

**DEPARTMENT OF THE AIR FORCE (AF)
SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM
X20.3 SBIR COMMERCIAL SOLUTIONS OPENING (CSO)
AF VENTURES TOPICS**

This solicitation applies to AF Ventures Topics AF203-CSO1 and AF203-DCSO1 (Direct to Phase II), as well as SMC Pitch Day Topic AF203-CSO2, AFLCMC/RSO Pitch Day Topic AF203-CSO3, Simulators Pitch Day AF203-DCSO2, Digital Engineering Pitch Day Topic AF203-DCSO3, and Materials and Manufacturing Pitch Day AF203-DCSO4

25 August 2020: Issued for pre-release

23 September 2020: Begin accepting proposals

22 October 2020: Full proposals due **no later than 12:00 p.m. ET**

IAW with Section 879 of the National Defense Authorization Act (NDAA) for Fiscal Year 2017 (P.L. 114-328), Congress has authorized the Defense CSO Pilot Program. This program allows agencies to obtain solutions or potential new capabilities fulfilling requirements, closing capability gaps, or providing potential technological advancements. Consistent with FY17 NDAA Section 879, AF is soliciting proposals under a CSO. This solicitation is intended for informational purposes and reflects current planning. If there is inconsistency between the information in the CSO and resulting awards, if any, the awards' terms and conditions take precedent.

IMPORTANT

Deadline for Receipt: No exceptions will be made for the submission deadline above. AF recommends early submission, as computer traffic gets heavy near announcement closing. **Do not wait until the last minute.** AF is not responsible for missed proposal submission due to servers being “down” or inaccessible.

How to Submit: All proposals must be prepared and submitted through the Department of Defense (DOD) SBIR/STTR Innovation Portal (DSIP), <https://www.dodsbirsttr.mil/>. Ensure the proposal email address is accurate. AF is not responsible for missed notifications due to firms changing mailing address/email address/company points of contact after submission without notifying the AF. **Classified proposals are NOT accepted**

CSO Changes: The instructions/topic information are significantly revised – read carefully.

SBIR/STTR Updates and Notices:

- The CSO of record is found at <https://beta.sam.gov/> and <https://www.dodsbirsttr.mil/> (select ‘Topics’; scroll down to ‘SITIS & Topics/Instructions’ header and select ‘AFX’ tab). **Proposals must meet all CSO of record requirements at proposal submission deadline.**
- To receive AF Ventures and other AF innovation opportunity notifications, register at <https://af-ventures.com/> and <https://www.afwerx.af.mil/join.html>.

Help Desk: For AF SBIR/STTR Program questions, contact the AF Help Desk at 1-800-222-0336 or AFSBIRSTTR-Info@us.af.mil. For Defense SBIR/STTR Innovation Portal (DSIP) questions or issues, contact the DoD SBIR/STTR Help Desk at DoDSBIRSupport@reisystems.com.

TABLE OF CONTENTS

1.0	INTRODUCTION	4
2.0	PROGRAM DESCRIPTION	5
2.1	Objectives	5
2.2	Three Phase Program	7
2.3	AF Special Topic Information	7
3.0	DEFINITIONS	7
3.1	Certified HUBZone Small Business Concern	7
3.2	Commercial Solutions Opening (CSO)	7
3.3	Commercialization	7
3.4	Essentially Equivalent Work	7
3.5	Export Control	7
3.6	Federal Laboratory	7
3.7	Foreign Nationals	7
3.8	Fraud, Waste and Abuse	8
3.9	Funding Agreement	8
3.10	Innovative	8
3.11	Other Transaction	8
3.12	Performance Benchmarks for Progress Toward Commercialization	8
3.13	Principal Investigator	8
3.14	Proprietary Information	9
3.15	Research Involving Animal Subjects	9
3.16	Research Involving Human Subjects	9
3.17	Research Involving Recombinant DNA Molecules	9
3.18	Research or Research and Development	9
3.19	Service-Disabled Veteran-Owned Small Business (SDVOSB)	10
3.20	Small Business Concern (SBC)	10
3.21	Subcontract	10
3.22	United States	10
3.23	Women-Owned Small Business Concern	10
4.0	PROPOSAL FUNDAMENTALS	11
4.1	Introduction	11
4.2	Offeror Eligibility and Performance Requirements	11
4.3	Joint Ventures	12
4.4	Administrative Proposal Requirements	12
4.5	Majority Ownership in Part	13
4.6	Conflicts of Interest	13
4.7	Classified Proposals	13
4.8	Research Involving Human Subjects	14
4.9	Research Involving Animal Subjects	14
4.10	Research Involving Recombinant DNA Molecules	14
4.11	Use of Unmanned Aerial Systems (UAS)	14
4.12	Proposal Status and Feedback	15
4.13	CSO Protests, Selection and Award Protests	15
4.14	Phase I Award Information	15
4.15	Phase II and Direct to Phase II Award Information	15
4.16	Questions about this CSO and CSO Topics	16
4.17	Identifying RDT&E in SBIR/STTR Proposals	17
4.18	Promotional Materials	17

4.19	Fraudulent or False Statements	17
4.20	State and Other Assistance Available	17
4.21	Government Use of Support Contractors on AF SBIR/STTR Program	17
4.22	Innovation in Manufacturing	17
5.0	PHASE I PROPOSAL	18
6.0	PHASE I EVALUATION CRITERIA	33
7.0	PHASE II PROPOSAL	34
8.0	PHASE II EVALUATION CRITERIA	36
9.0	DIRECT TO PHASE II PROPOSAL	37
10.0	DIRECT TO PHASE II EVALUATION CRITERIA	54
11.0	CONTRACTUAL REQUIREMENTS	55
12.0	VOLUNTARY DIRECT TO PHASE II MATCHING FUNDS GUIDANCE	59
13.0	TOPIC INDEX with Phase I and Direct to Phase II Topics	62
13.1	AF203-CSO1 Title: Phase I Open Call for Innovative Defense-Related Dual-Purpose Technologies/Solutions with a Clear Air Force Stakeholder Need	63
13.2	AF203-CSO2 Title: Space and Missiles Center (SMC) Pitch Day	66
13.3	AF203-CSO3 Title: AF Life Cycle Management Center Rapid Sustainment Office (AFLCMC/RSO) Pitch Day	70
13.4	AF203-DCSO1 Title: Direct to Phase II Open Call for Innovative Defense- Related Dual-Purpose Technologies/Solutions with a Clear Air Force Stakeholder Need	72
13.5	AF203-DCSO2 Title: Simulators Pitch Day 2020 Projects for Lightweight or Modular Simulators	76
13.6	AF203-DCSO3 Title: Digital Engineering Pitch Day	79
13.7	AF203-DCSO4 Title: Industry Technologies Advancing Materials and Manufacturing Processes for Attritable Structures, Engines, and Sensors of Autonomous Unmanned Aerial and Space Systems	80

Attachments:

1. X20.3 Customer Memorandum MANDATORY TEMPLATE
2. X20.3 Funds Matching Form

1.0 INTRODUCTION

The Air Force (AF) invites small business firms to submit proposals under this CSO for the Small Business Innovation Research (SBIR) Program. Firms with the capability to conduct research and development (R&D) in the AF-related topics described in Section 13.0 and to commercialize the results are encouraged to participate.

The *2014 Quadrennial Defense Review* (QDR) established innovation as a central line of effort in the United States' (US') national defense strategy. The US' decisive military advantage over its adversaries and peer competitors is steadily eroding. Consequently, under section 879 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2017 (Pub. L. 114-328) Contracting Officers may acquire innovative commercial items, technologies, or services using a competitive procedure called a Commercial Solutions Opening (CSO). Under the CSO, DoD may competitively select proposals received in response to a general solicitation, similar to a Broad Agency Announcement, based on proposal review by Government scientific, technological, or other subject-matter experts. CSO use in accordance with Class Deviation 2018-00016 is considered competitive for the purposes of 10 U.S.C. chapter 127 and FAR 6.102. Contracting officers shall treat items, technologies, and services acquired under a CSO as commercial items. The full definition of commercial items, i.e., products and services, under FAR 2.101 applies. This CSO includes no requirement for a commercial product or service be an already developed, off-the-shelf item.

This CSO seeks innovative, commercial technologies proposed to create new AF solutions or potential new capabilities fulfilling requirements, closing capability gaps, or providing potential technological advancements. This CSO may result in the award of prototype projects, which include not only commercially available technologies fueled by commercial or strategic investment, but also concept demonstrations, pilots, and agile development activities incrementally improving commercial technologies, existing Government-owned capabilities, or concepts for broad Defense application(s). The Government reserves the right to award a contract or an Other Transaction for any purpose, to include a prototype, under this CSO. The AF also reserves the right to award all, part, or none of the proposals received. The Federal Government is not responsible for any monies expended by the applicant before award, if selected. The SBIR/STTR Programs are not substitutes for existing unsolicited proposal mechanisms. Unsolicited proposals are not accepted under the AF SBIR/STTR Programs for Phase I or Phase II.

Information related to the AF Small Business Program is found at <http://www.airforcesmallbiz.af.mil/>. The site contains contracting opportunities within AF, as well as business information and upcoming outreach/conference events. Other informative sites include the Small Business Administration (SBA), www.sba.gov, and Procurement Technical Assistance Centers, <http://www.aptacus.us.org>. These centers provide Government contracting assistance and guidance to small businesses, typically at no cost.

2.0 PROGRAM DESCRIPTION

2.1 Objectives

The AF SBIR Program's objectives include stimulating technological innovation, strengthening the small business role in meeting DoD R&D needs, fostering and encouraging minority and disadvantaged persons in technological innovation, and increasing commercial application of DoD-supported R/R&D results.

The eight (8) Technology Areas below represent AF Strategic priorities. The list also includes a Blue Sky area for solutions not covered under the other eight technology areas. These areas pertain to Topics AF203-CSO1 and AF203-DCSO1 ONLY. Information regarding AF requirements for the remaining opportunities sought under this solicitation is found in the other individual topics.

1. Aerospace Systems Technology: Includes turbine engines; alternate fuels for unmanned vehicles and hypersonic systems; supersonic speed; high temperature materials; hypersonic vehicle manufacturing; air breathing propulsion; hypersonic guidance/control systems; aerospace vehicles; control, power & thermal management; high speed systems; rocket propulsion; and turbine engines.
2. Materials and Manufacturing Technology: New applications for radar and electro-optic sensors, including structural and functional materials; manufacturing technologies; and operations support. Also includes COVID-19 pandemic materials and manufacturing advances.
3. Directed Energy Technology: Includes powerful electromagnetics; electro-optics; high power electromagnetics; laser systems; and ground-based electro optical /infrared space situational awareness.
4. Human Performance, including Medical Technologies: Includes disease prevention/mitigation; rapid emergency medical response and trauma management; environmental remediation; advanced materials; biological/cognitive research, human capabilities including training, decision-making, bioeffects, and human-centered intelligence, surveillance, and reconnaissance (ISR); and COVID-19 pandemic human performance and medical response advances/solutions.
5. Sensors Technology: New applications for radar and electro-optic sensors, including spectrum warfare; trusted, resilient mission systems; multi-domain sensing autonomy; enabling devices and components, radio frequency (RF) sensing; and electronic optic (EO) sensing.
6. Munitions Technology: Effects with hyper-precision and speed against ground, sea, or air targets in all weather conditions, day or night. This includes ordnance sciences; terminal seeker sciences; munitions; airframe; guidance; navigation and control; modeling and simulation; and evaluation sciences.
7. Information Technology: Includes command, control, communications, computer, cyber and intelligence; enabling technologies for quantum computing in cryogenics and photon detection; improve algorithms; address data quality; optimize human-machine coordination; adversary effort disruption; autonomous systems teaming; machine perception, reasoning and intelligence; human and autonomy systems trust and interaction; addressing high-performance, low power embedded processing; developing algorithms for self-configuring, self-healing, and resource allocation; behavioral issues development; develop self-securing network development; develop cyber effects and consequences capability assessments; quantum clocks, sensors, and quantum communications technologies; autonomy, command and control, and decision support; processing and exploitation; cyber science technology, connectivity; and dissemination; and COVID-19 pandemic information sciences' advances/solutions.
8. Space Vehicles Technology: Includes space component technology; flying state of the art satellite space experiments; advanced space resilience technologies; space communication and navigation technologies; space awareness, command and control, and space environment; low earth orbit nano-satellites; and simulation and training.

*BS - Blue Sky: Use to propose solutions not envisioned under one of the eight technology areas above.

The AF SBIR Program follows the policies and practices of the Small Business Administration (SBA) SBIR/STTR Policy Directive (2 May 19), https://www.sbir.gov/sites/default/files/SBIR-STTR_Policy_Directive_2019.pdf. This CSO incorporates and makes use of Policy Directive flexibilities to encourage proposals based on scientific and technical approaches most likely to yield important results for the AF and private sector.

