http://www.dcaa.mil/preaward\_accounting\_system\_adequacy\_checklist.html">http://www.dcaa.mil/preaward\_accounting\_system\_adequacy\_checklist.html</a>).

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

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

#### 9. Small Business Subcontracting Plan

Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. § 637(d)) and FAR 19.702(a)(1), each proposer who is a large business concern and seeking a procurement contract that has subcontracting possibilities is required to submit a subcontracting plan with their proposal. The plan format is outlined in FAR 19.704. As of the date of publication of this BAA, per FAR 19.702, the threshold for submission of a small business subcontracting plan is \$750,000 (total contract amount including options).

#### **10. Intellectual Property**

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

#### a. For Procurement Contracts

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

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

#### b. For All Non-Procurement Contracts

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

#### 11. Patents

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

application, and a summary of the patent title, together with either: (1) a representation that you own the invention, or (2) proof of possession of appropriate licensing rights in the invention.

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

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

International entities can register in SAM by following the instructions in this link: https://www.fsd.gov/sys\_attachment.do?sys\_id=c08b64ab1b4434109ac5ddb6bc4bcbb8.

#### 13. Funding Restrictions

Not applicable.

C. Submission Information

DARPA will acknowledge receipt of all submissions and assign an identifying control number that should be used in all further correspondence regarding the submission. DARPA intends to use electronic mail correspondence regarding HR001123S0051. Submissions may not be submitted by fax or e-mail; any so sent will be disregarded.

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

All administrative correspondence and questions on this solicitation, including requests for clarifying information on how to submit an abstract or full proposal to this BAA should be directed to <u>HR001123S0051@darpa.mil</u>. DARPA intends to use electronic mail for correspondence regarding HR001123S0051. Proposals and abstracts may not be submitted by fax or e-mail; any so sent will be disregarded. DARPA encourages use of the Internet for retrieving the BAA and any other related information that may subsequently be provided.

#### 1. Submission Dates and Times

#### a. Abstract Due Date

Abstracts must be submitted to DARPA/MTO on or before 4:00 p.m., Eastern Time, November 1, 2023. <u>Abstracts received after this time and date may not be reviewed.</u>

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#### b. Full Proposal Date

Full proposals must be submitted to DARPA/MTO on or before 4:00 p.m., Eastern Time, December 15, 2023, in order to be considered during the single round of selections. <u>Proposals</u> received after this deadline will not be reviewed.

#### c. Frequently Asked Questions (FAQ)

DARPA will post a consolidated Question and Answer (FAQ) document on a regular basis. To access the posting go to: <u>http://www.darpa.mil/work-with-us/opportunities</u>. Under the HR001123S0051 summary will be a link to the FAQ. Submit your question/s by e-mail to <u>HR001123S0051@darpa.mil</u>. In order to receive a response sufficiently in advance of the proposal due date, send your question/s on or before 4:00 p.m., Eastern Time, December 4, 2023.

#### 2. Abstract Submission Information

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

All abstracts sent in response to HR001123S0051 shall be submitted via DARPA's BAA Website (https://baa.darpa.mil). Visit the website to complete the two-step registration process. Submitters will need to register for an Extranet account (via the form at the URL listed above) and wait for two separate e-mails containing a username and temporary password. After accessing the Extranet, submitters may then create an account for the DARPA BAA website (via the "Register your Organization" link along the left side of the homepage), view submission instructions, and upload/finalize the abstract. Proposers using the DARPA BAA Website may encounter heavy traffic on the submission deadline date; it is highly advised that submission process be started as early as possible.

All abstracts submitted through the DARPA BAA Submission website must be uploaded as zip files (.zip or .zipx extension). The final zip file should only contain the document(s) requested herein and must not exceed 100 MB in size. Only one zip file will be accepted per abstract; abstracts not uploaded as zip files will be rejected by DARPA.

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

Please note that the DoD-issued certificate associated with the BAA website is not recognized by all commercial certificate authorities, resulting in untrusted connection errors/messages. You can

either bypass the warning (possibly by adding https://baa.darpa.mil to your listed of trusted sites, or darpa.mil as a trusted domain), or visit DISA's site to download the Root Certificate Authority (CA): <u>https://public.cyber.mil/from-iase/</u>.

