

## AMENDMENT 1

**The purpose of Amendment 1 to DARPA Release 9 is to update the proposal due date to 12:00 pm ET, 22 Aug 23**

**Defense Advanced Research Projects Agency (DARPA)  
DoD 23.4 Small Business Innovation Research (SBIR) Annual BAA  
Proposal Submission Instructions Release 9**

### INTRODUCTION

To achieve DARPA's mission to create technological surprise, the agency makes strategic, early investments in science and technology that will have long-term positive impacts on our national security. The pace of discovery in both science and technology is accelerating worldwide, resulting in new fields of study and the identification of scientific areas ripe for small business utilization through the SBIR and STTR programs. Small businesses are critical for developing technology to support national security. Proposers are encouraged to consider whether the R/R&D being proposed to DoD Components also has private sector potential, either for the proposed application or as a base for other applications. The topics below focus on technical domains important to DARPA's mission pursuing innovative research concepts that fall within one of its technology offices. More information about DARPA's technical domains and research topics of interest may be found at: <http://www.darpa.mil/about-us/offices>.

Proposers responding to a topic in this BAA must follow all general instructions provided in the Department of Defense (DoD) SBIR Program BAA. DARPA requirements in addition to or deviating from the DoD Program BAA are provided in the instructions below.

**Proposers are encouraged to thoroughly review the DoD Program BAA and register for the DSIP Listserv to remain apprised of important programmatic and contractual changes.**

- The DoD Program BAA is located at: <https://www.defensesbirsttr.mil/SBIR-STTR/Opportunities/#announcements>. Be sure to select the tab for the appropriate BAA cycle.
- Register for the DSIP Listserv at: <https://www.dodsirsttr.mil/submissions/login>.

Specific questions pertaining to the administration of the DARPA Program and these proposal preparation instructions should be directed to: DARPA Small Business Programs Office at [SBIR\\_BAA@darpa.mil](mailto:SBIR_BAA@darpa.mil). DSIP Topic Q&A will NOT be available for these DARPA topics. Technical questions related to improving the understanding of a topic's requirements must be submitted to [SBIR\\_BAA@darpa.mil](mailto:SBIR_BAA@darpa.mil) by the deadline listed below.

The following dates apply to this DARPA Topic release:

**June 29, 2023:** Topic issued for pre-release

**July 18, 2023:** Topic opens; DARPA begins accepting proposals via DSIP

**August 10, 2023:** Deadline for technical question submission

**August 22, 2023:** Deadline for receipt of proposals no later than **12:00 pm ET**

### PHASE I PROPOSAL GUIDELINES

The Defense SBIR/STTR Innovation Portal (DSIP) is the official portal for DoD SBIR/STTR proposal submission. Proposers are required to submit proposals via DSIP; proposals submitted by any other means will be disregarded. Detailed instructions regarding registration and proposal submission via DSIP are provided in Appendix A.

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### Current Release Award Structure by Topic

Topic Number	Phase I		
	Technical Volume	Award Amount	Period of Performance (PoP)
HR0011SB20234- 14	25 pages	\$275,000	6 months

#### **Technical Volume (Volume 2)**

The technical volume is not to exceed 25 pages and must follow the formatting requirements provided in the DoD SBIR Program BAA. Phase I commercialization strategy shall not exceed 5 pages. This should be the last section of the Technical Volume.

#### **Content of the Technical Volume**

Proposers should refer to the DARPA Phase I Proposal Instructions, provided in Appendix A.

#### **Cost Volume (Volume 3)**

Please see the chart above for award amounts listed by topic. Proposers are required to use the Phase I – Volume 3: Cost Proposal Template (Excel Spreadsheet) provided on the DARPA Small Business site (<https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>).

Subcontractors may also submit unsanitized costs using this template directly to DARPA at [SBIR-BAA@darpa.mil](mailto:SBIR-BAA@darpa.mil).

Please review the updated Percentage of Work (POW) calculation details included in the DoD Program BAA. DARPA will occasionally accept deviations from the POW requirements with a letter of explanation or approval from the Funding Agreement officer

#### **Company Commercialization Report (CCR) (Volume 4)**

Completion of the CCR as Volume 4 of the proposal submission in DSIP is required. Please refer to the DoD SBIR Program BAA for full details on this requirement. Information contained in the CCR will not be considered by DARPA during proposal evaluations.

#### **Supporting Documents (Volume 5)**

In addition to the documents required by DoD, small businesses may also submit additional documentation to support the Technical Volume (Volume 2) and the Cost Volume (Volume 3) in Volume 5. See Appendix A for required certifications that must be included in Volume 5. For additional information, see the SBIR 23.4 Annual Program Broad Agency Announcement (BAA) at <https://www.defensesbirsttr.mil/SBIR-STTR/Opportunities/>.

### **DIRECT TO PHASE II PROPOSAL GUIDELINES**

Proposers should refer to the DARPA Direct to Phase II SBIR XL Proposal Instructions, provided in Appendix B.

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### **Current Release Award Structure by Topic**

Topics	Period of Performance	Amount
*HR0011SB20234XL-04	Base: 12 months	\$ 1,000,000
	Option 1: 6 months	\$ 500,000
	Option 2: 6 months	\$ 1,000,000

\*For this topic DARPA will accept DP2 proposals with a total maximum cost/price of \$2,500,000. This maximum cost/price includes a 12-month base period not to exceed \$1,000,000, a 6-month Option of \$500,000, and a second 6-month Option minimum of \$500,000. The base period and the minimum funding for the Options (if exercised) are funded entirely by DARPA. Additionally, if the second Option is exercised, DARPA is encouraging the performer to arrange additional program funding with a commercial or government (non-DARPA) partner of up to \$500,000. Any proposed non-DARPA funding agreement must be written, signed, and received by DARPA 60 calendar days before the last day of the period of performance of the base period to permit DARPA sufficient time to access as part of the determination to award the Option effort. DARPA will match up to \$500,000 of non-DARPA funds under a written, signed, and timely submitted agreement. Securing a non-DARPA funding agreement does not obligate DARPA to exercise the Option effort, nor will the lack of a written funding agreement prevent the performer from receiving an Option. DARPA will make option award decisions based on performance and funding availability.

Note that the information in the chart above includes matching funds for Option 2; firms may obtain matching funding at any time during performance of the effort.

Note: Please see Appendix B, section III (d) for complete instructions on the White Paper/Slide Deck technical volume format.

#### **Content of the Technical Volume**

Proposers should refer to the DARPA DP2 Proposal Instructions, provided in Appendix A.

#### **Cost Volume (Volume 3)**

Please see the chart above for award amounts listed by topic. Proposers are required to use the Direct to Phase II – Volume 3: Cost Proposal Template (Excel Spreadsheet) provided on the DARPA Small Business site (<https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>). Subcontractors may also submit unsanitized costs using this template directly to DARPA at [SBIR-BAA@darpa.mil](mailto:SBIR-BAA@darpa.mil).

Please review the updated Percentage of Work (POW) calculation details included in the DoD Program BAA. DARPA will occasionally accept deviations from the POW requirements with a letter of explanation or approval from the Funding Agreement officer.

#### **Company Commercialization Report (CCR) (Volume 4)**

Completion of the CCR as Volume 4 of the proposal submission in DSIP is required. Please refer to the DoD SBIR Program BAA for full details on this requirement. Information contained in the CCR will not be considered by DARPA during proposal evaluations.

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### **Supporting Documents (Volume 5)**

In addition to the documents required by DoD, small businesses may also submit additional documentation to support the Technical Volume (Volume 2) and the Cost Volume (Volume 3) in Volume 5. Firms should fill out and upload the DARPA SBIR XL Milestones Template found on the DARPA Small Business website under SBIR/STTR BAA FORMS & TEMPLATES at <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>. See Appendix B for required certifications that must be included in Volume 5. For additional information, see the SBIR 23.4 Annual Program Broad Agency Announcement (BAA) at <https://www.defensesbirstr.mil/SBIR-STTR/Opportunities/>.

### **PHASE II PROPOSAL GUIDELINES**

Phase II proposals may only be submitted by Phase I awardees. Should DARPA have funding available and decide to proceed with a Phase II, proposers awarded a Phase I contract will be eligible to submit a proposal for Phase II and will be contacted to do so by the DARPA Small Business Programs Office at the appropriate time during their Phase I period of performance. Phase II proposals will be evaluated in accordance with the applicable DoD or DARPA SBIR BAA. Phase II selection(s) are at the sole discretion of the government and are subject to funding availability and Phase I performance. Phase II Instructions are available at <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>.

### **Current Release Award Structure by Topic**

Topic Number	Phase II				
	Tech Volume	Award Amount	Period of Performance (PoP)	Option Amount	Option PoP
HR0011SB20234-14	45 pages	\$1,200,000	18 months	\$600,000	24 months

Technical Proposal shall not exceed 45 pages. Phase II commercialization strategy shall not exceed 5 pages. It should be the last section of the Technical Volume.