2.2 Three Phase Program

The SBIR/STTR Program consists of Phases I, II, and III. Phase I is to determine, to the extent possible, the scientific and technical merit and feasibility of ideas with commercial potential. Proposals should concentrate on R/R&D significantly contributing to proving scientific and technical feasibility and the proposed effort’s commercialization potential, wherein successful completion is required to obtain further AF support, e.g., a Phase II award. Proposers should consider whether the R/R&D proposed to the AF has private sector potential, either for the proposed application or as the basis for other applications.

Phase II awards are based on Phase I results, including commercialization potential, relevance to Defense needs, and the Phase II proposal’s technical merit. Phase II is the principal R/R&D effort, expected to produce a well-defined deliverable prototype. Phase II awardees may receive one additional, sequential Phase II award to continue the project. There is also the possibility for a third Phase II award under the Commercialization Assistance Pilot Program (CAPP). Additionally, agencies may provide opportunities to apply for Phase IIB awards seeking to bridge the gap between Phase II and III. Proposals for these opportunities, if/when available, are sought through separate, discreet solicitation cycles.

SBIR/STTR Phase IIIs include work deriving from, extending, or completing efforts made under prior SBIR/STTR funding agreements but funded by non-SBIR/STTR Program sources. This can be private sector, non-SBIR/STTR Government sources, or both. Phase III work is typically oriented towards commercializing SBIR/STTR research or technology.

2.3 Consolidated Topic Information (NOTE: This chart applies to Topics AF203-CSO1 and AF203-DCSO1. For the remaining topics, information may be found within the individual material.)

CHART 1				Phase I				Phase II and Direct to Phase II			
Technical Volume (Vol 2)	Additional Info (Vol 5)	Award Amount	Technical & Reporting Duration	Technical Volume (Vol 2)	Additional Info (Vol 5)	Technical & Reporting Duration	Initial Award Amount	Technical Volume (Vol 2)	Additional Info (Vol 5)	Technical & Reporting Duration	Initial Award Amount
NTE 5 pages	15-slide deck	NTE \$50,000	3 mo.; 2 mo. tech, 1 mo. reporting	NTE 15 pages	15-slide deck	NTE 15 mo.; 12 mo. tech, 3 mo. reporting	Max \$750K SBIR funds; may exceed this amount with cost share or match.				

3.0 DEFINITIONS

The following definitions from the SBA SBIR/STTR Policy Direction, the Federal Acquisition Regulation (FAR), and 10 USC 2371b apply to this CSO:

3.1 Certified HUBZone Small Business Concern: An SBC certified by SBA under the Historically Underutilized Business Zones (HUBZone) Program (13 C.F.R. § 126) as a HUBZone firm listed in the Dynamic Small Business Search (DSBS).

3.2 Commercial Solutions Opening (CSO): A competitive procedure Contracting Officers may use to acquire innovative commercial items, technologies or services.

3.3 Commercialization: The process of developing products, processes, technologies, or services and the production and delivery (whether by the originating party or others) of products, processes, technologies, or services for sale to or use by the Federal Government or commercial markets.

3.4 Essentially Equivalent Work: Work substantially the same research, proposed for funding in more than one application submitted to the same Federal agency, or two or more different Federal agencies for review and funding consideration. It may also include work where a specific research objective and the research design for accomplishing project objective are the same or closely related to another proposal or award, regardless of funding source.

3.5 Export Control: The International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through projects with military or dual-use applications beyond fundamental research. Fundamental research is basic and applied research ordinarily published and shared broadly within the scientific community. More information is available at https://www.pmdtc.state.gov/?id=ddtc_public_portal_itar_landing.

3.6 Federal Laboratory: As defined in 15 U.S.C. §3703, means any laboratory, any Federally funded research and development center (FFRDC), or any center established under 15 U.S.C. § 3705 & 3707 that is owned, leased, or otherwise used by a Federal agency and funded by the Federal Government, whether operated by the Government or by a contractor.

3.7 Foreign Nationals: Foreign Nationals (also known as Foreign Persons) as defined by 22 CFR 120.16 means any natural person who is not a lawful permanent resident as defined by 8 U.S.C. § 1101(a)(20) or who is not a protected individual as defined by 8 U.S.C. § 1324b(a)(3). It also means any foreign corporation, business association, partnership, trust, society or any other entity or group that is not incorporated or organized to do business in the United States, as well as international organizations, foreign Governments and any agency or subdivision of foreign Governments (e.g., diplomatic missions).

“Lawfully admitted for permanent residence” means the status of having been lawfully accorded the privilege of residing permanently in the United States as an immigrant in accordance with the immigration laws, such status not having changed.

“Protected individual” means an individual who (A) is a citizen or national of the United States, or (B) is an alien who is lawfully admitted for permanent residence, is granted the status of an alien lawfully admitted for temporary residence under 8 U.S.C. § 1160(a) or 8 U.S.C. § 1255a(a)(1), is admitted as a refugee under 8 U.S.C. § 1157, or is granted asylum under Section 8 U.S.C. § 1158; but does not include (i) an alien who fails to apply for naturalization within six months of the date the alien first becomes eligible (by virtue of period of lawful permanent residence) to apply for naturalization or, if later, within six months after November 6, 1986, and (ii) an alien who has applied on a timely basis, but has not been naturalized as a citizen within two (2) years after the date of the application, unless the alien can establish that the alien is actively pursuing naturalization, except that time consumed in the Service's processing the application shall not be counted toward the two (2)-year period.

3.8 Fraud, Waste and Abuse:

- a. **Fraud** includes any false representation about a material fact or any intentional deception designed to deprive the United States unlawfully of something of value or to secure from the United States a benefit, privilege, allowance, or consideration to which an individual or business is not entitled.
- b. **Waste** includes extravagant, careless or needless expenditure of Government funds, or the consumption of Government property, that results from deficient practices, systems, controls, or decisions.
- c. **Abuse** includes any intentional or improper use of Government resources, such as misuse of rank, position, or authority or resources.

3.9 Funding Agreement: Any contract, grant, cooperative agreement, or Other Transaction for Prototype entered into between any Federal Agency and any small business concern for the performance of experimental, developmental, or research work, including products or services, funded in whole or in part by the Federal Government.

3.10 Innovative:

- (1) Any new technology, process, or method, including research and development; or
- (2) Any new application of an existing technology, process, or method.

3.11 Other Transaction: Refers to the type of Other Transaction Agreement (OTA) that may be placed as a result of this CSO. This type of OT is authorized by 10 U.S.C 2371b for prototype projects directly relevant to enhancing the mission effectiveness of military personnel and the supporting platforms, systems, components, or material proposed to be acquired or developed by the DoD, or for the improvement of platforms, systems, components, or materials in use by the armed forces. This type of OTA is treated by DoD as an acquisition instruments, commonly referred to as an "other transaction" for a prototype or a Section 2371b "other transaction." The definition of a "prototype project" in the context of an OT is as follows: a prototype project addresses a proof of concept, model, reverse engineering to address obsolescence, pilot, novel application of commercial technologies for defense purposes, agile development activity, creation, design, development, demonstration of technical or operational utility, or combinations of the foregoing. A process, including a business process, may be the subject of a prototype project.

This authority also allows for a noncompetitive, follow-on OT for Production to an OT for Prototype competitively awarded and successfully completed. This statute requires advanced consideration be given and notice be made for follow-on OT for Production potential. It is a necessary precondition for such a follow-on award. As such, this solicitation documents, and resulting OTs for Prototype will include notice, follow-on OTs for Production are possible.

3.12 Performance Benchmarks for Progress Toward Commercialization: IAW the SBA SBIR/STTR Policy Directive Section 4.(a)(3), DoD's established benchmark threshold applies only to Phase I applicants with more than 20 awards in the prior five fiscal years. The ratio of Phase I awards to Phase II awards received during the period must be at least 4:1. Additional information can be found at <https://www.sbir.gov/performance-benchmarks>.

3.13 Principal Investigator: The principal investigator/project manager is the individual designated by the applicant to provide the scientific and technical direction to a project supported by the funding agreement. For both Phase I and Phase II, the primary employment of the principal investigator must be with the SBC at the time of award and during the conduct of the proposed project. Primary employment means that more than one-half of the principal investigator's time is spent in the employ of the SBC. This precludes full-time employment with another organization. Occasionally, deviations from this requirement may occur, and must be approved in writing by the Contracting Officer after consultation with the agency AF SBIR Program Manager/Coordinator. Further, an SBC may replace the principal investigator on an SBIR Phase I or Phase II award, subject to approval in writing by the Contracting Officer.

3.14 Proprietary Information: Proprietary information includes trade secrets, as well as commercial or financial information.

3.15 Research Involving Animal Subjects: "Activities involving animal subjects shall be conducted in accordance with DoDI 3216.01, "Use of Animals in DoD Programs"; 9 CFR parts 1-4; National Academy of Sciences Publication "Guide for the Care & Use of Laboratory Animals" as amended; Department of Agriculture rules implementing the Animal Welfare Act (7 U.S.C. §§ 2131-2159); and other applicable Federal/DoD/local laws, regulations, and instructions.

"Animal use" protocols apply to activities meeting any of the following criteria:

- a. Any research, development, test, evaluation or training (including experimentation) involving an animal or animals.
- b. An animal is defined as any living or dead, vertebrate organism (non-human) being used or intended for use in research, development, test, evaluation, or training.
- c. A vertebrate is a member of the subphylum Vertebrata (within the phylum Chordata), including birds and cold-blooded animals.

See DoDI 3216.01 for definitions of these terms and applicability to work involving animals

3.16 Research Involving Human Subjects: All research involving human subjects shall be conducted in accordance with 32 C.F.R. § 219 "The Common Rule", 10 USC §980 "Limitation on Use of Humans as Experimental Subjects", and DoDD 3216.02, "Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research," as well as other applicable Federal and state law and regulations, and DoD component guidance. Offerors must be cognizant of and abide by the additional restrictions and limitations imposed on the DoD regarding research involving human subjects, specifically as they regard vulnerable populations (DoDD 3216.02), recruitment of military research subjects (DoDD 3216.02), and informed consent and surrogate consent (10 U.S.C. § 980) and chemical and biological agent research (DoDD 3216.02). Food and Drug Administration regulation and policies may also apply.

"Human use" protocols apply to all research that meets any of the following criteria:

- a. Any research involving an intervention or an interaction with a living person that would not be occurring or would be occurring in some other fashion but for this research.
- b. Any research involving identifiable private information. This may include data/information/specimens collected originally from living individuals (broadcast video, web-use logs, tissue, blood, medical or personnel records, health data repositories, etc.) in which the identity of the subject is known, or the identity may be readily ascertained by the investigator or associated with the data/information/specimens.

See DoDD 3216.02 for definitions of these terms and more information about the applicability of DoDI 3216.02 to research involving human subjects.

3.17 Research Involving Recombinant DNA Molecules: Any recipient performing research involving recombinant DNA molecules and/or organisms and viruses containing recombinant DNA molecules shall comply with the National Institutes of Health Guidelines for Research Involving Recombinant DNA Molecules, dated January 2011, as amended. The guidelines can be found at: https://osp.od.nih.gov/wp-content/uploads/2013/06/NIH_Guidelines.pdf. Recombinant DNA is defined as (i) molecules that are constructed outside living cells by joining natural or synthetic DNA segments to DNA molecules that can replicate in living cells or (ii) molecules that result from the replication of those described in (i) above.

3.18 Research or Research and Development (R/R&D):

- a. A systematic, intensive study directed toward greater knowledge or understanding of the subject studied;
- b. A systematic study directed specifically toward applying new knowledge to meet a recognized need; or
- c. A systematic application of knowledge toward the production of useful materials, devices, systems, or

methods, including prototype or process design, development, and improvement to meet specific requirements.

- d. Intended broadly to include the work performed under a funding agreement with the government. It includes R&D in all fields, including the physical sciences, engineering, etc. Research is systematic study directed toward fuller scientific knowledge or understanding of the subject studied. Development is systematic use of the knowledge and understanding gained from research, for the production of useful materials, devices, systems, or methods, including the design and development of prototypes and processes.

3.19 Service-Disabled Veteran-Owned Small Business (SDVOSB): A small business concern owned and controlled by a Service-Disabled Veteran or Service-Disabled Veterans, as defined in Small Business Act 15 USC § 632(q)(2) and SBA's implementing SDVOSB regulations (13 CFR 125).

3.20 Small Business Concern (SBC): A concern meeting the requirements set forth in 13 CFR. § 121.702. An SBC must satisfy the following conditions on the date of award:

- a. Is organized for profit, with a place of business located in the United States, which operates primarily within the United States or which makes a significant contribution to the United States economy through payment of taxes or use of American products, materials or labor;
- b. Is in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that if the concern is a joint venture, each entity to the venture must meet the requirements set forth in paragraph (c) below;
- c. Is more than 50% directly owned and controlled by one or more individuals (who are citizens or permanent resident aliens of the United States), other small business concerns (each of which is more than 50% directly owned and controlled by individuals who are citizens or permanent resident aliens of the United States), or any combination of these; and
- d. Has, including its affiliates, not more than 500 employees. (For explanation of affiliate, see www.sba.gov/size.)

3.21 Subcontract: A subcontract is any agreement, other than one involving an employer-employee relationship, entered into by an awardee of a funding agreement calling for supplies or services for the performance of the original funding agreement. This includes consultants.