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

Note: DO NOT SUBMIT ABSTRACTS TO GRANTS.GOV.

#### 3. Proposal Submission Information

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

#### a. For Proposers Requesting Cooperative Agreements:

Proposers requesting cooperative agreements must submit proposals through one of the following methods: (1) electronic upload per the instructions at <u>https://www.grants.gov/applicants/apply-for-grants.html</u> (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 <u>https://apply07.grants.gov/apply/forms/sample/RR\_SF424\_2\_0-V2.0.pdf</u>. *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: <u>Research and Related Personal Data</u>, available on the Grants.gov website at <u>https://apply07.grants.gov/apply/forms/sample/RR\_PersonalData\_1\_2-V1.2.pdf</u>. Each applicant must complete the name field of this form, however, provision of the demographic information is voluntary. Regardless of whether the demographic fields are completed or not, this form must be submitted with at least the applicant's name completed.

Grants.gov requires proposers to complete a one-time registration process before a proposal can be electronically submitted. If proposers have not previously registered, this

process can take between three business days and four weeks. For more information about registering for Grants.gov, see www.darpa.mil/work-with-us/additional-baa. See the Grants.gov registration checklist at http://www.grants.gov/web/grants/register.html for registration requirements and instructions.

Once Grants.gov has received a proposal submission, Grants.gov will send two email messages to advise proposers as to whether or not their proposals have been validated or rejected by the system; IT MAY TAKE UP TO TWO DAYS TO RECEIVE THESE EMAILS. The first email will confirm receipt of the proposal by the Grants.gov system; this email only confirms receipt, not acceptance, of the proposal. The second will indicate that the application has been successfully validated by the system prior to transmission to the grantor agency or has been rejected due to errors. If the proposal is validated, then the proposer has successfully submitted their proposal. If the proposal is rejected, the proposed must be corrected and resubmitted before DARPA can retrieve it. If the solicitation is no longer open, the rejected proposal cannot be resubmitted. Once the proposal is retrieved by DARPA, the proposer will receive a third email from Grants.gov. To avoid missing deadlines, proposers should submit their proposals in advance of the final proposal due date with sufficient time to receive confirmations and correct any errors in the submission process through Grants.gov. For more information on submitting proposals to Grants.gov, visit the Grants.gov submissions page at: http://www.grants.gov/web/grants/applicants/apply-for-grants.html.

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

#### b. For Proposers Requesting Other Transaction for Research

Proposers requesting an Other Transaction for Research (OT-R) awarded under 10 U.S.C.§ 4021 must include the completed form indicated below. This requirement only applies only to those who expect to receive an OT-R as their ultimate award instrument.

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

The Research and Related Senior/Key Person Profile (Expanded) form, available on the Grants.gov website at

https://apply07.grants.gov/apply/forms/sample/RR\_KeyPersonExpanded\_3\_0-V3.0.pdf, will be used to collect the following information for all senior/key personnel, including Project Director/Principal Investigator and Co-Project Director/Co-Principal Investigator, whether or not the individuals' efforts under the project are funded by the DoD. The form includes 3 parts: the main form administrative information, including the Project Role, Degree Type and Degree Year; the biographical sketch; and the current and pending support. The biographical sketch and current and pending support are to be provided as attachments:

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

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

#### c. For Proposers Requesting Procurement Contracts or Other Transaction Agreements and submitting to a DARPA-approved Proposal Submissions Website

Unclassified full proposals sent in response to this BAA may be submitted via DARPA's BAA Website (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 (via the form at the URL listed above) and wait for two separate e-mails containing a username and temporary password. The "Password Reset" option at the URL listed above can be used if the password is not received in a timely fashion. 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 concepts 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.

Classified submissions and proposals requesting cooperative agreements should NOT be submitted through DARPA's BAA Website (<u>https://baa.darpa.mil</u>), though proposers will likely still need to visit <u>https://baa.darpa.mil</u> to register their organization (or verify an existing registration) to ensure the BAA office can verify and finalize their submission. <u>Proposal abstracts will not be accepted if submitted via Grants.gov.</u>

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 DARPA's BAA Website may be reached at <u>BAAT\_Support@darpa.mil</u>, and is typically available during regular business hours (9:00 AM – 5:00 PM Eastern Time).