### **DISCRETIONARY TECHNICAL AND BUSINESS ASSISTANCE (TAB A)**

DARPA does not offer TAB A funding.

### **EVALUATION AND SELECTION**

All proposals will be evaluated in accordance with the evaluation criteria listed in the DoD SBIR 2023.4 BAA. DARPA will conduct an evaluation of each conforming proposal. Proposals that do not comply with the requirements detailed in this BAA and the research objective(s) of the corresponding topic are considered non-conforming and therefore are not evaluated nor considered for award.

Using the evaluation criteria, the Government will evaluate each proposal in its entirety, documenting the strengths and weaknesses relative to each evaluation criterion, and, based on these identified strengths and weaknesses, determine the proposal's overall selectability. Proposals will not be evaluated against each other during the evaluation process, but rather evaluated on their own individual merit to determine how well the proposal meets the criteria stated in this BAA and the corresponding DARPA topic.

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Awards will be made to proposers whose proposals are determined to be the most advantageous to the Government, consistent with instructions and evaluation criteria specified in the DoD SBIR 2023.4 BAA and availability of funding. Given the limited funding available for each topic released, not all proposals considered selectable will be selected for funding.

For the purposes of this proposal evaluation process, a selectable proposal is defined as follows:

Selectable: A selectable proposal is a proposal that has been evaluated by the Government against the evaluation criteria listed in the DoD SBIR 2023.4 BAA and DARPA topic, and the strengths of the overall proposal outweighs its weaknesses. Additionally, there are no accumulated weaknesses that would require extensive negotiations and/or a resubmitted proposal.

For the purposes of this proposal evaluation process, a non-selectable proposal is defined as follows:

Non-Selectable: A proposal is considered non-selectable when the proposal has been evaluated by the Government against the evaluation criteria listed in the DoD SBIR 2023.4 BAA and DARPA topic, and the strengths of the overall proposal do not outweigh its weaknesses.

Proposing firms will be notified of selection or non-selection status for a Phase I award within 90 days of the closing date of the DoD SBIR 2023.4 BAA. It is the policy of DARPA to treat all proposals as source selection information and to disclose their contents only for the purpose of evaluation. Restrictive notices notwithstanding, during the evaluation process, submissions may be handled by support contractors for administrative purposes and/or to assist with technical evaluation. All DARPA support contractors are expressly prohibited from performing DARPA-sponsored technical research and are bound by appropriate nondisclosure agreements. Input on technical aspects of the proposals may be solicited by DARPA from other Government and/or non-Government consultants/experts who are strictly bound by the appropriate non-disclosure requirements. No submissions will be returned. Upon completion of the evaluation and selection process, an electronic copy of each proposal received will be retained at DARPA.

Proposal titles, abstracts, anticipated benefits, and keywords of proposals that are selected for contract award will undergo a DARPA Policy and Security Review. Proposal titles, abstracts, anticipated benefits, and keywords are subject to revision and/or redaction by DARPA. Final approved versions of proposal titles, abstracts, anticipated benefits, and keywords may appear on the DoD SBIR/STTR awards website and/or the SBA's SBIR/STTR award website (<https://www.sbir.gov/sbirsearch/award/all>).

Refer to the DoD SBIR 2023.4 Program BAA for procedures to protest the Announcement. As further prescribed in FAR 33.106(b), FAR 52.233-3, Protests regarding the selection decision should be submitted to:

DARPA  
Contracts Management Office (CMO)  
675 N. Randolph Street  
Arlington, VA 22203  
E-mail: [CMO\\_SBIRProtests@darpa.mil](mailto:CMO_SBIRProtests@darpa.mil) and [sbir@darpa.mil](mailto:sbir@darpa.mil)

## **AWARD AND CONTRACT INFORMATION**

### **1. General Award Information**

Multiple awards are anticipated. DARPA may award FAR-based government contracts (Firm- Fixed Price or Cost-Plus Reimbursement) or Other Transactions for Prototypes agreement (under the authority of 10 U.S.C. § 4022) subject to approval of the Contracting Officer. The amount of resources made

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available for each topic issued under this BAA will depend on the quality of the proposals received and the availability of funds.

Majority Ownership in Part. Proposers that are more than 50% owned by multiple venture capital operating companies (VCOC), hedge funds (HF), private equity firms (PEF), or any combination of these as set forth in 13 C.F.R. § 121.702, are eligible to submit proposals in response to DARPA topics advertised within this BAA.

For proposers that are a member of this ownership class the following must be satisfied for proposals to be accepted and evaluated:

- a. Prior to submitting a proposal, firms must register with the SBA Company Registry Database.
- b. The proposer within its submission must submit the Majority-Owned VCOC, HF, and PEF Certification. A copy of the SBIR VC Certification can be found on <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>, under SBIR/STTR BAA Forms. Include the SBIR VC Certification in the Supporting Documents (Volume 5).
- c. Should a proposer become a member of this ownership class after submitting its proposal and prior to any receipt of a funding agreement, the proposer must immediately notify the Contracting Officer, register in the appropriate SBA database, and submit the required certification which can be found under SBIR/STTR BAA Forms and Templates on <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>.

The Government reserves the right to select for negotiation all, some, one, or none of the proposals received in response to this announcement and to make awards with or without communications with proposers. Additionally, the Government reserves the right to award all, some, one, or none of the options on the contract(s)/agreement(s) of the performers based on available funding and technical performance. 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. The Government reserves the right to remove a proposal from award consideration should the parties fail to reach agreement on award terms, conditions, and price within a reasonable time, and/or the proposer fails to provide requested additional information within three business days.

In all cases, the Government Contracting Officer reserves the right 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 DoD SBIR 2023.4 BAA.

Because of the desire to streamline the award negotiation and program execution process, proposals identified for negotiation will result in negotiating a type of instrument for award that is in the best interest of the Government. In the case of an OT for Prototype agreement under DARPA's authority to



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award OTs for prototype projects, 10 U.S.C. § 4022, use of an OT provides significant opportunities for flexible execution to assist in meeting DARPA's aggressive SBIR/STTR program goals.

All proposers that wish to consider an OT award should carefully read the following:

The flexibility of the OT award instrument is beneficial to the program because the Performer will be able to apply its best practices as required to carry out the research project that may be outside of the Federal Acquisition Regulation (FAR) process-driven requirements. Streamlined practices will be used, such as milestone-driven performance, intended to reduce time and effort on award administration tasks and permit performers to focus on the research effort and rapid prototyping. Because of this ability, OTs provide the Agreements Officer the flexibility to create an award instrument that contains terms and conditions that promote commercial transition, reduce some administratively burdensome acquisition regulations, and meet SBIR/STTR program goals.

Proposers must only propose an OT agreement with fixed payable milestones. Fixed payable milestones are fixed payments based on successful completion of the milestone accomplishments agreed to in the milestone plan. Refer to the Other Transactions for Prototypes Fact Sheet and Other Transaction for Prototype Agreement, available at <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>. Specific milestones will be based upon the research objectives detailed in the topic.

Please see <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program> for more information on OTs.

### **2. Transition and Commercialization Support Program (TCSP)**

DARPA will provide services to Phase II or DP2 awardees upon contract execution through the Transition and Commercialization Support Program (TCSP) at no cost to awardees. The TCSP goal is to maximize the potential for SBIR/STTR companies to move their technology beyond Phase II and into other research and development programs for further maturity or into solutions or products for DoD acquisition programs, other Federal programs, and/or the commercial market. Please visit <https://www.darpa.mil/work-with-us/for-small-businesses/commercialization-continued> for more information on DARPA TCSP.

### **3. Embedded Entrepreneurship Initiative**

Awardees of SBIR funding pursuant to this BAA may be eligible to participate in the DARPA Embedded Entrepreneurship Initiative (EEI) during the Period of Performance. Invitation to participate in EEI is at the sole discretion of the Government based on evaluation of technical and commercial factors and subject to program balance and the availability of funding. 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

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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 9-18 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 technology transition plan aimed at delivering new capabilities for national defense. Milestone examples are available at: <https://www.darpa.mil/work-with-us/contract-management>.

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

For more information please refer to the EEI website <https://eei.darpa.mil/>.

#### **4. DARPA Toolbox Initiative**

DARPA Toolbox is an Agency-wide effort to provide open licensing opportunities with commercial technology vendors to the researchers behind DARPA programs. DARPA Toolbox provides easy, low-cost, scalable access to state-of-the-art tools and intellectual property (IP) under predictable legal terms and streamlined acquisition procedures. The goal is to reduce performer reliance on low-quality, low-cost tools and IP that increase execution risks and complicate post-DARPA transitions.