3.22 United States: The fifty states, the territories and possessions of the Federal Government, the Commonwealth of Puerto Rico, the Republic of the Marshall Islands, the Federated States of Micronesia, the Republic of Palau, and the District of Columbia.

3.23 Women-Owned Small Business Concern: An SBC at least 51% owned by one or more women, or in the case of any publicly owned business, at least 51% of the stock is owned by women, and women control the management and daily business operations.

4.0 PROPOSAL FUNDAMENTALS

Unless otherwise specified, this section applies to Phase I and II proposals, including Direct to Phase II.

4.1 Introduction: The proposal must provide sufficient information to demonstrate to the reviewers the proposed work represents an innovative approach to investigation of important scientific or engineering problems and is worthy of support under the stated criteria. The proposed R/R&D must be responsive to the chosen topic.

Before submitting a proposal, offerors should assess the intended effort to determine:

- a. The technical approach has a reasonable chance of meeting the topic objective;
- b. This approach is innovative, not routine, with potential for commercialization; and
- c. The proposing firm has the capability to implement the technical approach, i.e., has or can obtain people and equipment suitable to the task.

4.2 Offeror Eligibility and Performance Requirements

- a. Each proposer must qualify as a small business concern IAW 13 C.F.R §§ 701-705 at time of award and certify to this on the proposal Cover Sheet. SBIR/STTR eligibility requirements are unique and do not correspond to other business programs (see Section 3.15 of this CSO). Proposers must meet eligibility requirements for Small Business Ownership and Control IAW 13 CFR § 121.702 and Section 4.4 of this CSO.
- b. A minimum of two-thirds of the research and/or analytical work in Phase I must be conducted by the proposing firm. For Phase II, a minimum of one-half (50%) of the research and/or analytical work must be performed by the proposing firm. The percentage of work is measured by both direct and indirect costs.
- c. Primary employment of the principal investigator must be with the small business firm at the time of the award and during the conduct of the proposed effort. Primary employment means more than one-half of the principal investigator's time is spent with the small business. Primary employment with a small business concern precludes full-time employment at another organization.
- d. All Phase I and Phase II R/R&D work must be performed by the small business concern and its subcontractors in the U.S.
- e. **Benchmarks.** Proposers with prior SBIR/STTR awards must meet two benchmark requirements for progress toward commercialization as determined by the Small Business Administration (SBA) on 1 June each year.
 1. For all proposers with greater than 20 Phase I awards over the past five fiscal years, excluding the most recent year (currently FY 2015-2019), the ratio of Phase II awards to Phase I awards must be at least 0.25.
 2. For all proposers with greater than 15 Phase II awards over the last ten fiscal years excluding the last two years (currently FY 2008-2018), the proposer must have received, to date, an average of at least \$100,000 of sales and/or investments per Phase II award received or have received a number of patents resulting from the SBIR work equal to or greater than 15% of the number of Phase II awards received during the period.

Consequence of failure to meet the benchmarks:

- o SBA will identify and provide Agencies annually on 1 June the list of companies failing to meet minimum performance requirements. These companies will not be eligible to submit Phase I proposals for one year from that date.

- This requirement only affects a company's eligibility for new Phase I awards. Companies failing to meet minimum performance requirements may continue work on current, ongoing SBIR/STTR awards. They may also apply for and receive new Phase II awards. Likewise, they are not prohibited from receiving Phase III awards.
- To provide advance warning, SBA notifies companies on 1 April if they are failing the benchmarks. If a company believes the information used was not complete or accurate, it may provide feedback through the SBA Company Registry at www.sbir.gov.
- In addition, SBA has posted a [Guide to SBIR/STTR Program Eligibility](#) to help small businesses understand program eligibility requirements, determine if they will be eligible at award, and accurately complete necessary certifications.
- Companies' benchmark information is not available to the public.

4.3 Joint Ventures: Joint ventures and limited partnerships are permitted, provided the entity created qualifies as a small business in accordance with the Small Business Act, 13 U.S.C. § 121.701.

4.4 Administrative Proposal Requirements: The AF SBIR/STTR Center of Excellence (CoE) is committed to reducing Phase I and II proposal-to-award lead times. To this end, processes and tools have been developed allowing for rapid, streamlined contracting via periodic expedited contracting events. Such speed dictates stringent administrative practices in the proposal submission process. **Therefore, proposals not meeting the requirements as identified below will not be considered for award.**

4.4.1 Registrations and Certifications. Firms shall be registered in the DoD SBIR/STTR Innovation Portal (DSIP) to prepare and submit proposals, <https://www.dodsbirsttr.mil/submissions/login>.

Firms shall register in the System for Award Management (SAM), <https://www.sam.gov/>, to be eligible for proposal acceptance. Follow instructions therein to obtain a Commercial and Government Entity (CAGE) code and Dunn and Bradstreet (DUNS) number. Firms shall also verify registration for "All Contracts", not just "Grants". Firms registered to compete for grants only at the time of proposal submission will not be considered for award. Addresses must be consistent between the proposal and SAM at award. Previously registered firms are advised to access SAM to ensure all company data is current before proposal submission and, if selected, award.

In addition to the standard Federal and DoD procurement certifications, the SBA SBIR/STTR Policy Directive requires certain information be collected from firms at award and during the award life cycle. Each firm will be asked to provide this additional information at the time of award, prior to receiving 50% of the total award amount, and prior to final payment.

4.4.2 Prior, Current, or Pending Support of Similar Proposals or Awards. It is permissible, with proper notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work (see Section 3.3) for consideration under multiple Federal program solicitations. However, it is unlawful to enter into contracts, grants, cooperative agreements, Other Transactions, or other award types, requiring essentially equivalent effort. Questions concerning prior, current, or pending support of similar proposals or awards shall be disclosed to the soliciting agency or agencies as early as possible.

4.4.3 Proprietary Information. Information constituting a trade secret, commercial or financial information, confidential personal information, or data affecting national security must be clearly marked. It shall be treated in confidence to the extent permitted by law. Awards for selected proposals will incorporate the Work Plan, in whole or part, by reference or as an attachment. Therefore, **the Work Plan shall be Non-Proprietary and marked accordingly.**

Proprietary and/or classified information shall not be included in the Proposal Cover Sheet. The term "Component" on the Cover Sheet refers to the soliciting AF organization, i.e., AFWERX, AFLCMC, SMC, etc. **Proposals submitted to the wrong Command will not be considered for award.**

4.5 Majority Ownership in Part: Small businesses owned in majority part by multiple venture capital operating companies (VCOCs), hedge funds, or private equity funds are ineligible to submit proposals under this CSO.

4.6 Conflicts of Interest: Contract awards to firms owned by or employing current or previous Federal Government employees could create conflicts of interest for those employees which may be a violation of Federal law. Proposing firms should contact the cognizant Ethics Counselor from the employee's Government agency for further guidance if in this situation.

4.7 Classified Proposals: Classified proposals will not be accepted in response to this CSO. If efforts will require classified work during Phase II performance, the proposing firm must have or obtain a facility clearance. Additional information on facility and personnel clearance procedures and requirements can be found at the Defense Security Service site, <http://www.dss.mil/index.html>.

4.8 Research Involving Human Subjects

All research involving human subjects, to include use of human biological specimens and human data, shall comply with the applicable Federal and state laws and agency policy/guidelines for human subject protection (see Section 3.12).

Institutions to be awarded funding for research involving human subjects must provide documentation of a current Federal Assurance of Compliance with Federal regulations for human subject protection, for example a Department of Health and Human Services, Office for Human Research Protections Federal wide Assurance (<http://www.hhs.gov/ohrp>).

Additional Federal Assurance documentation may also be requested by the AF. All institutions engaged in human subject research, to include subcontractors, must also have a valid Assurance. In addition, personnel involved in human subject research must provide documentation of completing appropriate training for the protection of human subjects. Institutions proposing to conduct human subject research that meets one of the exemption criteria in 32 CFR 219.101 are not required to have a Federal Assurance of Compliance. If selected, institutions must also provide documentation of Institutional Review Board (IRB) approval or a determination from an appropriate official in the institution that the work meets one of the exemption criteria with 32 CFR 219. As part of the IRB review process, evidence of appropriate training for all investigators should accompany the protocol. The protocol, separate from the proposal, must include a detailed description of the research plan, study population, risks and benefits of study participation, recruitment and consent process, data collection and data analysis.

The amount of time required for the IRB to review and approve the protocol will vary depending on such things as the IRB's procedures, the complexity of the research, the level of risk to study participants and the responsiveness of the Investigator. The average IRB approval process can last between one and three months. Once the IRB has approved the research, the AF will review the protocol and the IRB's determination to ensure that the research will be conducted in compliance with DoD and DoD Component policies. The DoD review process can last between three to six months. Ample time should be allotted to complete both the IRB and DoD approval processes prior to recruiting subjects. **No funding can be used towards human subject research until ALL approvals are granted.**

4.9 Research Involving Animal Subjects

All research, development, testing, experimentation, education or training involving the use of animals shall comply with the applicable Federal and agency rules on animal acquisition, transport, care, handling, and use (see Section 3.11).

For submissions containing animal use, proposals should briefly describe plans for their Institutional Animal Care and Use Committee (IACUC) review and approval.

All Recipients must receive their IACUC's approval as well as secondary or headquarters-level approval by a DoD veterinarian who is trained or experienced in laboratory animal medicine and science. **No animal research may be conducted using DoD funding until all the appropriate DoD office(s) grant approval.**

4.10 Research Involving Recombinant DNA Molecules

All research involving recombinant DNA molecules shall comply with the applicable Federal and state laws and regulations and any additional agency guidance. Research shall be approved by an Institutional Biosafety Committee.

4.11 Use of Unmanned Aircraft Systems (UAS)

All activities involving the operation of Unmanned Aerial Systems shall be conducted IAW Department of Defense Memo entitled "Guidance for the Domestic Use of Unmanned Aircraft Systems in the U.S. National Airspace, dated 18 August 2018 and DOD memo entitled, "Delegation Authority to Approve Exemptions for Using Commercial-Off-The-Shelf Unmanned Aerial Systems in Support of Urgent Needs, dated 16 November 2018. Contractor personnel operating DoD or DoD-contracted UAS in U.S. National Airspace, whether or not the domestic use is related to an intelligence activity, will comply with all laws, regulations, and guidance relating to the operation of UAS in U.S. National Airspace. Specific programs utilizing UAS are required to obtain an exemption for operational use of a UAS; therefore, additional documentation may be requested by the AF to support an exemption request. The DOD exemption approval process can require as long as two months. **No funding can be used for contracted-UAS operations until ALL approvals are granted.**

4.12 Proposal Status and Feedback

The Principal Investigator (PI) and Corporate Official (CO) indicated on the Proposal Cover Sheet (Volume 1) will be notified by email regarding proposal selection or non-selection. The SBC will receive a notification for each proposal submitted. Please read each notification carefully and note the proposal number referenced. **If changes occur to the company mail or email address(es) or points of contact after proposal submission, the information must be provided to the AF at sbir@afwerx.af.mil. The message shall include the subject line, "20.3 Address Change".**

Feedback requests will be provided to offerors with proposals determined "Not Selectable" ONLY. Requests shall be submitted in writing within 30 calendar days after non-selection notification receipt. Written feedback requests shall be submitted via AFRL.SBIR.STTR.FeedbackRequests@us.af.mil. Requests for feedback shall include the company name and the telephone number/e-mail address for a specific point of contact, as well as an alternate. Additionally, the request shall include the proposal number(s). **If the preceding information is not included in the request, it will not be fulfilled.** Feedback requests received more than 30 calendar days after non-selection notification receipt will be fulfilled at the Contracting Officers' discretion. Unsuccessful offerors are entitled to no more than one feedback response for each proposal. The Contracting Officer may also delay feedback dissemination until all awards resulting from the solicitation are finalized.

Release of Proposal Review Information. After final award decisions have been announced, the peer review of the applicant's proposal may be provided to the offeror. The identity of the reviewer shall not be disclosed. Requests

may be sent to the address above. The same information required for feedback requests shall be required for release of proposal review information. **If not included in the request, it will not be fulfilled.**

It is anticipated all proposal reviews will be complete, selection decisions made, and notification letters sent within approximately 30 calendar days of solicitation close. Please refrain from contacting the AF SBIR/STTR Center of Excellence for proposal status before that time.

4.13 CSO, Selection, and Award Protests

Interested parties may have the right to protest this CSO by serving the Contracting Officer, Ms. Kris Croake, kristina.croake@us.af.mil, with the protest, by filing with the Government Accountability Office (GAO), or by filing U.S. Court of Federal Claims. Protest of selections or awards should also be directed to Ms. Croake, filed with GAO, or filed with the U.S. Court of Federal Claims. If the protest is filed with GAO, a copy of the protest shall be received by the AF Legal Operations Agency within one day of filing. Protests of a selected firm's small business status should be directed to the SBA.