# V. Application Review Information

#### A. Evaluation Criteria

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

#### 1. Overall Scientific and Technical Merit

The proposed technical approach is innovative, feasible, achievable, and complete. The proposed technical approach clearly describes the proposed solution for fabricating low defect density, large area UWBG substrates (TA1) or uniform, low defect density UWBG device layers with high doping efficiency and low electrical contact resistance (TA2). The proposed technical team has the expertise and experience to accomplish the proposed tasks. Task descriptions and associated technical elements provided are complete and in a logical sequence with all proposed deliverables clearly defined such that a final outcome that achieves the goal can be expected as a result of award. The proposal identifies major technical risks and planned mitigation efforts are clearly defined and feasible.

#### 2. Potential Contribution and Relevance to the DARPA Mission

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

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

#### 3. Cost Realism

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

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

#### **B.** Review of Proposals

#### 1. Review Process

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

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

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

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

#### 2. Handling of Source Selection Information

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

#### 3. Federal Awardee Performance and Integrity Information (FAPIIS)

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

#### 4. Countering Foreign Influence Program (CFIP)

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

## VI. Award Administration Information

#### A. Selection Notices

#### 1. Abstracts

DARPA will respond to abstracts with a statement as to whether DARPA is interested in the idea. If DARPA does not recommend the proposer submit a full proposal, DARPA will provide feedback to the proposer regarding the rationale for this decision. Regardless of DARPA's response to an abstract, proposers may submit a full proposal. DARPA will review all conforming full proposals using the published evaluation criteria and without regard to any comments resulting from the review of an abstract.

#### 2. Proposals

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

#### **B.** Administrative and National Policy Requirements

#### 1. Meeting and Travel Requirements

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

### 2. Solicitation Provisions and Award Clauses, Terms and Conditions

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

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

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

#### 4. Representations and Certifications

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

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 <a href="http://www.darpa.mil/work-with-us/reps-certs">http://www.darpa.mil/work-with-us/reps-certs</a> for further information on required representation and certification depending on your requested award instrument.

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

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

#### 5. Terms and Conditions

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

#### C. Reporting

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

#### **D.** Electronic Systems

#### 1. Wide Area Work Flow (WAWF)

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

#### 2. i-Edison

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

#### 3. Vault

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

#### 4. DARPA Embedded Entrepreneurship Initiative (EEI)

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

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

#### **EEI Application Process:**

After receiving an award under the solicitation, awardees interested in being considered for EEI should notify their DARPA Program Manager (PM) during the period of performance. Timing of such notification should ideally allow sufficient time for DARPA and the awardee to review the

awardee's initial transition plan, identify milestones to achieve under EEI, modify the award, and conduct the work required to achieve such milestones within the original award period of performance. These steps may take 18-24 months to complete, depending on the technology. If the DARPA PM determines that EEI could be of benefit to transition the technology to product(s) the Government needs, the PM will refer the performer to DARPA Commercial Strategy.

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

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

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

### VII. Agency Contacts

Administrative, technical or contractual questions should be sent via e-mail to <u>HR001123S0051@darpa.mil</u>. All requests must include the name, email address, and phone number of a point of contact.

The technical POC for this effort is:

Dr. Thomas Kazior DARPA/MTO ATTN: HR001123S0051 675 North Randolph Street Arlington, VA 22203-2114 BAA Email: HR001123S0051@darpa.mil

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

### VIII. Other Information

#### A. Proposers Day

The UWBGS Proposers Day will be held virtually on October 5, 2023. Advance registration is required for the webcast. See DARPA-SN-23-95 posted at https://sam.gov for all details. Attendance at the UWBGS Proposers Day is not required to propose to this solicitation.

#### **B.** University Student and Researcher Funding

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

To that end, should a DARPA funded program awarded through a grant or cooperative agreement with a university or a Research Other Transaction pursuant to 10 U.S.C. § 4021 where the university is a participant end (due to termination or down-select) before the planned program completion, DARPA may continue to fund, for no more than two semesters (or equivalent), the documented costs to employ or sponsor Ph.D. students and/or post-doctoral researchers. Should such a circumstance arise, the following will take place:

- 1) The Government will provide appropriate notification to the University participant by the Agreements Office or through the prime performer.
- 2) The University must make reasonable efforts to find alternative research or employment opportunities for these students and researchers.
- 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.