Through this initiative, DARPA performers are granted access to select vendor tools and technologies throughout the life of their contractual relationship with the Agency. The Toolbox suppliers bring to the



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table proven technologies commonly used in state-of-the art commercial microelectronics or system design methodologies.

DARPA Toolbox program information and a full list of participating suppliers can be found at <https://www.darpa.mil/work-with-us/darpa-toolbox-initiative>. If there are tool or technologies of interest, contact the Supplier POC listed for the product, referencing the DARPA Toolbox Initiative. The Supplier POC will provide advice on products and pricing information. Include any non-production pricing quotes in your proposal. Products and pricing are between you and the suppliers – *do not* contact DARPA directly.

### **ADDITIONAL INFORMATION**

DARPA intends to use electronic mail for all correspondence regarding these topics. Questions related to the technical aspect of the research objectives and awards specifically related to a topic should be emailed to [SBIR\\_BAA@darpa.mil](mailto:SBIR_BAA@darpa.mil). Please reference the topic number in the subject line. All questions must be in English and must include the name, email address, and the telephone number of a point of contact.

DARPA will attempt to answer questions in a timely manner; however, questions submitted within seven (7) calendar days of the proposal due date listed herein may not be answered. DARPA will post a consolidated Frequently Asked Questions (FAQ) document. To access the posting please visit: <http://www.darpa.mil/work-with-us/opportunities>. Under the topic number summary, there will be a link to the FAQ. The FAQ will be updated on an ongoing basis until one week prior to the proposal due date.

Technical support for the Defense SBIR/STTR Innovation Portal (DSIP) is available Monday through Friday, 9:00 a.m. – 5:00 p.m. ET. Requests for technical support must be emailed to [DoDSBIRSupport@reisystems.com](mailto:DoDSBIRSupport@reisystems.com) with a copy to [SBIR\\_BAA@darpa.mil](mailto:SBIR_BAA@darpa.mil).

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**DARPA SBIR 23.4 Topic Index**

**Release 9**

HR0011SB20234-14	Canopies for High-speed Ultra-Long Terrain Execution (CHUTE)
HR0011SB20234XL-04	Fast, Light, Airworthy, Repackable Parachute (FLARE) - SBIR XL

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HR0011SB20234-14 TITLE: Canopies for High-speed Ultra-Long Terrain Execution (CHUTE)

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Advanced Materials, Human-Machine Interfaces

**OBJECTIVE:** Design, develop and demonstrate a proof-of-concept ram-air parachute specifically capable of low-altitude (<1000 feet) and long-distance (>10 km) flight, in a parachute rig weighing <50 kg. Such parachute systems will need to be capable of forcing air into parachute cells to keep them inflated during flight over long distances, with ultimate range being a function of the capabilities of this forced air system. Proposers should include any testing capabilities needed to verify that the modified canopy is in an airworthy (jumpable) configuration, without significant impact to the probability of a successful opening.

**DESCRIPTION:** Parachute technology has evolved (Figure 1) since the creation of round canopies, which slow the rate of descent by creating drag. Ram-air canopies, developed in the 1970s, have inflatable parallel cells that fill with high-pressure air from vents that face forward on the leading edge of the airfoil. The fabric is shaped, and the parachute lines trimmed under load, such that the ballooning fabric inflates into a cambered airfoil shape. Air must flow faster over the top than the bottom, creating lift in addition to drag, and allowing steerability by controlled deflection of air. The use of airplane terminology is no accident; ram-air canopy designs share many features with airplane wings.

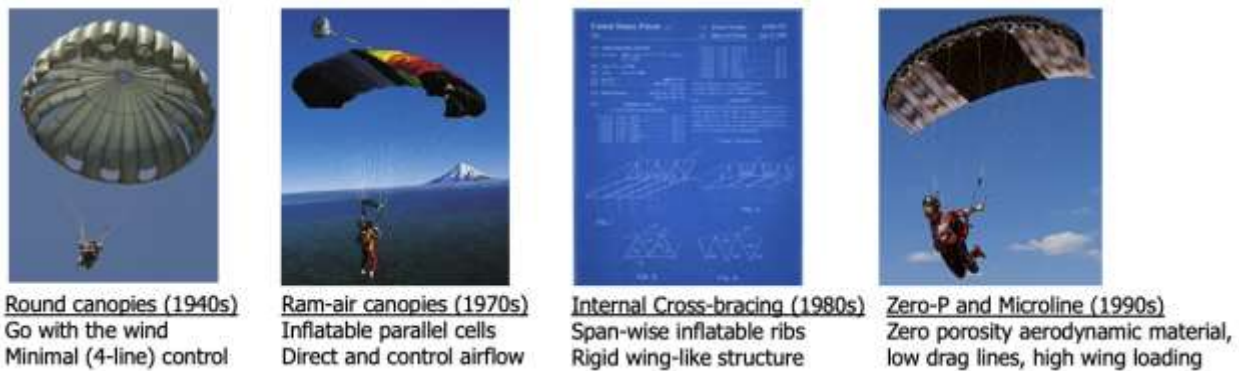


Figure 1. Evolution of parachute technology, demonstrating the steady growth toward rigid wing-like structures. CHUTE aims to redesign the canopy wing for long-distance, low-altitude flight with an airplane philosophy in mind.

In order to create a new paradigm for quiet, long-distance, low-altitude flight using parachutes, DARPA seeks to leverage recent advances in aerodynamics and materials technology to develop cost-effective ram-air parachutes that deliver a revolutionary leap in the distance that can be traversed, without significantly adding to the mass of the overall parachute rig or impacting its airworthiness (defined here as “jumpability”, the probability of a successful parachute opening).

Today’s state of the art is dynamic, maneuverable cross-braced canopies used in the competitive high-speed sport of parachute swooping. Swooping canopies can generate speeds in excess of 70 miles per hour, traverse lengths greater than a football field at one foot above ground level (AGL), change direction abruptly when flying around “gates”, and land on a specific target with accuracy. Zero porosity aerodynamic parachute material, span-wise inflatable ribs, low drag lines, a more rigid wing-like design, and high wing loading allow finer control in close proximity to the ground, sometimes simply by shifting weight in the harness. However, modern parachutes ultimately remain a prisoner to energy conservation. Swoopers generate high kinetic energy by trading for potential energy (altitude over a drop zone). When

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this kinetic energy is exhausted, they must land, placing physics limits on speed and distance they can traverse.

Powered paragliders are one way that sustained flight may be possible. However, three limitations place constraints on the use of these systems for military operations: noise, weight and speed. Powered paragliders can create in excess of 120 dB of sound, typically weigh >250 lbs, and have large parafoils with dozens of cells, resulting in parasitic drag that limits sustained speed to <30 mph. Powered paragliders are therefore out of scope for this effort. The Joint Precision Aerial Descent System (JPADS) has used winches, wires and pulleys located below the parachute to demonstrate lightweight, adjustable airflow control on round parachutes, but is ultimately constrained by the round canopy's limited maneuverability. Round canopies are therefore out of scope for this effort. Concepts that rely exclusively on powered cargo and do not add propulsion to the parachute canopy (e.g. LRPADS [2]) are out of scope. For more information on this topic, see [https://www.youtube.com/watch?v=7\\_kqMjz94B8](https://www.youtube.com/watch?v=7_kqMjz94B8).

PHASE I: Phase I consists of a base period of six months that will result in the development, design, and refinement of a low-mass (<50 kg) parachute system design capable of long-distance (>10 km) flight, to create continuously inflated parachute cells at altitudes of 1000-3000 ft. AGL.

Successful proposals for this SBIR offering must make significant arguments supporting the ability to rapidly iterate and execute to meet the timelines laid out in this solicitation, while addressing three key aspects of the program goals: (1) how the method of powered propulsion or forced air will be integrated into the parachute wing and/or jumper; (2) to what degree such propulsion interacts with, or relies upon, ground effect aerodynamics and canopy wing design; (3) how the parachute and powered propulsion system will be built and tested via real-world jump operations planned for Phase II. Successful proposals will also demonstrate in-depth knowledge of aerodynamic design and parachute fabrication, and should illustrate how their method might be expected to meet the envisioned metrics.

This effort is expected to primarily center around new active airflow control and/or powered motor methods, that are conformally integrated with ram-air parachutes and allow sustained flight for as long as that control or power is provided. Methods such as adjustable inlet control, battery-powered bleed air for directional control, laminar flow injection, boundary layer control to maintain lift across long traverse distances, or other innovative methods, are suitable for investigation. Recent developments have shown that designed geometric openings can create macro-control with new wing shapes, or the opening/closing of slots or voids for air flow (e.g., ram air parachutes with controllable flaps for directional control). Additional efforts to minimize drag may be required to maximize range.