4.14 Phase I Award Information

- a. **Number of Phase I Awards.** The number of awards will depend upon funds availability. The Government reserves the right to make no awards under this solicitation. The Federal Government is not responsible for any costs incurred before award receipt.
- b. **Type of Funding Agreement.** Phase I awards will be made as firm-fixed-price purchase orders.
- c. **Dollar Value.** The maximum Phase I award value will be \$50,000.
- d. **Timing.** It is intended that peer review, proposal selection, negotiations, and award will be complete within 60 calendar days of solicitation close.

4.15 Phase II and Direct to Phase II Award Information

- a. **Number of Awards.** The number of awards will depend upon funds availability. The Government reserves the right to make no awards under this solicitation. The Federal Government is not responsible for any costs incurred before award receipt.
- b. **Type of Funding Agreement.** Phase II awards are made as firm-fixed-price contracts or Other Transactions for Prototype, including reasonable profit consistent with profit-making R/R&D firms. Awards may be negotiated; award type is at the Contracting Officer's discretion.
- c. **Average Dollar Value.** Maximum Phase II contract value is found in Section 2.3, Chart 1.
- d. **Timing.** It is intended that peer review, proposal selection, negotiations, and award will be complete within 120 calendar days of solicitation close.

4.16 Questions about this CSO and CSO Topics

a. General SBIR Questions/Information

1. **AF Help Desk.** The AF SBIR/STTR Help Desk is prepared to address general questions about this CSO, the proposal preparation and electronic submission process, and other program-related areas. The Help Desk may be contacted from 9:00 a.m. to 5:00 p.m. ET Monday through Friday at 855-855-5360 or usaf.team@sbirstr.us.
2. **AF SBIR/STTR Special Topic Updates and Notices.** To receive notifications about AF Ventures and other AF innovation opportunities, please register at <https://af-ventures.com/> and <https://www.afwerx.af.mil/join.html>.

- b. **AFWERX Topic Online Q&A Webinars ('Ask me Anything'):** For information on these webinars, please visit <https://www.afwerx.af.mil/sbir.html>.

4.17 Identifying RDT&E in SBIR/STTR Proposals: The definitions and criteria below govern SBIR/STTR as Research, Development, Test, and Evaluation (RDT&E) programs. These definitions and criteria implement 15 U.S.C. 638, the Combined SBIR/STTR Policy Directive (2019), and DoD Financial Management Regulation (FMR), Vol. 2A, Chapter 1, Section 0102, *Funding Policies* (June 2004, as amended). Subject to programmatic phase conditions, SBIR/STTR awards are made for research, development, test and evaluation (RTD&E) efforts.

a. **Phase I and II Conditions:**

Consistent with 15 U.S.C. 638 and Combined SBIR/STTR Policy Directive (2019, both Phase I and Phase II awards are aimed at furthering “scientific and technical merit and feasibility” of ideas in the proposals. The object of Phase I is to conduct feasibility-related experimental or theoretical research/research and development related to agency’s described broad or narrow requirements, as to determine the scientific and technical merit and feasibility of the proposed effort and the quality of performance of the offeror. The object of Phase II is to continue the research/research and development effort from the completed Phase I (or from prior non-SBIR/STTR research in case of Direct to Phase II award). Phase II also includes a Special Phase II Testing and Evaluation authority.

b. **Scientific and Technical Feasibility Determination IAW 15 USC 638(cc):**

Direct to Phase II awards are conditioned upon the awarding agency’s determination that the offeror’s idea has sufficient scientific and technical feasibility and merit despite the lack of Phase I award.

c. **Treatment of Commercial Off-the-Shelf (COTS) and Non-Developmental Items (NDIs):**

COTS/NDIs: Items purchased directly from a commercial source that can be utilized without alteration through design and development, or without modification, are classified as COTS or NDI. This includes, for example, ready-to-use products, training services, and software licenses for ready-to-use software to satisfy service needs (including Software as a Service (SaaS)). Purchases of COTS and NDIs for use, including the first article and associated first article acceptance testing and related minor adjustments are not suitable for SBIR/STTR funding. The acquisition of commercial items or NDIs for testing and operational evaluation that do not require RDT&E engineering, design or integration effort will not be funded by SBIR/STTR funds. However, if an end item requires design and development in order to accept the COTS or NDI, funding for design and development effort could be funded by SBIR/STTR funds. If a COTS or NDI is required for RDT&E test purposes, the cost could be funded by SBIR/STTR funds.

Modified COTS/Modified NDIs: Commercially available items that must be modified to satisfy user requirements are classified as "modified COTS" or "modified NDI" articles. In this instance, the first article, modification of the first article, and first article testing could be funded by SBIR/STTR funds. Follow-on purchases will not be funded by SBIR/STTR funds. The number of “modified” first articles bought with SBIR/STTR funds will not exceed the quantity needed to conduct the RDT&E acceptance tests. Modification is technology refreshment that significantly changes the performance envelope of the end item. If the commercially available item is modified and requires testing prior to approval for service use or inventory it may be funded by SBIR/STTR funds, as all developmental items. In contrast to modification, continuous technology refreshment is the intentional, incremental insertion of newer technology to improve reliability, improve maintainability, reduce cost, and/or add minor performance enhancement, typically in conjunction with depot or field level maintenance. The insertion of such technology into end items as part of maintenance is not funded by SBIR/STTR funds.

d. **Technical Baseline:** As RDT&E programs, SBIR/STTR efforts are subject to scientific and technical literature searches in order to establish technical baseline, avoid duplication, and justify funding IAW AFI 61-201, *Management of Scientific and Technical Information (STINFO)* (29 January 2019) and AFRL/CA guidance, *Streamlined and Waivered SBIR/STTR Specified Requirements* (05 Aug 2019).

- f. **Special circumstances:** Offerors wishing to assert special circumstances or criteria meriting SBIR/STTR funds expenditure other than those provided above must address them in the proposal and provide appropriate statutory or regulatory justification.

4.18 Promotional Material: Promotional and non-project related proposal content is discouraged. Additional information provided via website or other communication medium, except where explicitly requested, will not be considered.

4.19 Fraud and False Statements: Knowingly and willfully making false, fictitious, or fraudulent statements or representations may be a felony under the Federal Criminal False Statement Act (18 USC Sec 1001), punishable by a fine of up to \$10,000, imprisonment up to five years, or both.

The DoD Office of Inspector General (IG) Hotline is an important avenue for reporting fraud, waste, abuse, and mismanagement within the DoD. The DoD IG operates this hotline to receive and investigate complaints or information from contractor employees, DoD civilians, military service members, and public citizens. Individuals who wish to report fraud, waste or abuse may contact the Hotline at (800) 424-9098 between 8:00 a.m. and 5:00 p.m. Eastern Time or visit <http://www.dodig.mil/Components/Administrative-Investigations/DoD-Hotline/Hotline-Complaint/>. Written correspondence should be addressed to the Defense Hotline, The Pentagon, Washington DC, 20301-1900. Email reporting is available at hotline@dodig.mil.

4.20 State and Other Assistance Available: Many states have established programs to provide services to small business firms wishing to participate in the Federal SBIR Program. These services vary from state to state, but may include:

- Information and technical assistance;
- Matching funds to SBIR award recipients;
- Assistance in obtaining Phase III funding.

Contact the state SBIR/STTR Support office at https://www.sbir.gov/state_services?state=105813# for further information.

4.21 Use of Support Contractors for the AF SBIR Program: Proposals may be handled for administrative purposes only by support contractors, including Oasis Systems, Riverside Research, Peerless Technologies, HPC-COM, Mile Two, Wright Brother Institute, and MacB (an Alion Company). In addition, only Government employees and technical personnel from Federally Funded Research and Development Centers (FFRDCs) MITRE and Aerospace Corporations working under contract to provide technical support to AF Life Cycle Management Center and Space and Missiles Centers may evaluate proposals. All support contractors are bound by appropriate non-disclosure agreements. Contact the AF SBIR/STTR Contracting Officer listed in Section 4.12 with concerns regarding the listed contractors.

4.22 Innovation in Manufacturing: Pursuant to EO 13329, high priority is accorded to proposals advancing innovation in U.S. small business manufacturing.

5.0 PHASE I PROPOSAL INSTRUCTIONS

5.1 Introduction: This CSO and the DoD SBIR/STTR Submission Web site are designed to reduce the time and cost required to prepare a formal proposal.

A complete proposal consists of:

- 0. Registration**
 - 0.1. DUNS Number
 - 0.2. Commercial or Government Entity (CAGE) Code
 - 0.3. Small Business Association ID
 - 0.4. SBA Small Business Concern (SBC) Control ID
- 1. Volume 1: Proposal Cover Sheet**
 - 1.1. CAGE, DUNS
 - 1.2. Certification Questions
 - 1.3. Business Information
 - 1.4. Proposal Information
 - 1.5. Contact Information
- 2. Volume 2: Technical Volume**
 - 2.1. Up to 5 Page White Paper
 - 2.1.1. Identification of Problem or Opportunity
 - 2.1.2. Phase I Technical Objectives
 - 2.1.3. Phase I Work Plan Outline (including sub-contractors)
 - 2.1.4. Related Work
 - 2.1.5. Relationship with Future R&D
 - 2.1.6. Commercialization Strategy
 - 2.1.7. Key Personnel (listed)
 - 2.1.8. Facilities/Equipment
- 3. Volume 3: Cost Volume**
 - 3.1. Direct Labor Costs
 - 3.2. Direct Material Costs
 - 3.3. Other Direct Costs
- 4. Volume 4: Company Commercialization Report (Not in use for 20.3.)**
- 5. Volume 5: Supporting Documents**
 - 5.1. 15 Page Slide Deck
 - 5.2. Coversheet Supplement
 - 5.3. Supplemental Cost Information
 - 5.4. Resumes of Key Personnel
 - 5.5. *Non-Proprietary* Work Plan
 - 5.6. Technical Data Assertions
 - 5.7. DoD Funding Agreement Certification (Signed)
- 6. Volume 6: Fraud, Waste and Abuse Training**

NOTE: Refer to Chart 1 for AFWERX topic submission requirements. Information for other topics may be found in the individual material. Proposals shall be submitted to the Defense SBIR/STTR Innovation Portal (DSIP). Once the firm begins a Proposal Cover Sheet they will be assigned a proposal number. **Please make note of this proposal number and print it for future reference.**

The proposer may add volumes or modify the Proposal Cover Sheet until the CSO closes. It is the proposing firm's responsibility to verify that the Technical Volume does not exceed the page limit after upload to DSIP by clicking on the "Verify Technical Volume" icon.

Signatures are not required on the electronic forms at the time of submission. If the proposal is selected for award, the AF Contracting Officer will contact the proposer for signatures at the time of award.

5.2 Marking Proprietary Proposal Information: Offerors including data in their proposals they do not want disclosed to the public, or used by the Government except for evaluation purposes, shall:

- (1) Mark the first page of each Volume of the proposal submission with the following legend:
"This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed-in whole or in part-for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of-or in connection with-the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in pages [insert numbers or other identification of sheets]"; and
- (2) Mark each sheet of data it wishes to restrict with the following legend: "Use or disclosure of data contained on this page is subject to the restriction on the first page of this volume."

The DoD assumes no liability for disclosure or use of unmarked data and may use or disclose such data for any purpose. Restrictive notices notwithstanding, proposals and final reports submitted through DSIP may be handled, for administrative purposes only, by support contractors. All support contractors are bound by appropriate non-disclosure agreements.

5.3 Phase I Proposal Instructions

Phase I should address the topic solution's feasibility. Also identify the scientific and technical baseline using relevant scientific and technical literature, and describe how the RDT&E effort advances this baseline. The period of performance shall be three (3) months, and the award shall not exceed \$50,000.

- a. **Proposal Cover Sheet (Volume 1):** Prepare the Proposal Cover Sheet in DSIP. The Cover Sheet must include a brief technical abstract of no more than 200 words describing 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 selected for award, the technical abstract and discussion of anticipated benefits may be publicly released on the Internet. Once the Cover Sheet is saved, the system will assign a proposal number. The cover sheet may be modified as often as necessary until the CSO closes.
- 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 Limitation: **The Technical Volume is limited to five (5) pages** (excluding the Table of Contents (on its own page), Cover Sheet Cost Volume Itemized Listing (a-j), and Company Commercialization Report). Only the Technical Volume and any enclosures or attachments count toward the 5-page limit. In the interest of equity, pages

in excess of the 5-page limitation **will not** be considered for review or award. (Example, if the technical volume is 5 pages and a 15 page technical volume is submitted, only the first 5 pages will be considered during proposal review). The documents required for upload into Volume 5 “Other” category do not count towards the 5-page limit.

- (3) Layout: Number all pages of your proposal consecutively (*no type 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. Most proposals will be printed in black and white so make sure all graphics are distinguishable in black and white. To verify your proposal has been received click on the “Check Upload” icon to view your proposal. Typically, the uploaded file will be virus checked and converted to a .pdf document within the hour. If your proposal does not appear after an hour, please contact the DoD SBIR/STTR Help Desk via email at DoDSBIRSupport@reisystems.com (9:00 am to 5:00 pm ET Monday through Friday). Confirm all digital signatures contained in your proposal, if applicable, are still present after upload.