Phase I fixed payable milestones for this program should include:

Phase I Base period (required): 6 months

- Month 2: Concept Design Review (CoDR) on powered parachute design, in accordance with the metrics below.
- Month 4: Preliminary Design Review (PDR). Initial report on “do no harm” probability.
- Month 6: Critical Design Review (CDR). Interim report on “do no harm” probability, scalability, proposed cost and noise estimates. Present initial test and evaluation plan, hardware purchase plan, and safety plan for Phase II testing.

Performers may perform lab or bench-scale testing to increase design fidelity as desired, as long as this does not negatively impact the design review schedule. Performers will work with DARPA to identify potential transition partners for demonstrations in Phase II. Performers will present plans to manufacture prototype parachute(s) and test them in Phase II.

## **AMENDMENT 1**

### **The purpose of Amendment 1 to DARPA Release 9 is to update the proposal due date to 12:00 pm ET, 22 Aug 23**

Phase I metrics: Present the design, at a CDR level, of a parachute system that can:

- Deliver air to canopy cells, or use other innovative methods, to maintain sustained parachute canopy flight at an altitude of >500 ft. AGL and <3000 ft. AGL (<5000 ft. MSL),
- Do so for a horizontal flight distance greater than 10 km from the point of engagement,
- Do so in less than 20 seconds from a manual initiation command,
- Do so while preserving total mass of the parachute rig (to include a reserve parachute) at <50 kg,
- If weight is added to the body of the jumper, add no more than 50 lbs. to the weight of the jumper,
- Be capable of being engaged while airborne, and disengaged via manual control in order to land as needed,
- Maintain a forward speed of at least 20 mph, at an altitude of >500 ft. AGL and <3000 ft. AGL (<5000 ft. MSL),
- Determine the probability of a successful opening of the prototype, i.e., demonstrate “do no harm” with the added mechanism(s) to existing opening probability when in a rigger-approved, properly packed configuration.
- Present estimates of the noise generated by the system in flight, in decibels (dB),
- Present scalability calculations for maximum projected range, with added mass,
- Present the proposed cost of the parachute system when produced at scale, as demonstrated via techno-economic analysis of the cost of production, in dollars per parachute rig.
- Systems may use initiation energy from a parachute dive that increases velocity (e.g., a diving sloop that trades potential energy for kinetic energy), but may not use such methods when at the flight altitude.

Proposers must begin their effort with an experienced, licensed parachute rigger team, with significant practical experience in parachute packing, repair, evaluation, and modification. Additionally, by the end of Phase I, proposers should demonstrate the following:

- To show available expertise for Phase II fabrication of the proposed design: teaming with an existing commercial parachute manufacturer that has sold at least 5,000 airworthy canopy units;
- To conduct jump testing in Phase II: teaming with an existing US Parachute Association (USPA) compliant drop zone [1].

PHASE II: The Phase II effort consists of a base period of 12 months, an Option 1 period of 12 months and an Option 2 period of 12 months. The Option 2 period will follow the Option 1 period. DARPA reserves the right to release a separate Direct to Phase II (DP2) SBIR solicitation in lieu of exercising either Option.

Testing in the base period will center around design, feasibility testing and proof-of-concept. Experimental assessments of ram-air generation, and interaction with parachute cells, may also be necessary to demonstrate a proof of concept. Testing in the option periods will expand the maximum range, reduce noise, and conduct a challenge-based flyoff (Figure 2).

Phase II fixed payable milestones for this program should include:

- Base period: 12 months
  - Month 4: Bench Testing Review (BTR). First prototype ready for bench testing at parachute manufacturer facility. Deliver assessments of the degree of maneuverability and speed, and experimentally demonstrate key components that produce parachute cell inflation. Deliver interim report on trade studies, integration of hardware to canopy and canopy to rig, and system design. Present final test and evaluation plan, and safety plan for testing.

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- Month 9 (optional; dummy real-world jumps may be substituted to achieve the same end goal): Complete wind tunnel testing. Deliver interim report, describing results of wind tunnel testing, design iterations, and manufacturing results.
- Month 12: Complete first round of dummy parachute jumps to evaluate airworthiness. Test Readiness Board (TRB) and Safety Review Board (SRB) to determine criteria for human jump testing, to include safety mitigation plans. Present readiness for live test to DARPA.
- Option 1 (Initial test jumps): 12 months
  - Month 16: Complete dummy parachute jumps to evaluate airworthiness. Go/no-go for human jump testing, to include updated safety mitigation plans.
  - Month 22: Complete jump testing at USPA approved drop zone. Demonstrate steadily decreasing altitudes and steadily increasing ranges. Demonstrate at least 5 km. straight-line range at >500 ft. AGL and <2500 ft. AGL, in a parachute rig weighing <50 kg, and document real-world noise level (dB) in excess of the ambient.
  - Month 24: Update Phase II report documenting powered parachute system design and testing results, future specifications, manufacturing process, and evaluation of airworthiness. Evaluate cost of full-rate production using partner parachute manufacturer facilities.
- Option 2 (Advanced test jumps): 12 months
  - Month 27: Demonstrate ability to perform  $\pm 50$  feet of in-flight altitude adjustment by manual control. Demonstrate ability to interrupt/disengage the actuation system in order to land immediately. Test modifications to reduce sound level. Prepare expanded version of actuation system for long-range testing.
  - Month 30: Parachuting Challenge flyoff 1 (interim, home drop zone). Long-range (at least 8 km), low-altitude (maximum of 1500 ft. AGL) jump testing at USPA approved drop zone.
  - Month 33: Parachute Challenge flyoff 2 (final, DARPA-selected drop zone). Maximum feasible range, low-altitude (maximum of 1000 ft. AGL) jump testing. Measure sound addition to the ambient noise level; validate <50 kg. total rig weight.
  - Month 36: Final Phase II report documenting powered parachute system design and testing results, manufacturing process, and verifications of airworthiness. Demonstrate long-distance, low-altitude system for Department of Defense observers and customers. Present future commercialization plans.



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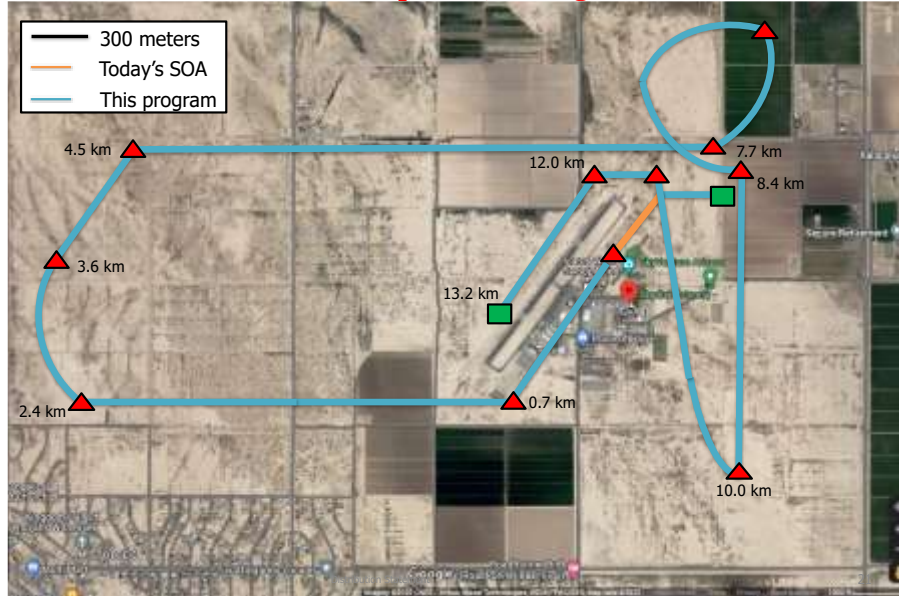


Figure 2. A notional Parachute Challenge flyoff course, demonstrating long-distance legs and steadily increasing sharpness of turns / smaller turn radius. The first challenge will occur at the performer's partner drop zone. The second challenge will occur at a drop zone of DARPA's choosing (SOA: state of the art).

PHASE III DUAL USE APPLICATIONS: Ram-air parachute technology is currently at high technology readiness level and in full-rate production for both military and civilian uses. Multiple commercial and DoD applications are envisioned after the successful demonstration of a powered parachute prototype.

1. DoD use by Special Operations Command. The ability to use designed systems for silent, low-altitude ingress is expected to have significant ramifications for pararescue jumpers and military special operators. The ability to separate landing zones (LZ) from targets by over 10 km will allow significant freedom to ingress route planning, and place less demand on helicopter aircraft to place themselves in harm's way to deliver operators to their LZs.
2. Commercial use by US Parachute Association, and other international skydiving entities. Cross-braced canopies has created the sport of parachute swooping, which today boasts national and international championships, and the creation of over 20 distinct parachute designs, each of which has sold over 5,000 units at costs of >\$4,000 USD per piece. A safe, powered parachute system is expected to revolutionize modern recreational skydiving and create a significant market for parachutes that can do more than simply land where the wind, and existing kinetic energy, dictate. The products delivered in this effort will create a new sport with significant mass-market attraction, and there is a viable business model from the skydiver audience – for example, the US Parachute Association alone has over 35,000 members.

### REFERENCES:

1. [1] USPA Dropzone Locator, United States Parachute Association. <https://uspa.org/DZlocator>
2. [2] Long Range Precision Aerial Delivery System (LRPADS). <https://ombra.us/product/long-range-precision-aerial-delivery-system/>

KEYWORDS: Systems Level, Handling, Product Design, System

TPOC-1: DARPA BAA Help Desk  
Email: SBIR\_BAA@darpa.mil

## AMENDMENT 1

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HR0011SB20234XL-04

TITLE: Fast, Light, Airworthy, Repackable Parachute (FLARE) - SBIR XL

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Advanced Materials, Human-Machine Interfaces

**OBJECTIVE:** Develop and demonstrate a proof-of-concept ram-air parachute specifically designed to provide automated repacking of an unpacked canopy for special operations and other applications. The prototype should include fabricated hardware integrated into a commercially available parachute rig, and should support repacking on a fast timeline (<60 seconds), with the addition of no more than 20% of the mass of the parachute rig. Proposers should include any testing capabilities needed to verify that the modified canopy is in an airworthy (jumpable) configuration, without significant impact to the probability of a successful opening.

**DESCRIPTION:** Parachutes are used by the Department of Defense in ejection seats (e.g., the F-16 ACES II system), for special operations ingress, and advance airdrop (Figure 1).

If ejecting behind enemy lines becomes necessary, particularly in time-critical scenarios, a large open canopy on the ground can be an indicator to the location of downed aircrew. The ability to trigger an automated repack of this parachute, without impacting its airworthiness and probability of successful opening, is desired. Special operators plan parachute ingress routes to allow sufficient distance from the target to land and manually pack the parachute. The ability to trigger a time-critical repack to minimize ground footprint could significantly change route planning and allow a landing closer to a target for maximum impact. Finally, logistics airdrops from an airborne platform are capable of delivering large amounts of mass to areas of engagement, but leave a large footprint; the ability to minimize this footprint to support special operations is also of interest to the Department of Defense.



Figure 1. Three scenarios that benefit from repackable parachutes: Downed aircrew (left), special operations ingress (center), and advance logistics airdrops (right).

For more information on this topic, see <https://www.youtube.com/watch?v=YXBjhBVaxpw>.

**PHASE I:** This is a Direct to Phase II (DP2) topic only. In order to demonstrate that Phase I feasibility has been met, proposers should demonstrate the following:

- To show available expertise for immediate fabrication of the proposed design: teaming with an existing commercial parachute manufacturer that has sold at least 5,000 airworthy canopy units;
- An initial design with detailed descriptions of physical mechanisms that shows the ability to retract and stow parachute lines into the container;
- To conduct jump testing: teaming with an existing US Parachute Association (USPA) compliant drop zone [1];
- An experienced, licensed parachute rigger team with significant practical experience in parachute packing, repair, evaluation, and modification

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PHASE II: The Phase II effort consists of a DP2 base period of 12 months, an Option 1 (required) period of 6 months and an Option 2 (optional) period of 6 months. The Option 2 period will follow the Option 1 period. Testing in the base and Option 1 periods will be conducted on ram-air canopies, to preserve maximum aerodynamic flexibility. Testing in the Option 2 period will be conducted on round canopies, and evaluate the jumpability (defined here as the probability of a successful parachute opening, with the addition of the repacking mechanism) of repacked ram-air parachutes.

In this effort, proposers will design and develop a jumpable, repackable parachute prototype that will:

- Repack an opened parachute into its container using electromagnetic, mechanical or other mechanisms, Do so in less than 60 seconds from a manual initiation command,
- Do so while adding less than 20% mass to an existing commercially available parachute rig,
- Determine the probability of a successful opening of the prototype before automated repacking, i.e., demonstrate that the added repacking mechanism “does no harm” to existing opening probability when in a rigger-approved, properly packed configuration,
- Characterize the probability of a successful opening of the prototype after automated repacking, toward potential future commercialization opportunities.

It is expected that designed repackable parachutes will need to be test jumped in order to support the goals of this effort. Proposers should describe their ability to work with parachute test jumpers, at appropriate drop zones, in order to accomplish statistical significance on the probability of a successful parachute opening with added repacking mechanisms. The wide number of commercially available parachuting rigs for recreational skydiving, and the high reliability of belly-mounted and rig-mounted reserve parachutes, allow for a rapid cycle of design-test-fly-redesign that proposers should plan to leverage.

The minimum deliverable will be an airworthy, repackable proof-of-concept parachute prototype in a complete rig (i.e., with a container, main and reserve parachute, and other accompanying hardware).

Phase II fixed payable milestones for this program should include:

Base period (required): 12 months

- Month 2: Concept Design Review (CoDR) on repackable parachute design, with hardware purchase plan and initial test and evaluation plan;
- Month 6: Bench Testing Review (BTR). First prototype ready for bench testing at parachute manufacturer facility. Interim report on trade studies, integration of hardware to canopy and canopy to rig, and system design. Present final test and evaluation plan, and safety plan for testing.
- Month 9 (optional; dummy real-world jumps may be substituted to achieve the same end goal): Complete wind tunnel testing. Deliver interim report, describing results of wind tunnel testing, design iterations, and manufacturing results.
- Month 12: Complete first round of dummy parachute jumps to evaluate airworthiness. Test Readiness Board (TRB) and Safety Review Board (SRB) to determine go/no-go for human jump testing, to include safety mitigation plans. Present readiness for live test to DARPA.

Option 1 (Initial test jumps) (required): 6 months

- Month 15: Complete initial phase of ram-air canopy jump testing at USPA approved drop zone.
- Month 17: Complete final phase of ram-air canopy jump testing.
- Month 18: Update Phase II report documenting repackable parachute system design and testing results, future specifications, manufacturing process, and verification of airworthiness. Demonstrate repackable system for Department of Defense observers and customers. Present

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scaling plans to large canopies (airdrop size) and high-impact loading canopy (ejection seats) applications. Evaluate cost of full-rate production using partner parachute manufacturer facilities.

Option 2 (Advanced test jumps) (optional): 6 months

- Month 20: Present TRB and SRB, with results from bench testing, of large (>500 sq. ft) repackable round canopies. Present re-design for repackable and rejumpable ram-air designs.
- Month 23: Update interim report to include results of test jumps. Large round canopy jump testing at USPA approved drop zone. Dummy parachute jump testing to evaluate airworthiness of previously repacked parachutes at USPA approved drop zone.
- Month 24: Final Phase II report documenting repackable parachute system design and testing results, parachute manufacturing process, and verifications of airworthiness. Demonstrate round and ram-air repackable system for Department of Defense observers and customers. Present future commercialization plans.

Successful proposals for this SBIR offering must make significant arguments supporting the ability to rapidly iterate and execute to meet the timelines laid out in this solicitation.

PHASE III DUAL USE APPLICATIONS: Ram-air and round parachute technology are currently at high technology readiness level and in full-rate production for both military and civilian uses. Adding the capability for rapid, on-command repack while maintaining the reliability and performance of existing parachute systems, and enabling tactics centered around advance logistics airdrops to support special operations, would attract attention from US Special Operations Command (USSOCOM), Air Combat Command (ACC), and similar agencies within the Department of Defense.

It is fully anticipated that this technology would have simultaneous, broad applicability to the members of the US Parachute Association (USPA) and the international Fédération Aéronautique Internationale (World Air Sports Federation) that regulates and encourages the recreational skydiving community around the world. The products delivered in this effort are expected to be directly applicable to an existing sport with significant mass-market attraction, and a viable business model from the skydiver audience – for example, the US Parachute Association alone has over 35,000 members.