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 Work Plan Outline (including Subcontractors’ Efforts):** Provide an explicit, detailed description of the Phase I approach. 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. At the beginning of your work plan outline section, include an outline of the work plan in the following format:
 - **Scope:** List the major requirements and specifications of the effort.
 - **Task Outline:** Provide a brief outline of the work to be accomplished over the span of the Phase I effort.
 - **Deliverables**
 - **Kickoff meeting** within 30 calendar days of contract start
 - **Progress report (Only 1 for AF Special Topics)**
 - **Final report** with SF 298 and DD Form 882

NOTE: A separate *Non-Proprietary* version of the Work Plan Outline should be included in Volume 5, Supporting Documents.

- (4) **Related Work.** Describe significant activities directly related to the proposed effort, including any conducted by the principal investigator, 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 R/R&D.**

- 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) **Commercialization Strategy.** Describe in one page or less the company's strategy for commercializing this technology in DoD, other Federal Agencies, and/or private sector markets. Provide specific information on the market need the technology will address and the size of the market. Also include a schedule showing the quantitative commercialization results from this SBIR/STTR project the company expects to achieve.

Clearly describe existing commercial (Government and non-Government) traction of the proposed solution (to be modified, adapted, validated or expanded during this SBIR/STTR effort), to include, where applicable, revenue, unit sales, user adoption, pre-sales, and investment. Broad adoption and commercial success are indicators of commercial potential and reduced technical risk.

The one-page Commercialization Strategy should be included in Volume 5, Supporting Documents, and is not included in the 5-page limit.

(7) **Key Personnel.** Identify in the Technical Volume all key personnel who will be involved in this project. The offeror shall address qualifications for conducting RDT&E in addition to qualifications for commercialization. Include information regarding directly related education, experience, and citizenship. A concise technical resume of the principal investigator, including a list of relevant publications, if any, must be included. Please do not include Privacy Act Information. Identify all U.S. permanent residents to be involved in the project as direct employees, subcontractors, or consultants. Full resumes of Key Personnel should be included in Volume 5, Supporting Documents, and do not count towards the 5-page limit.

(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. Information on Facilities/Equipment should be included in Volume 3, Cost Volume and Volume 5, Supporting Documents, and does not count towards the 5-page limit.

(9) **Subcontractors/Consultants.** 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 Guidance. A minimum of two-thirds of the research and/or analytical work in Phase I, as measured by direct and indirect costs, must be conducted by the proposing firm, unless otherwise approved in

writing by the Contracting Officer. SBIR/STTR efforts may include subcontracts with Federal Laboratories and/or Federally Funded Research and Development Centers (FFRDCs). A waiver is no longer required for the use of Federal laboratories and FFRDCs. However, proposers must certify their use of such facilities on the Cover Sheet of the proposal. Information on Subcontractor/Consultants should be included in Volume 3, Cost Volume and Volume 5, Supporting Documents, and does not count towards the 5-page limit.

- d. **Content of the Cost Volume (Volume 3):** Complete the Cost Volume in the format shown in the Cost Breakdown Guidance by using the online cost volume form on the DoD Submission Web site. Some items in the Cost Breakdown Guidance may not apply to the proposed project. If that is the case, there is no need to provide information on each and every item. What matters is that enough information be provided to understand how the company's plan to use the requested funds if selected. The Cost Volume must be adequate to enable AF personnel to determine the purpose, necessity and reasonability of each cost element. The cost volume will cover two months of technical effort (see Chart 1) and one month reporting. Provide sufficient detail (1-10 below) on how funds will be used if the contract is awarded. The on-line Cost Volume and Itemized Cost Volume Information will not count against the 5-page limit/15 slide limit. The itemized listing may be placed in the "Explanatory Material" section of the on-line Cost Volume (if enough room), or may be submitted in Volume 5, Supporting Documents, under the "Other" dropdown options. (Note: Only one file can be uploaded to the DoD Submission Site). Ensure this file includes the company's complete Technical Volume and the information below.
- (1) Direct Labor Costs: Identify key personnel by name if possible or by labor category if specific names are not available. The number of hours, labor overhead and/or fringe benefits and actual hourly rates for each individual are also necessary.
 - (2) Direct Material Costs: Justify cost for materials, parts, and supplies with an itemized list containing types, quantities, and price and where appropriate, purpose. If proposing direct material costs, justification information (to include vendor quotes, historical costs, etc.) can be included as "Supplemental Cost Information" in Volume 5, Other Supporting Documents.
 - (3) Other Direct Costs: This category of costs includes specialized services such as machining or milling, special testing or analysis, cost incurred in obtaining temporary use of specialized equipment. Proposals, which include leased hardware, must provide an adequate lease vs. purchase justification or rationale. If proposing other direct costs, additional information can be included as "Supplemental Cost Information" in Volume 5, Other Supporting Documents.
 - a) Travel: Include travel costs in "Other Direct Costs." Travel costs must relate to the needs of the project. Break out travel cost by trip, with the number of travelers, airfare, per diem, lodging, etc. The number of trips required, as well as the destination and purpose of each trip should be reflected. Recommend budgeting at least one (1) trip to the Air Force location managing the contract. For the special topic, greater travel expectations will be required as noted topic statements and corresponding SBIR/STTR Interactive Topic Information System (SITIS) Q&A. Estimation of travel costs need not be an overly onerous exercise, and your actual travel cost may differ from your proposed travel; however, this information allows the Contracting Officer to ensure the costs of travel are not excessive.

- b) Subcontracts: Include subcontract/consultant costs in “Other Direct Costs.” Involvement of university or other consultants in the planning and/or research stages of the project may be appropriate. If the offeror intends such involvement, describe in detail and include information in the Cost Volume. The proposed total of all consultant fees, facility leases or usage fees, and other subcontract or purchase agreements may not exceed one-third of the total contract price or cost, unless otherwise approved in writing by the Contracting Officer. Support subcontract costs with copies of the subcontract agreements. The supporting agreement documents must adequately describe the work to be performed. At a minimum, an offeror must include a Statement of Work (SOW) with a corresponding detailed Cost Volume for each planned subcontract.
 - c) Consultants: Provide a separate agreement letter for each consultant. The letter should briefly state what service or assistance will be provided, the number of hours required and hourly rate.
- (4) Special Tooling and Test Equipment and Material: The inclusion of equipment and materials will be carefully reviewed relative to need and appropriateness of 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 relate directly to the specific effort. They 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 the AF, unless it is determined that transfer of title to the contractor would be more cost effective than recovery of the equipment by the Government.

NOTE: If no exceptions are taken to an offeror’s proposal, the Government may award a contract with only clarifications. Therefore, the offeror’s initial proposal should contain the offeror’s best terms from a cost or price and technical standpoint. If there are questions regarding the award document, contact the Phase I Contracting Officer listed on the selection notification.

- e. DD Form 2345: For export-controlled efforts (either International Traffic in Arms (ITAR) or Export Administration Regulations (EAR)), a copy of the certified DD Form 2345, Militarily Critical Technical Data Agreement, or evidence of application submission must be included. Approval of the DD Form 2345 will be verified if proposal is chosen for award. If applicable, the DD Form 2345 should be included in Volume 5, Supporting Documents, and does not count towards page limit.
- f. The AF does not participate in the Discretionary Technical and Business Program. Contractors should not submit proposals that include Discretionary Technical and Business Assistance.
- g. Supporting Documents (Volume 5) is provided for small businesses to submit additional documentation to support the Technical Volume (Volume 2) which is limited to five (5) pages, and the Cost Volume (Volume 3). NOTE: The online application may only allow for a single document to be uploaded to the “Supporting Documents” Volume; therefore, the documents may need to be combined into a single PDF file before uploading to the application form. (NOTE – when combining PDF documents, ensure digital signatures are not stripped.)

Additional documents acceptable for inclusion in Volume 5 are:

- (1) **15 Slide Deck:** Describes the overall proposal, including technical information, team’s ability to perform the research, and the commercialization potential of the proposed solution.
- (2) **Coversheet Supplement:** This document, intended to provide extra information, may be needed and should include the following information:

- a. **Certification/Eligibility Check:** The online coversheet asks many questions and, depending on the answers, more information may be needed. The list of the questions is reflected below along with any additional information needed.
- 1) Do you allow for the release of contact information to Economic Development Organizations?
 - i. Either answer is awardable
 - 2) Are you a small business as described in section 3.15 of this CSO, with no more than 500 employees including affiliates?
 - i. If your firm is NOT an eligible small business, your proposal will be disqualified.
 - 3) Does your business concern meet the ownership and control requirements in 13 CFR 121.702?
 - i. If your firm does NOT meet the ownership and control requirements, your proposal will be disqualified.
 - 4) Is 50% or more of your firm owned or managed by a corporate entity?
 - i. If YES, and the corporate entity is also a small business as described in section 3.15 of this CSO, please include in this section a description of your corporate relationship, including any other affiliates of the owning corporate entity.
 - ii. If your firm is 50% or more owned or managed by a corporate entity that is not a small business, your proposal will be disqualified.
 - 5) At a minimum, will two-thirds of the research and/or analytical work in Phase I be carried out by your small business as described in section 4.2 of this CSO?
 - i. If your firm will NOT perform at least 2/3 of the research and/or analytical work, your proposal will be disqualified.
 - 6) Is primary employment of the principal investigator with your firm as described in section 4.2 of this CSO?
 - i. If primary employment of the Principal Investigator for this project is NOT with your firm, your proposal will be disqualified.
 - 7) Has your firm been convicted of a fraud-related crime involving SBIR and/or STTR funds or found civilly liable for a fraud-related violation involving Federal funds?
 - i. If your firm has been convicted of a fraud-related crime involved SBIR and/or STTR funds, your proposal will be disqualified.
 - 8) Has your firm's Principal Investigator (PI) or Corporate Official (CO), or owner been convicted of a fraud-related crime involving SBIR and/or STTR funds or found civilly liable for a fraud-related violation involving Federal funds?
 - i. If your Principal Investigator or Corporate Official has been convicted of a fraud-related crime involved SBIR and/or STTR funds, your proposal will be disqualified.
 - 9) Has your firm met the performance benchmarks in section 3.1 of this CSO and listed by the SBA on their website as eligible to participate?
 - i. Either answer is awardable.
 - 10) Is your firm registered in the SBA's venture capital database as majority-owned by venture capital operating companies, hedge funds, or private equity firms?
 - i. If YES, please state whether the VCOC, hedge fund, or private equity firm is also a small business as defined by the SBA. If so, then the VCOC, hedge fund, or private equity firm may count as an 'affiliate' and their employee numbers will need to be added to your

- employee total.
- ii. If your firm is majority-owned by venture capital operating companies, hedge funds, or private equity firms, your proposal will be disqualified.
- 11) Is your firm more than 50% owned by a single Venture Capital Owned Company (VCOC), hedge fund, or private equity firm?
- i. If YES, please state whether the VCOC, hedge fund, or private equity firm is also a small business as defined by the SBA. If so, then the VCOC, hedge fund, or private equity firm may count as an ‘affiliate’ and their employee numbers will need to be added to your employee total.
 - ii. If your firm is more than 50% owned by a single venture capital operating company, hedge fund, or private equity firm, your proposal will be disqualified.
- 12) Is your firm more than 50% owned by multiple business concerns that are VCOCs, hedge funds, or private equity firms?
- i. If YES, please state whether the VCOC, hedge fund, or private equity firm is also a small business as defined by the SBA. If so, then the VCOC, hedge fund, or private equity firm may count as an ‘affiliate’ and their employee numbers will need to be added to your employee total.
 - ii. If your firm is more than 50% owned by multiple venture capital operating companies, hedge funds, or private equity firms, your proposal will be disqualified.

NOTE: If questions 10, 11, or 12 are answered ‘YES’, then explain the ownership structure of your firm and that of your investors. If the VCs, hedge funds or PE firms that own equity in your company are themselves small businesses as defined by the SBA, you may be still eligible for award.

More information can be found here: <https://www.sba.gov/document/support--affiliation-guide-size-standards>

- 13) Number of employees including all affiliates (average for preceding 12 months):
- i. If your firm and affiliates have employed, on average over the last 12 months, more than 500 employees, your proposal will be disqualified.
- 14) Is your firm affiliated as set forth in 13 CFR 121.103?
- i. If yes, then please describe your affiliations as described here: <https://www.sba.gov/document/support--affiliation-guide-size-standards>
 - ii. Note that this may include investors (VCs, hedge funds or PE firms) and their other controlled entities, if they own a controlling share of the company.

NOTE: A business that is wholly owned or substantially owned by investment companies or development companies that are licensed or qualified under the Small Business Investment Act of 1958 (SBIA), are not considered affiliates of those investment companies or development companies.

- 15) As defined by SBA:
- i. Are you a socially or economically disadvantaged small business? -

- Either answer is awardable.
- ii. Are you a Woman-Owned small business (WOSB)? - Either answer is awardable.
 - iii. Are you a certified HUBZone small business concern? - Either answer is awardable.
 - iv. Are you a Service-Disabled Veteran-Owned small business (SDVOSB)? - Either answer is awardable.
- 16) Has the Defense Contracting Audit Agency (DCAA) or other agreed upon agency, performed a review of your accounts or records in connection with government contracts or subcontracts within the past 12 months?
- i. Either answer is awardable.
- 17) Does the proposed cost include Technical and Business Assistance (TABAs)?
- i. The Air Force does not allow for TABAs; therefore if you are applying for TABAs, your proposal may be disqualified.
- 18) Has a proposal for essentially equivalent work (Section 3.3 of this CSO) been submitted to other US government agencies or DOD components?
- i. If the answer to this question is yes, you must include the requested information in the Coversheet Supplement.
- 19) Has a contract been awarded for any of the proposals listed above?
- i. If your firm has been awarded a contract from the US Government for essentially equivalent work, your proposal will be disqualified.
- 20) Are you submitting assertions in accordance with DFARS 252.227-7017 "Identification and assertions use, release, or disclosure restriction"?
- i. If you answered 'yes' to this question, you must include the table in Volume 5 of your proposal, which can be found at: https://www.jhuapl.edu/vendorforms/forms/data_rights_assertion_table.pdf If you are claiming data rights assertions, but do not send a Data Rights Assertions Table, then your proposal will be disqualified.
- 21) Are you proposing research that utilizes human/animal subjects or recombinant DNA as described in section 3.11, 3.12, and 3.13 of the solicitation?
- If your firm does intend to perform research involving 1) human subjects, 2) animal subjects, or 3) recombinant DNA molecules, please include the following information (add attachments as needed):
- i. For 1) please provide a current Federal Assurance of Compliance with
 - ii. Federal regulation for human subject protection and evidence of completed appropriate training in human subject protection for all involved personnel from your firm;
 - iii. for 2) documentation verifying review and approval for the research from the Institutional Animal Care and Use Committee;
 - iv. and for 3) evidence of approval by the Institutional Biosafety Committee.
 - v. If the required documentation is not included in the proposal, the proposal will be disqualified.
- 22) Are teaming partners or subcontractors proposed?
- i. If yes, be sure to include this information in the proposal Coversheet (Volume 1), Cost Volume (Volume 3) and Supplemental Cost Information (Volume 5).
- 23) Are you proposing to use foreign nationals as defined in section 3.5 of the solicitation for work under the proposed effort?

- i. For these individuals, please provide the country(ies) of origin, work permit(s)/visa(s) held, and the specific tasks with the Work Plan to be assigned to each individual.
 - ii. If the cognizant Government Program Manager does not concur with the individuals' involvement or the information is not received by the specified date/time, your proposal will be disqualified.
- 24) What percentage of the principal investigator's total time will be on the project?
- i. Any non-zero answer is awardable.
 - ii. If the answer is below 25%, please describe the principal investigator's other roles.
- 25) Is the principal investigator a woman?
- i. Either answer is awardable. This information is required for the SBA's Award Information Database.
- 26) Is the principal investigator socially/ economically disadvantaged?
- i. Either answer is awardable. This information is required for the SBA's Award Information Database.

b. **Prior, Current, or Pending Support of Similar Proposals or Awards:** If a proposal submitted in response to this CSO is substantially the same as another proposal that was funded, is now being funded, or is pending with another Federal Agency, or another or the same DoD Component, you must reveal this on the Proposal Cover Sheet (Volume 1) and provide the following information in the Coversheet Supplement:

Name of Federal Agency to which the Proposal was submitted, or from which an award is expected or has been received	Date of Proposal Submission or date of award	Title of Proposal (if SBIR/STTR, include Proposal Number and SBIR/STTR topic number)	Name and Title of Principal Investigator for each proposal submitted or award received	Was awarded? If so, include contract number.
(LIST)	(LIST)	(LIST)	(LIST)	(LIST)

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

The identification of similar proposals or awards is particularly important for the special topics, as they are broader in nature than many of the traditional SBIR/STTR topics. **Failure to disclose similar proposals or awards will result in your proposal being disqualified.** Additionally, re-using parts or whole proposals from previously awarded proposals will likely result in your proposal being deemed essentially equivalent.

c. **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. Offerors frequently assume that individuals with dual citizenship or a work permit will be permitted to work on a SBIR/STTR project and do not report

them. This is not necessarily the case and a proposal will be rejected if the requested information is not provided. Therefore, firms should report any and all individuals expected to be involved on this project that are considered a foreign national as defined in Section 3.5 of the CSO. You may be asked to provide additional information during negotiations in order to verify the foreign citizen's eligibility to participate on a SBIR/STTR contract. 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)). Proposals including the involvement of foreign nationals should include this table:

Full Name	Foreign National (Yes or No)	Country of Origin	Type of Visa or Work Permit	Description of Involvement (specific task(s) in the work plan)
(LIST)	(LIST)	(LIST)	(LIST)	(LIST)

3) **Supplemental Cost Information:** This document will be used for you to explain any additional information surrounding the cost information you submitted in the Cost Volume (Volume 3) in the online form. The Supplemental Cost Information detail must be adequate to enable Air Force personnel to determine the purpose, necessity and reasonability of each cost element provided in the Cost Volume. Information in this section should include the following where applicable:

- a. **Direct Labor:** For any notable instances (i.e. a significant number of hours, very high hourly wages or significant labor overhead/fringe rates), please justify them in this section. A helpful resource for telling if a wage is very high is <https://www.bls.gov/bls/blswage.htm>.
- b. **Direct Material Costs:** Justify costs for materials, parts, and supplies with an itemized list containing types, quantities, and price and where appropriate, purposes. For the materials included in the cost volume, please provide the basis for the listed costs. This can be historical information, vendor quotes, catalogs, etc.
- c. **Travel Costs (included in Other Direct Costs):** If travel was proposed (as an Other Direct Cost), justify those expenses here. Cost for travel funds must be justified and related to the needs of the project. For the travel costs included in the proposal provide the number of trips, travelers per trip, specific locations and purpose of each trip. Also include, to the extent practicable, the basis for the proposed flight, lodging, per diem (meals), and ground transportation costs. A useful resource for this section is <https://www.gsa.gov/travel/plan-book/per-diem-rates>.
- d. **Special Tooling and Test Equipment and Material:** While special tooling and test equipment and material cost may be included under Phase I, 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 Component Contracting Officer, be advantageous to the Government and should be related directly to the specific topic. These may include such items as innovative instrumentation or automatic test equipment. Title to property furnished by the Government or acquired with Government funds will be vested with the DoD Component,

unless it is determined that transfer of title to the contractor would be more cost effective than recovery of the equipment by the DoD Component.

- e. **Copies of Subcontract Agreements:** Involvement of university or other consultants in the planning and/or research stages of the project may be appropriate. If the offeror intends such involvement, describe in detail and include information in the Cost Volume. The proposed total of all consultant fees, facility leases or usage fees, and other subcontract or purchase agreements may not exceed one-third of the total contract price or cost, unless otherwise approved in writing by the Contracting Officer. Support subcontract costs with copies of the subcontract agreements. The supporting agreement documents must adequately describe the work to be performed. **At a minimum, an offeror must include a Statement of Work (SOW) with a corresponding detailed Cost Volume for each planned subcontract.**
- f. **Copies of Consultant Agreements:** Provide a separate agreement letter for each consultant. The letter should briefly state what service or assistance will be provided, the number of hours required and hourly rate.

Some proposing firms choose to work with subcontractors or consultants that help proposing firms determine the feasibility of their solutions for a specific DoD customer through customer discovery assistance. **If the proposing firm is working with a customer discovery firm like this for any Special Topic, the associated agreement, is required to be included with the proposal.**

- g. **Cost Match/Share:** Cost match/share is NOT permitted for Phase I proposals under this CSO.

NOTE: When a proposal is selected for award, be prepared to submit further documentation to the Component Contracting Officer to substantiate costs, e.g., an explanation of cost estimates for equipment, materials, and consultants or subcontractors.

- 4) **Resumes of Key Personnel:** Identify in the Technical Volume all key personnel, including and especially the Principal Investigator, who will be involved in this project; include information on directly related education, experience, and citizenship. A technical resume of the principal investigator, including a list of publications, if any, must be part of that information.
- 5) **Non-Proprietary Work Plan Outline:** Your Phase I contract will include a non-proprietary version of your work plan outline. Please include a separate, non-proprietary version of your work plan in this section, free of any proprietary markings. This should be attached as a stand-alone document so that it can be easily attached to the final contract. The AF uses the *Non-Proprietary* Work Plan Outline as the initial draft of the Phase I Statement of Work (SOW); therefore, do not include Proprietary information in the *Non-Proprietary* Work Plan Outline. To do so will necessitate a request for revision and may delay contract award.
- 6) **Technical Data Rights (Assertions):** Rights in technical data, including software, developed under the terms of any contract resulting from proposals submitted in response to this CSO generally remain with the contractor, except that the Government obtains a royalty-free license to use such technical data only for Government purposes during the period commencing with contract award and ending

20 years later. This data should be marked with the restrictive legend specified in DFARS 252.227-7018. Upon expiration of the 20 year restrictive license, the Government has Government Purpose Rights in the SBIR data. During the license period, the Government may not release or disclose SBIR data to any person other than its support services contractors except: (1) For evaluation purposes; (2) As expressly permitted by the contractor; or (3) A use, release, or disclosure that is necessary for emergency repair or overhaul of items operated by the Government. See DFARS clause 252.227-7018, "Rights in Noncommercial Technical Data and Computer Software – Small Business Innovation Research (SBIR) Program."

a. If you answered 'yes' to question 20 in the Certification/Eligibility Check, you must include the following table in your proposal, which can be found at:

https://www.jhuapl.edu/vendorforms/forms/data_rights_assertion_table.pdf

b. If a proposer plans to submit assertions in accordance with DFARS 252.227-7017, those assertions must be identified and assertion of use, release, or disclosure restriction MUST be included with your proposal submission. The contract cannot be awarded until assertions have been approved.

- 7) **DoD Funding Agreement Certification (Signed):** The Air Force Special Topics require that a Funding Agreement Certification be completed and signed at time of proposal submission and included in Volume 5. This certification can be found at: <https://www.afsbirsttr.af.mil/Program/Phase-I-and-II/> under "Phase I and II Certification – Funding Agreement."
- 8) Additional documents that are acceptable and may be included in Volume 5 for Phase Is are:
1. Letters of Support.
 2. Lifecycle Certification (see example at <https://www.afsbirsttr.af.mil/Portals/60/Pages/Phase%20I-II/SBIR-STTR-Phase-I-II-Life%20Cycle%20Certifications.pdf>)
 3. Allocation of Rights (see example at <https://www.afsbirsttr.af.mil/Portals/60/Pages/Phase%20I-II/Model%20agreement%20for%20the%20allocation%20of%20rights.pdf>)
 4. ITAR/EAR Certification: For proposals whose solutions fall under export-controlled regulations (either International Traffic in Arms (ITAR) or Export Administration Regulations (EAR)), a copy of the certified DD Form 2345, Militarily Critical Technical Data Agreement, or evidence of application submission must be included. The form, instructions, and FAQs may be found at the United States/Canada Joint Certification Program website, <http://www.dla.mil/HQ/InformationOperations/Offers/Products/LogisticsApplications/JCP/DD2345Instructions.aspx>. Approval of the DD Form 2345 will be verified if proposal is chosen for award.
 5. Other

h. Fraud, Waste and Abuse Training (Volume 6)

Please note that the Fraud, Waste and Abuse Training must be completed prior to proposal submission. This training must be completed for each proposal you submit. The SBIR/STTR Program training related to Fraud, Waste and Abuse is available at: <https://www.dodsbirsttr.mil/submissions/>. Once completed, print out the last slide and add the following elements to the final slide:

1. "The undersigned has fully and completely reviewed this training on behalf of the proposer/awardee, understands the information presented, and has the authority to make this certification on behalf of the proposer/awardee. The undersigned understands providing false or misleading information during any part of the proposal, award, or performance phase of a SBIR or STTR contract or grant may result in criminal, civil or administrative sanctions, including but

not limited to: fines, restitution, and/or imprisonment under 18 USC 1001; treble damages and civil penalties under the False Claims Act, 31 USC 3729 et seq.; double damages and civil penalties under the Program Fraud Civil Remedies Act, 31 USC 3801 et seq.; civil recovery of award funds; suspension and/or debarment from all Federal procurement and non-procurement transactions, FAR Part 9.4 or 2 CFR Part 180; and other administrative remedies including termination of active SBIR/STTR awards.”

2. Name of Firm
3. Proposal Number
4. Name of Signatory
5. Position of Signatory
6. Date of Signing
7. Signature

Once this has been completed, upload the modified final slide to Volume 6 on DSIP. When the training has been completed and certified, the DoD Submission Website will indicate this in the proposal which will complete the Volume 6 requirement. If the training has not been completed, you will receive an error message. Your proposal cannot be submitted until this training has been completed. Your complete proposal **must** be submitted via the submissions site on or before the **12:00 pm ET, 23 October 2020 deadline**. A hardcopy **will not** be accepted.