#### REFERENCES:

1. [1] USPA Dropzone Locator, United States Parachute Association. <https://uspa.org/DZlocator>

KEYWORDS: Systems Level, Handling, Product Design, System

TPOC-1: DARPA BAA Help Desk

Email: SBIR\_BAA@darpa.mil

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### Appendix A: DARPA PHASE I PROPOSAL INSTRUCTIONS

#### I. Introduction

A complete proposal submission consists of:

Volume 1: Proposal Cover Sheet

Volume 2: Technical Volume

Volume 3: Cost Volume

Volume 4: Company Commercialization Report

Volume 5: Supporting Documents

a. Contractor Certification Regarding Provision of Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment (Attachment 1)

MANDATORY

b. Disclosures of Foreign Affiliations or Relationships to Foreign Countries (Attachment 2)

MANDATORY

c. Verification of Eligibility of Small Business Joint Ventures (Attachment 3), if applicable

d. Disclosure of Funding Sources (Attachment 4) MANDATORY

e. Other supporting documentation

**A completed proposal submission in DSIP does NOT indicate that the mandatory supporting documents have been uploaded. It is the responsibility of the proposing small business concern to ensure that the mandatory documents listed above have been uploaded and included with the proposal submission.**

Volume 6: Fraud, Waste and Abuse Training

The Defense SBIR/STTR Innovation Portal (DSIP) provides a structure for building the proposal volumes and submitting a consolidated proposal package. If this is your first time submitting an SBIR or STTR proposal using DSIP, please review detailed training guides at

<https://www.dodsbirsttr.mil/submissions/learning-support/training-materials>. It is the responsibility of the proposing firm to ensure that a complete proposal package is certified and submitted by the close date listed in the TOPIC to which they are responding.

To assist in proposal development, templates for Volume 2: Technical Volume and Volume 3: Cost Volume have been provided as attachments on the DARPA Small Business website, under SBIR/STTR BAA Forms & Templates at <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>. Use of the DARPA Cost Proposal template is mandatory.

#### II. Proprietary Information

Proposers that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall follow instructions in the DoD SBIR 2023.4/STTR 2023.D BAA regarding marking proprietary proposal information.

#### III. Phase I Proposal Instructions

##### a. Proposal Cover Sheet (Volume 1)

The Cover Sheet must include a brief technical abstract of no more than 3000 characters that describes the proposed R&D project with a discussion of anticipated benefits and potential commercial applications. **Do not include proprietary or classified information in the Proposal Cover Sheet.** If your proposal is selected for award, the technical abstract and



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discussion of anticipated benefits may be publicly released.

### b. Format of Technical Volume (Volume 2)

1. Type of file: The Technical Volume must be a single Portable Document Format (PDF) file, including graphics. Perform a virus check before uploading the Technical Volume file. If a virus is detected, it may cause rejection of the proposal. **Do not lock or encrypt the uploaded file. Do not include or embed active graphics such as videos, moving pictures, or other similar media in the document.**
2. Length: The length of the technical volume will be specified by the corresponding topic. The Government will not consider pages in excess of the page count limitations.
3. Layout: Number all pages of your proposal consecutively. Font size should not be smaller than 10-point on standard 8-1/2" x 11" paper with one-inch margins. The header on each page of the Technical Volume should contain your company name, topic number, and proposal number assigned by DSIP when the Cover Sheet was created. The header may be included in the one-inch margin. Please refer to the attachment titled Phase I Template – Volume 2: Technical Volume at <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program> for additional details.

### c. Content of the Technical Volume (Volume 2)

The Technical Volume should cover the following items in the order given below:

1. **Identification and Significance of the Problem or Opportunity.** Define the specific technical problem or opportunity addressed and its importance.
2. **Phase I Technical Objectives.** Enumerate the specific objectives of the Phase I work, including the questions the research and development effort will try to answer to determine the feasibility of the proposed approach.
3. **Phase I Statement of Work (including Subcontractors' Efforts)**
  - a) Provide an explicit, detailed description of the Phase I approach. The Statement of Work should indicate what tasks are planned, how and where the work will be conducted, a schedule of major events, and the final product(s) to be delivered. The Phase I effort should attempt to determine the technical feasibility of the proposed concept. The methods planned to achieve each objective or task should be discussed explicitly and in detail. This section should be a substantial portion of the Technical Volume section.
  - b) The topic may have been identified by the Program Manager as research or activities involving Human/Animal Subjects and/or Recombinant DNA. In the event that Phase I performance includes performance of these kinds of research or activities, please identify the applicable protocols and how those protocols will be followed during Phase I. Please note that funds cannot be released or used on any portion of the project involving human/animal subjects or recombinant DNA research or activities until all of the proper approvals have been obtained (see DoD SBIR 2023.4/STTR 2023.D BAA).



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4. **Related Work.** Describe significant activities directly related to the proposed effort, including any conducted by the PI, the proposing firm, consultants, or others. Describe how these activities interface with the proposed project and discuss any planned coordination with outside sources. The technical volume must persuade reviewers of the proposer's awareness of the state-of-the-art in the specific topic. Describe previous work not directly related to the proposed effort but similar. Provide the following: (1) short description, (2) client for which work was performed (including individual to be contacted and phone number), and (3) date of completion.
  
5. **Relationship with Future Research or Research and Development**
  - a) State the anticipated results of the proposed approach if the project is successful.
  - b) Discuss the significance of the Phase I effort in providing a foundation for Phase II research or research and development effort.
  - c) Identify the applicable clearances, certifications and approvals required to conduct Phase II testing and outline the plan for ensuring timely completion of said authorizations in support of Phase II research or research and development effort.
  
6. **Key Personnel.** Identify key personnel who will be involved in the Phase I effort including information on directly related education and experience. A concise technical resume of the PI, including a list of relevant publications (if any), must be included (Please do not include Privacy Act Information). All resumes will count toward the page limit for Volume 2, as specified in the topic.
  
7. **Foreign Citizens.** Identify any foreign citizens or individuals holding dual citizenship expected to be involved on this project as a direct employee, subcontractor, or consultant. For these individuals, please specify their country of origin, the type of visa or work permit under which they are performing and an explanation of their anticipated level of involvement on this project. Refer to DoD SBIR 2023.4/STTR 2023.D BAA for more information.  
  
Supplemental information provided in response to this paragraph will be protected in accordance with the Privacy Act (5 U.S.C. 552a), if applicable, and the Freedom of Information Act (5 U.S.C. 552(b)(6)).
  
8. **Facilities/Equipment.** Describe available instrumentation and physical facilities necessary to carry out the Phase I effort. Justify equipment purchases in this section and include detailed pricing information in the Cost Volume. State whether or not the facilities where the proposed work will be performed meet environmental laws and regulations of federal, state (name), and local Governments for, but not limited to, the following groupings: airborne emissions, waterborne effluents, external radiation levels, outdoor noise, solid and bulk waste disposal practices, and handling and storage of toxic and hazardous materials.
  
9. **Subcontractors/Consultants.** Subcontractor means any supplier, distributor, vendor, firm, academic institution, research center, or other person or entity that furnishes supplies or

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services pursuant to a subcontract, at any tier. Involvement of a university or other subcontractors or consultants in the project may be appropriate. If such involvement is intended, it should be identified and described according to the Cost Breakdown Structure at <https://www.dodsbirsttr.mil/submissions/learning-support/firm-templates>. Please refer to DoD SBIR 2023.4/STTR 2023.D BAA for detailed eligibility requirements as it pertains to the use of subcontractors/consultants.

10. **Prior, Current, or Pending Support of Similar Proposals or Awards.** If a proposal submitted in response to a corresponding topic is substantially the same as another proposal that was funded, is now being funded, or is pending with another Federal Agency, or another DoD Component or DARPA, you must reveal this on the Proposal Cover Sheet and provide the following information:
- a) Name and address of the Federal Agency(s) or DoD Component to which a proposal was submitted, will be submitted, or from which an award is expected or has been received.
  - b) Date of proposal submission or date of award.
  - c) Title of proposal.
  - d) Name and title of the PI for each proposal submitted or award received.
  - e) Title, number, and date of BAA(s) or solicitation(s) under which the proposal was submitted, will be submitted, or under which award is expected or has been received.
  - f) If award was received, state contract number.
  - g) Specify the applicable topics for each proposal submitted or award received.

**Note: If this does not apply, state in the proposal "No prior, current, or pending support for proposed work."**

11. **Transition and Commercialization Strategy.** DARPA is equally interested in dual use commercialization of SBIR/STTR project results to the U.S. military, the private sector market, or both, and expects explicit discussion of key activities to achieve this result in the transition and commercialization strategy part of the proposal. Phase I is the time to plan for and begin transition and commercialization activities. The small business must convey an understanding of the market, competitive landscape, potential stakeholders and end-users, and preliminary transition path or paths to be established during the Phase I project. The Phase I transition and commercialization strategy shall not exceed 5 pages. It should be the last section of the technical volume and include the following elements:

- a) **A summary of transition and commercialization activities conducted during prior SBIR/STTR efforts if applicable, and the Technology Readiness Level (TRL) achieved.**
- b) **Problem or Need Statement.** Briefly describe the problem, need, or requirement, and its significance relevant to a Department of Defense application and/or a private sector application that the SBIR/STTR project results would address. Is there a broader societal need you are trying to address? Please describe.
- c) **Description of Product(s) and/or System Application(s).** Identify the commercial product(s) and/or DoD system(s), or system(s) under development, or potential new system(s). Identify the potential DoD end- users, Federal customers, and/or private sector customers who would likely use the