5.4 Phase I Proposal Checklist

The Offeror’s proposal shall be in accordance with Section 5.0. It is mandatory that the complete proposal submission consist of:

0. Registration
 - 0.1. DUNS Number
 - 0.2. Commercial or Government Entity (CAGE) Code
 - 0.3. Small Business Association ID
 - 0.4. SBA Small Business Concern Control ID
1. Volume 1: Proposal Cover Sheet
 - 1.1. Basic Information (CAGE, DUNS)
 - 1.2. Certification Questions
 - 1.3. Business Information
 - 1.4. Proposal Information
 - 1.5. Contact Information
2. Volume 2: Technical Volume
 - 2.1 Up to 5 Page White Paper
 - 2.1.1. Identification of Problem or Opportunity
 - 2.1.2. Phase I Technical Objectives
 - 2.1.3. Phase I Work Plan Outline (including sub-contractors)
 - 2.1.4. Related Work
 - 2.1.5. Relationship with Future R&D
 - 2.1.6. Commercialization Strategy
 - 2.1.7. Key Personnel (listed)
 - 2.1.8. Facilities/Equipment
3. Volume 3: Cost Volume
 - 3.1. Direct Labor Costs
 - 3.2. Direct Material Costs
 - 3.3. Other Direct Costs
4. Volume 4: Company Commercialization Report
5. Volume 5: Supporting Documents
 - 5.1. 15 Page Slide Deck

- 5.2. Coversheet Supplement
- 5.3. Supplemental Cost Information
- 5.4. Resumes of Key Personnel
- 5.5. Non-Proprietary Work Plan
- 5.6. Technical Data Assertions
- 5.7. DoD Funding Agreement Certification (Signed)
6. Volume 6: Fraud, Waste and Abuse Training

Those responding to this CSO should note the proposal preparation tips listed below:

- a. Read and follow all instructions contained in this CSO.
- b. Register the firm on the secure, password-protected DSIP and, as instructed on the Web site, prepare the firm's submission. The Air Force will accept only those proposals submitted electronically via DSIP.
- c. Register in the System for Award Management (SAM), <https://www.sam.gov/>. If you are not registered in SAM, you will not be eligible for award. Additionally, verify that you are registered to receive contracts (not just grants) and that your address matches between your proposal and SAM. ***Begin this process early, as it can sometimes take more than 30 days to be issued.***
- d. Register the firm with SBA's Company Registry at www.sbir.gov and provide the SBA SBC Identification Number on each proposal Cover Sheet submitted in response to this CSO.
- e. Check that the cost adheres to paragraph 5.3 d of this CSO and the cost on the Cover Sheets matches the cost in the Cost Volume.
- f. Check that the Project Abstract and other content provided on the Cover Sheets contain NO proprietary information.
- g. Mark proprietary information within the Technical Volume as instructed in Section 5.3.
- h. The content in the Technical Volume includes the items in Section 5.3.c.
- i. That the header on each page of the technical volume should contain the company name, topic number, and proposal number. (The header may be included in the one-inch margins.)
- j. The Company Commercialization Report is submitted online in accordance with Section 5.4.e. This report is required even if the firm has not received prior SBIR/STTR funding.
- k. Limit the Technical Volume to five (5) pages.

The AF recommends you complete your submission early, as computer traffic gets heavy near the announcement closing and could slow down the system. **Do not wait until the last minute.** The AF will not be responsible for proposals being denied due to servers being "down" or inaccessible. Please assure the email address listed in the proposal is current and accurate. The AF is not responsible for ensuring notifications are received by firms changing mailing address/e-mail address/company points of contact after proposal submission without proper notification to the AF. Changes of this nature that occur after proposal submission or award (if selected) for Phase I and II shall be sent to usaf.team@afsbirsttr.us.

6.0 PHASE I REVIEW CRITERIA

All Phase I and II proposals will be evaluated and judged on a competitive basis. Proposals will be initially screened to determine responsiveness. Proposals passing this initial screening will be peer reviewed by engineers or scientists to determine the most promising technical and scientific approaches. Each proposal will be judged on its own merit. AF is under no obligation to fund any proposal or any specific number of proposals under this topic. It also may elect to fund several or none of the topic's proposed approaches.

Proposals will be peer reviewed based on the criteria below. Selections will represent best value to the Government considering the following factors listed in descending order of importance:

1. The potential for Government or private sector commercialization application and benefits expected to accrue from commercialization. The SBC's record of commercializing SBIR or other research and Phase II follow-on commitments for the subject research are evidence of commercialization potential.
2. The appropriateness, relevance, and specificity of an identified Defense Need. Adequacy of the proposed effort and its relationship to fulfilling the identified Defense Need.
3. The soundness, technical merit, and innovation of the proposed approach and its incremental progress toward fulfilling the identified Defense need. Includes the proposed Principal Investigators/Project Managers, supporting staff, and consultant qualifications to execute the proposed approach.

Price reasonableness and realism be considered to the extent appropriate.

Peer reviewers will base their conclusions only on information contained in the proposals. It cannot be assumed reviewers are acquainted with the firm or key individuals or any referenced experiments.

IAW 15 USC 638(dd)(7), investment by venture capital, private equity firms, or hedge funds shall not be used as an award criterion.

Other Factors Considered During the Selection Process:

- Possible duplication with other R/R&D;
- Potential integration with other Air Force or DoD Programs;
- Phase III potential;
- Funding limitations;
- Innovativeness;
- USAF SBIR program balance;
- Applicant small business size/status pursuant to 13 CFR 121.701-705; demonstrations of eligibility through registrations pursuant to FAR Subpart 4.11 and 4.18; and applicant responsibility pursuant to FAR Part 9;
- National security concerns.

The effort's cost to the Government may be considered to determine the successful offeror when more than one proposal is found to be essentially equal in merit.

7.0 PHASE II PROPOSAL

This section is for informational purposes for Phase I awardees. A more specific Request for Proposal will be provided to all Phase I awardees as described in Section 7.1. The AF reserves the right to modify Phase II submission requirements. Should requirements change, all Phase I awardees will be notified. The AF also reserves the right to change administrative procedures to improve AF SBIR Program management.

7.1 Introduction: Phase II is the demonstration of the technology that was found feasible in Phase I. Only Phase I awardees are eligible to submit a Phase II proposal (exception is a Direct to Phase II Proposal, see Volume 9.0 for instructions). All Phase I awardees will be sent a notification with the Phase II proposal submittal date and detailed proposal preparation instructions.

7.2 Proposal Provisions: IMPORTANT -- While it is permissible, with proper notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work for consideration under numerous Federal program solicitations, it is unlawful to enter into contracts or grants requiring essentially equivalent effort. If there is any question concerning this, it must be disclosed to the soliciting agency as early as possible. If a proposal submitted for a Phase II effort is substantially the same as a previously funded proposal, is now being funded, or is pending award with another Federal Agency, DoD Component, or AF organization, it must be noted on the Cover Sheet and required information included in Section 5.4.c(11).

Due to agency specific limitations on funding and number of awards made to a particular firm per topic using SBIR/STTR funds, Head of Agency determinations are now required before another agency may make an award under that topic. This limitation does not apply to Phase III funding. Please contact the original sponsoring agency before submitting a Phase II proposal to an agency other than the original topic sponsor.

Section 4(b)(1)(i) of the SBIR and the STTR Policy Directives states, at the agency's discretion, projects awarded a Phase I under a SBIR solicitation may transition to STTR in Phase II and vice versa. A firm wishing to transfer from one to the other must contact the designated technical monitor to discuss the basis and the agency's ability to support it. The transition may be proposed prior to award or during Phase II performance. Agency disapproval of a change request shall not be grounds for granting relief from contractual performance requirements. All approved transitions requiring a research institution's removal and revision to work percentages must be noted in the Phase II award or modification signed by the Contracting Officer.

7.3 How to Submit: Phase I awardees will be notified when the Phase II submission period opens. Each Phase II proposal must be submitted through the DoD SBIR/STTR Submission Website, <https://www.dodsbirsttr.mil/>. Please ensure the proposal is submitted to the correct Command under the correct topic number. Each proposal submission must contain a Proposal Cover Sheet, Technical Volume, Cost Volume, Supporting Documents and Fraud, Waste and Abuse Training. The preferred format for proposal submission is Portable Document Format (.pdf). Graphics must be distinguishable in black and white. Please virus-check all submissions.

NOTE: The Government is not obligated to make any Phase II awards nor is it responsible for offeror expenditures prior to award. All awards are subject to successful negotiations and funds availability.

7.4 Commercialization Strategy: At a minimum, the commercialization strategy must address the following questions:

- (1) What is the first product into which the technology will be incorporated?
- (2) Who are the customers and what is the estimated market size? How much money is needed to bring the technology to market? How will the funding be raised?
- (3) Does the company possess marketing expertise? If not, how will it be obtained?
- (4) What companies are the proposing firm's competitors, and what is the firm's price and/or quality advantage over them?

The commercialization strategy must also include a schedule showing the anticipated quantitative commercialization results from the Phase II project one year after performance starts, at performance completion, and after performance completion, e.g., 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 (see Section 5.3.e) at least annually.

8.0 PHASE II REVIEW CRITERIA

All Phase I and II proposals will be evaluated and judged on a competitive basis. Proposals will be initially screened to determine responsiveness. Proposals passing this initial screening will be peer reviewed by engineers or scientists to determine the most promising technical and scientific approaches. Each proposal will be judged on its own merit. AF is under no obligation to fund any proposal or any specific number of proposals under this topic. It also may elect to fund several or none of the proposed approaches.

Proposals will be peer reviewed based on the criteria below. Selections will represent best value to the Government considering the following factors of equal importance:

- a. The potential for commercial (Government or private sector) application and benefits expected to accrue from commercialization. The SBC's record of commercializing SBIR or other research, the existence of Phase II follow-on commitments for the subject research, matching funding, and whether from Government or private sources, are evidence of commercialization potential. Additionally, a sound transition strategy in Section 9 of the Air Force Customer Memorandum is evidence of commercialization potential.
- b. The appropriateness, relevance, and specificity of an identified Defense Need. A complete, signed, and cogent Air Force Customer Memorandum is an indicator of the appropriateness, relevance, and specificity of an identified Defense Need. Adequacy of the proposed effort and its relationship to fulfilling the identified Defense Need.
- c. The soundness, technical merit, and innovation of the proposed approach and its incremental progress toward fulfilling the identified Defense need and the qualifications of the proposed Principal Investigators/Project Managers, supporting staff, and consultants to execute against the proposed approach

Price reasonableness and realism will be considered to the extent appropriate. Peer reviewers will base their conclusions only on information contained in the proposals. It cannot be assumed reviewers are acquainted with the firm or key individuals or any referenced experiments.

IAW 15 USC 638(dd)(7), investment by venture capital, private equity firms, or hedge funds shall not be used as an award criterion.

Other Factors Considered During the Selection Process:

- Possible duplication with other R/R&D;
- Potential integration with other Air Force or DoD Programs;
- Phase III potential;
- Funding limitations;
- Innovativeness;
- USAF SBIR program balance;
- Applicant small business size/status pursuant to 13 CFR 121.701-705; demonstrations of eligibility through registrations pursuant to FAR Subpart 4.11 and 4.18; and applicant responsibility pursuant to FAR Part 9;
- National security concerns.

The effort's cost to the Government may be considered to determine the successful offeror when more than one proposal is found to be essentially equal in merit.

9.0 DIRECT TO PHASE II PROPOSAL INSTRUCTIONS

All information in this section applies to Topic AF203-DCSO1. Other Direct to Phase II topics provide guidance regarding the specific portions of this section to follow.

9.1 Introduction: 15 U.S.C. §638(cc), as amended by NDAA FY12, Sec. 5106, and further amended by NDAA FY19, Sec. 854, PILOT TO ALLOW PHASE FLEXIBILITY, allows the AF to make SBIR Phase II awards to small business concerns without regard to whether the small business concerns were provided awards under Phase I of the program for the same proposed project. The Air Force is implementing a Direct to Phase II CSO opportunity under this authority. This does not guarantee future Direct to Phase II opportunities will be offered. Proposals submitted under this CSO must include documentation to determine Phase I feasibility has been met.

9.2 Proposal Provisions: Offerors must provide documentation satisfying the Phase I feasibility requirement* as an appendix to the Phase II proposal. Offerors must demonstrate completion of research and development through means other than the SBIR/STTR Programs solely to establish the feasibility of the Phase II proposal based on the criteria outlined in the topic description. Phase II proposals require a comprehensive, detailed effort description. Proposals should demonstrate sufficient Phase I technical progress or problem-solving results to warrant more extensive R/R&D. Developing technologies with commercial and military potential is extremely important. Particularly, AF is seeking proposals emphasizing technologies' dual-use applications and commercial exploitation.