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- technology.
- d) **Business Model(s)/Procurement Mechanism(s).** Discuss your current business model hypothesis for bringing the technology to market. Describe plans to license, partner, or self-produce your product. How do you plan to generate revenue? Describe the resources you expect will be needed to implement your business models. Discuss your plan and expected timeline to secure these resources. Understanding DARPA's goal of creating and sustaining a U.S. military advantage, describe how you intend to develop your product and supply chains to enable this differentiation.
  - e) **Target Market.** Describe the market and addressable market for the innovation. Describe the customer sets you propose to target, their size, their growth rate, and their key reasons they would consider procuring the technology. Discuss the business economics and market drivers in the target industry. Describe competing technologies existent today on the market as well as those being developed in the lab. How has the market opportunity been validated? Describe the competition. How do you expect the competitive landscape may change by the time your product/service enters the market?
  - f) **Funding Requirements.** Describe your company's funding history. How much external financing have you raised? Describe your plans for future funding sources (internal, loan, angel, venture capital, etc.).
  - g) **Transition and Commercialization Risks.** Describe the major technology, market and team risks associated with achieving successful transition and commercialization of the DARPA funded technology. DARPA is not afraid to take risks but we want to ensure that our awardees clearly understand the risks in front of them. What are the key risks in bringing your innovation to market? What are actions you plan to undertake to mitigate these risks?
  - h) **Expertise/Qualifications of Team/Company Readiness.** Describe the expertise and qualifications of your management, marketing/business development and technical team that will support the transition of the technology from the prototype to the commercial market and into government operational environments. Has this team previously taken similar products/services to market? If the present team does not have this needed expertise, how do you intend to obtain it? What is the financial history and health of your company (e.g., availability of cash, profitability, revenue growth, etc.)?
  - i) **Anticipated Transition and Commercialization Results.** Include a schedule showing the anticipated quantitative transition and commercialization results from the Phase II project at one year after the start of Phase II, at the completion of Phase II, and after the completion of Phase II (i.e., amount of additional investment, sales revenue, etc.). After Phase II award, the company is required to report actual sales and investment data in its Company Commercialization Report at least annually.

Advocacy Letters (OPTIONAL)\* Feedback received from potential Commercial and/or DoD customers and other end-users regarding their interest in the technology to support their capability gaps. Advocacy letters that are faxed or e-mailed separately will NOT be accepted.

Letters of Intent/Commitment (OPTIONAL)\* Relationships established, feedback received, support and commitment for the technology with one or more of the following: Commercial customer, DoD PM/PEO, a Defense Prime, or vendor/supplier to the Primes and/or other vendors/suppliers identified as having a potential role in the integration of the technology into

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fielded systems/products or those under development. Letters of Intent/Commitment that are faxed or e-mailed separately will NOT be accepted.

\*Advocacy Letters and Letters of Intent/Commitment are optional, and should ONLY be submitted to substantiate any transition or commercialization claims made in the commercialization strategy. Please DO NOT submit these letters just for the sake of including them in your proposal. These letters DO NOT count against any page limit.

In accordance with section 3-209 of DOD 5500.7-R, Joint Ethics Regulation, letters from government personnel will NOT be considered during the evaluation process.

#### **d. Format of Cost Volume (Volume 3)**

Proposers are required to use the Phase I – Volume 3: Cost Proposal Template (Excel Spreadsheet) provided at <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>.

#### **e. Content of the Cost Volume (Volume 3)**

Some items in the Cost Breakdown Guidance below may not apply to the proposed project. If such is the case, there is no need to provide information on each and every item.

ALL proposed costs should be accompanied by documentation to substantiate how the cost was derived. For example, if you proposed travel cost to attend a project-related meeting or conference, and used a travel website to compare flight costs, include a screen shot of the comparison. Similarly, if you proposed to purchase materials or equipment, and used the internet to search for the best source, include your market research for those items. You do not necessarily have to propose the cheapest item or supplier, but you should explain your decision to choose one item or supplier over another. It's important to provide enough information to allow contracting personnel to understand how the proposer plans to use the requested funds.

If selected for award, failure to include the documentation with your proposal will delay contract negotiation, and the proposer will be asked to submit the necessary documentation to the Contracting Officer to substantiate costs (e.g., cost estimates for equipment, materials, and consultants or subcontractors). It is important to respond as quickly as possible to the Contracting Officer's request for documentation.

#### Cost Breakdown Guidance:

- List all key personnel by name as well as by number of hours dedicated to the project as direct labor.
- Special tooling and test equipment and material cost may be included. The inclusion of equipment and material will be carefully reviewed relative to need and appropriateness for the work proposed. The purchase of special tooling and test equipment must, in the opinion of the Contracting Officer, be advantageous to the Government and should be related directly to the specific topic. These may include such items as innovative instrumentation and/or automatic test equipment. Title to property furnished by the Government or acquired with Government funds will be vested with DARPA; unless it is determined that transfer of title to the contractor would be more cost effective than

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recovery of the equipment by the DARPA.

- Cost for travel funds must be justified and related to the needs of the project.
- Cost sharing is permitted for proposals under this announcement; however, cost sharing is not required nor will it be an evaluation factor in the consideration of a proposal.
- All subcontractor costs and consultant costs must be detailed at the same level as prime contractor costs in regard to labor, travel, equipment, etc. Provide detailed substantiation of subcontractor costs in your cost proposal. Enter this information in the Explanatory Material section of the on-line cost proposal form. The Supporting Documents Volume (Volume 5) may be used if additional space is needed.

For more information about cost proposals and accounting standards associated with contract awards, see the DCAA publication titled “Audit Process Overview – Information for Contractors” available at <http://www.dcaa.mil>.

### **f. Company Commercialization Report (Volume 4)**

The Company Commercialization Report (CCR) allows companies to report funding outcomes resulting from prior SBIR and STTR awards. The Company Commercialization Report (CCR) is required for Phase I and Direct to Phase II proposals. Please refer to the DoD STTR Program BAA for full details on this requirement. Information contained in the CCR will not be considered by DARPA during proposal evaluations.

### **g. Supporting Documents (Volume 5)**

In addition to required DoD documentation and certifications, small businesses may also submit additional documentation to support the Technical Volume (Volume 2) and the Cost Volume (Volume 3) in Volume 5. See Appendix A Introduction for required certifications that must be included in Volume 5. For additional information, see the SBIR 23.4 Annual Program Broad Agency Announcement (BAA) at <https://www.defensesbirsttr.mil/SBIR-STTR/Opportunities/>.

### **h. Fraud Waste and Abuse (Volume 6)**

The Fraud, Waste and Abuse (FWA) training is required for Phase I and Direct to Phase II proposals. FWA training provides information on what represents FWA in the SBIR/STTR program, the most common mistakes that lead to FWA, as well as the penalties and ways to prevent FWA in your firm. This training material must be thoroughly reviewed once per year. Plan ahead and leave ample time to complete this training based on the proposal submission deadline. Knowingly and willfully making any false, fictitious, or fraudulent statements or representations may be a felony under the Federal Criminal False Statement Act (18 U.S.C. Sec 1001), punishable by a fine of up to \$10,000, up to five years in prison, or both. Understanding the indicators and types of fraud, waste, and abuse that can occur is critical for the SBIR/STTR awardees’ role in preventing the loss of research dollars.

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**APPENDIX B: DARPA DIRECT TO PHASE II (DP2) PROPOSAL INSTRUCTIONS**

I. Introduction

A complete proposal submission consists of:

Volume 1: Proposal Cover Sheet

Volume 2: Technical Volume (feasibility documentation and technical proposal)

Volume 3: Cost Volume

Volume 4: Company Commercialization Report

Volume 5: Supporting Documents

a. Contractor Certification Regarding Provision of Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment (Attachment 1)

**MANDATORY**

b. Disclosures of Foreign Affiliations or Relationships to Foreign Countries (Attachment 2)

**MANDATORY**

c. Verification of Eligibility of Small Business Joint Ventures (Attachment 3), if applicable

d. Disclosure of Funding Sources (Attachment 4) **MANDATORY**

e. Other supporting documentation

**A completed proposal submission in DSIP does NOT indicate that the mandatory supporting documents have been uploaded. It is the responsibility of the proposing small business concern to ensure that the mandatory documents listed above have been uploaded and included with the proposal submission.**

Volume 6: Fraud, Waste and Abuse Training

The Defense SBIR/STTR Innovation Portal (DSIP) provides a structure for building the proposal volumes and submitting a consolidated proposal package. If this is your first time submitting an SBIR or STTR proposal using DSIP, please review detailed training guides at <https://www.dodsbirsttr.mil/submissions/learning-support/training-materials>. It is the responsibility of the proposing firm to ensure that a complete proposal package is certified and submitted by the close date listed in the topic to which they are responding.

To assist in proposal development, templates Volume 3: Cost Volume have been provided as attachments to the announcement posted at <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>. Use of this template is mandatory.

NOTE: All proposers are required to submit Volume 4: Company Commercialization Report (CCR).

II. Proprietary Information

Proposers that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall follow instructions in section 4.5 regarding marking propriety proposal information.

III. DP2 Proposal Instructions

**a. Proposal Cover Sheet (Volume 1)**



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The Cover Sheet must include a brief technical abstract of no more than 3000 characters that describes the proposed R&D project with a discussion of anticipated benefits and potential commercial applications. Do not include proprietary or classified information in the Proposal Cover Sheet. If your proposal is selected for award, the technical abstract and discussion of anticipated benefits may be publicly released.

#### **b. Content of the Technical Volume (Volume 2) – White Paper & Slide Deck**

White Paper (NTE 20 pages). Provide the following information:

Goals and Impact: Clearly describe what is being proposed and what difference it will make (qualitatively and quantitatively), including a brief discussion on how this directly relates to the topic.

1. Phase I Feasibility: This topic is accepting Direct to Phase II proposals ONLY. To be eligible, proposers must demonstrate that the feasibility requirements outlined in the topic have been met, and achieved outside of the SBIR program.
2. Technical Plan: Outline and address all technical areas and challenges inherent in the approach and possible solutions for overcoming potential problems. Provide specific objectives, metrics, and milestones at intermediate stages to demonstrate a plan for accomplishment of the project objectives. Propose additional appropriate qualitative and quantitative metrics specific to the approach, as needed. Intermediary milestones should occur at no greater than 1-month increments.
3. Management and Capabilities: Designate key personnel who will be involved in the Phase II effort. Provide a brief summary of expertise of the team, including subcontractors and key personnel. Describe the organizational experience in this technology area, previous work not directly related to the proposed effort but similar, existing intellectual property required to complete the project, and any specialized facilities to be used as part of the project. List Government-furnished materials or data assumed to be available. Describe any specialized facilities to be used as part of the project, the extent of access to these facilities, and any biological containment, biosafety, and certification requirements.
4. Transition and Commercialization Plan:
  - a. Describe the commercial product or DoD system to be developed.
  - b. Discuss the potential end users – DoD, Federal, and/or private sector customers. Discuss your business model for this technology (i.e., how do you anticipate generating revenue with this technology?). Who are you selling to directly or indirectly, a supplier, an integrator, or an end user?
  - c. Describe your company's funding history. Discuss how much additional funding above this proposed effort (include additional required technology development, staffing requirements, infrastructure requirements, IP strategy costs, etc.) that will be required to bring this technology to market and how you anticipate going about getting that funding (e.g., Govt S&T contracts, investment).
  - d. Describe the timeline to maturity for sales or transition to an end user. Describe your IP strategy.
  - e. Describe the technology, market, team and business risks associated with this proposed effort and your plan to mitigate these risks.

Slide Deck (NTE 15 slides). Provide the following information (convert the completed deck to a pdf and attach it to the white paper):

1. What are you trying to do and how does this directly relate to the topic?

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2. Technology and commercial product: Specifically, what are you proposing to produce – software, system, application? Be specific on what your proposed technology development is targeting as an end state.
3. How is the technology approached today? Who is doing the research, development and delivering products/services? What are the current limitations in the technology and commercial marketplaces?
4. Technical and commercial value proposition: How have you substantiated the feasibility of your approach? What is innovative in your approach and how does it compare to the state-of-the-art? Why do you think it will be successful both from a technical and commercial perspective? If you are successful what difference will it make? Discuss your proposed business model – how do you expect to generate revenue from your technology?
5. Technical and commercial risks: What are the key technical and commercial challenges and how do you plan to address/overcome these?
6. Technical and commercial market analysis: Who will care and what will the impact be if you are successful? What/who are the markets/industries/integrators/stakeholders that would/should care?
7. Cost, schedule and milestones: Provide a summary of your cost volume. Provide a summary of your schedule and milestones. How much will your proposed effort cost in total? How long will it take? What are your technical milestones for achieving the proposed efforts? What are your transition and commercialization plan milestones? Discuss how much funding will be required to bring your proposed technology to market and execute on your proposed transition and commercialization plan. Include any funding raised to date and expected plans for raising any additional required funding (government contracting revenue, product sales, internal R&D investment, loan, angel or Venture Capital investment, etc.). Describe timeline to maturity for operational use or commercial sales.
8. Management: Overview of team, facilities and qualifications.
9. Technical summary quad chart: Use template provided at <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>.
10. Commercialization summary quad chart: Use the DARPA Transition and Commercialization Strategy Plan (TCSP) template, located at <https://www.darpa.mil/work-with-us/for-small-businesses/commercialization-continued>.

NOTE: All letters of recommendation and CVs can be loaded in Volume 5: Supporting Documents.

### **c. Format of Cost Volume (Volume 3)**

Proposers are required to use the Direct to Phase II – Volume 3: Cost Proposal Template (Excel Spreadsheet) provided as an attachment to this announcement. The Cost Volume (and supporting documentation) DOES NOT count toward the page limit of the Technical Volume.

### **d. Content of the Cost Volume (Volume 3)**

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ALL proposed costs should be accompanied by documentation to substantiate how the cost was derived. For example, if you proposed travel cost to attend a project-related meeting or conference, and used a travel website to compare flight costs, include a screen shot of the comparison. Similarly, if you proposed to purchase materials or equipment, and used the internet to search for the best source, include your market research for those items. You do not necessarily have to propose the cheapest item or supplier, but you should explain your decision to choose one item or supplier over another. It's important to provide enough information to allow contracting personnel to understand how the proposer plans to use the requested funds. If selected for award, failure to include the documentation with your proposal will delay contract negotiation, and the proposer will be asked to submit the necessary documentation to the Contracting Officer to substantiate costs (e.g., cost estimates for equipment, materials, and consultants or subcontractors). It is important to respond as quickly as possible to the Contracting Officer's request for documentation.

#### Cost Breakdown Guidance:

1. List all key personnel by name as well as by number of hours dedicated to the project as direct labor. Special tooling and test equipment and material cost may be included. The inclusion of equipment and material will be carefully reviewed relative to need and appropriateness for the work proposed. The purchase of special tooling and test equipment must, in the opinion of the Contracting Officer, be advantageous to the Government and should be related directly to the specific topic. These may include such items as innovative instrumentation and/or automatic test equipment. Title to property furnished by the Government or acquired with Government funds will be vested with DARPA; unless it is determined that transfer of title to the contractor would be more cost effective than recovery of the equipment by the DARPA.
2. Cost for travel funds must be justified and related to the needs of the project.
3. Cost sharing is permitted for proposals under this announcement; however, cost sharing is not required nor will it be an evaluation factor in the consideration of a proposal.
4. All subcontractor costs and consultant costs must be detailed at the same level as prime contractor costs in regard to labor, travel, equipment, etc. Provide detailed substantiation of subcontractor costs in your cost proposal. Enter this information in the Explanatory Material section of the on-line cost proposal form. The Supporting Documents Volume (Volume 5) may be used if additional space is needed.

For more information about cost proposals and accounting standards, see the DCAA publication titled "Audit Process Overview – Information for Contractors" available at: <http://www.dcaa.mil>.

#### **e. Company Commercialization Report (Volume 4)**

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#### **f. Supporting Documents (Volume 5)**

In addition to required DoD documentation and certifications, small businesses may also submit additional documentation to support the Technical Volume (Volume 2) and the Cost Volume (Volume 3) in Volume 5. Firms should fill out and upload the DARPA SBIR XL Milestones Template found on the

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DARPA Small Business website under SBIR/STTR BAA FORMS & TEMPLATES at <https://www.darpa.mil/work-with-us/for-small-businesses/participate-sbir-sttr-program>. See Appendix B Introduction for **required** certifications that must be included in Volume 5. For additional information, see the SBIR 23.4 Annual Program Broad Agency Announcement (BAA) at <https://www.defensesbirstr.mil/SBIR-STTR/Opportunities/>.

### **g. Fraud Waste and Abuse (Volume 6)**

The Fraud, Waste and Abuse (FWA) training is required for Phase I and Direct to Phase II proposals. FWA training provides information on what represents FWA in the SBIR/STTR program, the most common mistakes that lead to FWA, as well as the penalties and ways to prevent FWA in your firm. This training material must be thoroughly reviewed once per year. Plan ahead and leave ample time to complete this training based on the proposal submission deadline. Knowingly and willfully making any false, fictitious, or fraudulent statements or representations may be a felony under the Federal Criminal False Statement Act (18 U.S.C. Sec 1001), punishable by a fine of up to \$10,000, up to five years in prison, or both. Understanding the indicators and types of fraud, waste, and abuse that can occur is critical for the SBIR/STTR awardees' role in preventing the loss of research dollars.