* NOTE: The offeror shall provide information to enable the agency to make the 15 U.S.C. 638(cc) determination of scientific and technical feasibility and merit. Offerors are required to provide information demonstrating scientific and technical merit and feasibility has been established. The AF will not review the Phase II proposals if it is determined the offeror 1) fails to demonstrate technical merit and feasibility are established or 2) the feasibility documentation does not support substantial performance by the offeror and/or the principal investigator (PI). Refer to the Phase I description (within the topic) to review the minimum requirements needed to be demonstrated in the feasibility documentation. **Feasibility documentation MUST NOT be solely based on work performed under prior or ongoing Federally funded SBIR or STTR work.**

9.3 Direct to Phase II Open Topic: The Direct to Phase II contract period of performance is up to 15 months, including 12 months for technical performance and three months for reporting. The award value will not exceed \$750,000 in SBIR funds. Companies with solutions requiring further prototyping and demonstration prior to a SBIR Phase III award may apply. Awards will provide additional funds to conduct further R/R&D effort on non-defense commercial solutions to meet a specific Air Force end-user and customer need. These Phase II awards are intended to provide a path to commercialization, not the final step for the proposed solution. Matching funds from non-SBIR Federal and non-Federal sources are not mandatory. Cost-sharing is also not required. However, cost share or match serves as evidence of commercial potential in accordance with 15 USC 638(e)(4)(B)(ii).

For Governmental cost match, funds must be received by AFRL/SBRF within 30 days of CSO closing. For private investment, the company must provide funds receipt evidence within 90 days of award. It is anticipated Phase II efforts with Federal cost match or share will be awarded via contracts. Proposed efforts with private investment cost match will be awarded via OTs for Prototype.

9.4 Proposal Submission: Proposals must be electronically submitted through the DoD SBIR/STTR Submission Web site, <https://www.dodsbirsttr.mil/submissions/> no later than the date and time indicated on the CSO title page. Please ensure the proposal is submitted to the correct Command under the correct topic number. Late proposals will not be evaluated; no exceptions will be made. **Classified proposals are not accepted; proposals shall not contain classified information or data.**

Each proposal submission must contain a Proposal Cover Sheet, Technical Volume, Cost Volume, Supporting Documents, and Fraud, Waste and Abuse Training (see Section 5.4). **NOTE: The Company Commercialization Report, typically a required proposal volume, is not available for this solicitation.** The preferred submission format

is Portable Document Format (.pdf). When combining .pdf documents into a full proposal, ensure digital signatures are not stripped. Graphics must be distinguishable in black and white. Virus-check all submissions. NOTE: The Government is not obligated to make any Direct to Phase II awards nor is it responsible for offeror expenditures prior to award. All awards are subject to successful negotiations and funds availability.

The AF SBIR/STTR Program Office has instituted training and certification requirements to combat fraud in the SBIR/STTR Programs. As a result, SBCs are required to complete Fraud, Waste, and Abuse Training as part of the proposal submission process. The training is available at <https://www.dodsbirsttr.mil/submissions/>. When training is complete and certified, DSIP will indicate so in the proposal, completing the Volume 6 requirement. If training is not completed, the submitter will receive an error message and submission cannot be completed.

All Phase II R/R&D must be performed by the small business and its team members in the United States, as defined in Section 4.2, "Offeror Eligibility and Performance Requirements". The Phase II Principal Investigator's primary employment must be with the small business concern at the time of award and during the entire performance period. Primary employment means more than one-half of the Principal Investigator's time is spent working for the small business. This precludes full-time employment with another organization.

9.5 Government and Private Matching Funds: Proposers wishing to include cost match, Government or private, in their proposals must submit a completed Fund Matching form as described in "Volume 5" (this section).

Additional Private Cost Match Reporting Requirement: If proposer chooses to include private cost match, the Phase II final report shall include a brief description in company format discussing investor funds expenditure in support of the project. This report shall be submitted by the deadline specified in the award document.

9.6 Direct to Phase II Proposal Preparation Instructions

Proposal Requirements. A Phase II proposal should provide sufficient information to persuade the AF the proposed effort represents an innovative solution worthy of support under the stated criteria. All sections below count toward the page limitation unless otherwise specified.

Proprietary Information. Information constituting a trade secret, commercial or financial information, confidential personal information, or data affecting national security must be clearly marked. It shall be treated in confidence to the extent permitted by law. Awards for selected proposals will likely incorporate the Work Plan, in whole or part, by reference or as an attachment. Therefore, **the Work Plan shall be Non-Proprietary and marked accordingly.**

Layout: Number all proposal pages consecutively. Use type no smaller than 10-point on standard 8-1/2" x 11" paper with one-inch margins. Technical Volume page headers should contain the company name, topic number, and proposal number assigned by DSIP upon Cover Sheet creation. The header may be included in the one-inch margin. Most proposals will be printed in black and white so make sure all graphics are distinguishable in black and white. Offerors are discouraged from including promotional and non-programmatic items, except when directed, e.g., in the 'one-pager'. To verify proposal receipt, click on the "Check Upload" icon to view the proposal. Typically, the uploaded file will be virus checked and converted to a .pdf document within the hour. If the proposal does not appear after an hour, contact the DoD SBIR/STTR Help Desk via email at DoDSBIRSupport@reisystems.com, 9:00 am to 5:00 pm ET, Monday through Friday. Confirm all digital signatures in the proposal, if applicable, are still present after upload.

9.7 Proposal Content

A complete proposal consists of:

Registration

- DUNS Number
- Commercial and Government Entity (CAGE) Code
- Small Business Association ID
- SBA Small Business Concern Control ID

Volume 1: Proposal Cover Sheet

- Basic Information (CAGE, DUNS)
- Proposal Summary
- Proposal Certification
- Contact Information

Volume 2: Technical Volume

- White Paper Not To Exceed 15 Pages
 - Table of Contents
 - Glossary
 - Technical Summary
 - Identification/Significance of Problem/Opportunity
 - Phase I Feasibility Study Results
 - Phase II Technical Objectives/Key Results
 - Phase II Work Plan
 - Scope
 - Task Outline
 - Milestone Schedule
 - Deliverables
 - Required Reports
 - Safety Related Deliverables
 - Commercialization Strategy
 - Commercialization Plan
 - Military Applications/DoD Customers
 - Non-Defense Commercial Customers
 - Key Personnel
 - Foreign Nationals
 - Investors/Partners
 - Related Work

Volume 3: Cost Volume

- Direct Labor
- Overhead
- G&A
- Subcontractors/Consultants
- Other Direct Costs, e.g., materials, equipment, travel
- Profit Rate/Cost Share or Match

Volume 4: Company Commercialization Report **Not in use for 20.3.**

Volume 5: Supporting Documents:

- Signed Customer Memorandum (*Template at Attachment 1*)
- 15 Page Slide Deck
- Coversheet Supplement
 - Certification/Eligibility Check
 - Prior, Current, or Pending Support of Similar Proposals or Awards
 - Foreign Citizen Table, if applicable
- Supplemental Cost Information
- Resumes of Key Personnel

Non-Proprietary Work Plan
DoD Funding Agreement Certification (Signed)
SBIR/STTR Environment, Safety and Occupational Health (ESOH)
1-Page ‘Sales Pitch’
The following are as required:
Fund Matching Form (*Template at Attachment 2*)
Additional Fund Matching Documentation, e.g., Private Investor Letter
Technical Data Assertions
Additional Facilities/Equipment Information
Additional Subcontractor/Consultant Information
Certified DD Form 2345, Militarily Critical Technical Data Agreement
Lifecycle Certification
Allocation of Rights
Additional Letters of Support

Volume 6: Fraud, Waste and Abuse Training

VOLUME 1, Proposal Coversheet: The proposal Cover Sheet is prepared in DSIP. It must include a technical abstract no more than 200 words describing the proposed R/R&D project, discussing anticipated benefits and potential commercial applications. **Proprietary and/or classified information shall not be included in the Proposal Cover Sheet.** For selected proposals, the technical abstract and anticipated benefits discussion may be publicly released. When the Proposal Cover Sheet is saved, DSIP will assign a proposal number. The Cover Sheet may be revised as often as necessary until the CSO closes. Include the Technology Area ID # in the ‘Keywords’ areas of the online SBIR application, e.g., TA-001.

Technical Abstract: The technical abstract should include a brief program objective/effort description. Technical abstracts are submitted to the Office of the Secretary of Defense (OSD) for publication. They shall not contain proprietary or classified information. The term “Component” on the Cover Sheet refers to the soliciting AF organization, i.e., AFWERX or AFLCMC.

Anticipated Benefits/Potential Commercial Applications of R/R&D: The first line of the ‘Anticipated Benefits’ section should follow this format: *We solved [AF problem] by providing [advantage], to help [AF end-user organization] accomplish [AF end-user’s] goal. We will recognize profit by charging [non-defense commercial customer organizations] to get [non-defense commercial benefit].* Be very explicit regarding the proposed AF end user and customer, if different, which is likely, and potential non-SBIR funding sources after successful Phase II completion. This list should also include non-proprietary, non-defense commercial customers. Do not include specific AF names or non-defense customers, as this section will be publicly released.

List of maximum 8 Key Words or Phrases, separated by commas, describing the project: This section will be used to categorize the application. These keywords may also be used to identify Phase III transition partners within the Government. Therefore, consider more than technical key words. A potentially useful analogy is Search Engine Optimization (SEO) Keywords.

Prior, Current, or Pending Support of Similar Proposals or Awards: *While permissible, with proper notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work under one or more than one Federal announcement, it is unlawful to enter into contracts requiring essentially equivalent effort.* Potential for this situation must be disclosed to the AF before award. Proposals substantially the same as another submission previously, currently, or in process of being funded by another Federal agency or the AF must be identified. On the Proposal Cover Sheet, answer ‘Yes’ to the following or similar question, “Has a proposal for essentially equivalent work been submitted to other US Government agencies or the AF?”

VOLUME 2, Technical Volume: The technical volume shall be no longer than 15 pages. Pages beyond 15 will not be considered. Include page numbers in the technical volume.

Table of Contents: Include a table of contents immediately following the Proposal Cover Sheet. Does not count against the 15 page limit.

Glossary: Include a glossary of acronyms and abbreviations used in the proposal. Does not count against the 15 page limit.

Technical Summary:

Identification and Significance of the Problem or Opportunity: Briefly describe the specific problem/opportunity addressed in the feasibility study and its relationship to Phase II.

- Non-Defense Commercial Solution: Describe the non-defense commercial solution, including its use by non-defense commercial customers. Describe its technical specifications as well as the qualitative and quantitative value it brings to the solution's users. Additionally, answer the following questions:
 - Is the proposed item "of a type", i.e., similar to a commercial item, customarily used by the public or by non-Governmental entities for non-Governmental purposes?
 - Has the proposed item been (i) sold, leased, or licensed to the public; OR (ii) offered for sale, lease, or license to the public?
 - Include, where applicable, revenue, unit sales, user adoption, pre-sales, and investment. Broad adoption and commercial success can be indicators of commercial potential and reduced technical risk, but are not mandated. This is an R/R&D solicitation, not a Commercial Off The Shelf resale solicitation. See FAR 2.101 for a full definition of commercial items.
- Proposed Adaptation of Non-Defense Commercial Solution: Describe the proposed R/R&D adaptation of the non-defense commercial solution to meet a US Government end-user need. In this section, answer the following questions:
 - How similar is the modified item to others sold in the commercial marketplace to non-US Government customers?
 - Does the supplier perform similar modifications for non-US Government customers?
 - Do AF unique modifications change the product's essential use and purpose?
 - Are there differences in the production/manufacturing/delivery processes used to perform the modification for the Federal Government versus non-Government customers?
 - What are the quantitative benefits expected for identified AF end-users?
 - When adapting the commercial solution, what is the intended Commercial Off the Shelf (COTs) or commercial product/process modification? Explain.

Phase I 'Feasibility Study' Results: The proposal shall detail the solution's ability to meet AF end-users' and customers' needs. These results shall be framed in the context of AF End User and Customer Exploration previously performed for the effort.

- Scientific or Technical R/R&D effort, including research questions, methods, results, and relevant literature.
- AF End-User and Customer Exploration Methods: Describe methods, both successful and unsuccessful, used to perform technical and scientific feasibility analysis and AF Customer and End-User Exploration for adapting the non-defense commercial solution to a specific AF end-user's needs. This should include detailed reports of at least one in-depth interview with an AF End-User and one in-depth interview with an AF Customer.
- Empowered and Committed AF End-Users: List and describe specific AF end-users, e.g., operators, willing to support further R&D, testing, evaluation, or trial for the proposed Phase II solution. Specifically explain how the proposed solution meets the end-user(s) needs. Describe in as much detail as possible the firm's understanding of the AF end-user's problem or benefit area.

- Empowered and Committed AF Customers: List and describe the specific AF customer, e.g., acquisition professional such as a Program Manager at a system program office, willing to assist with transitioning the proposed Phase II solution into a Phase III.
- Empowered and Committed US Non-AF Government End-Users: Commitments from US non-AF Government end-users will also be considered. However, there MUST be at least one AF end-user and customer.
- **NOTE:** Inclusion of a Customer Memorandum is mandatory. A template is available at Attachment 1. This Customer Memorandum formally captures Interest from the empowered and committed AF end-users and customers described above. Proposals without a signed Customer memorandum will not be considered. Customer Memoranda must be uploaded to the ‘*Letters of Support*’ Section in Volume 5, Supporting Documents. **The Customer Memorandum requirement applies to AF203-DCSO1 ONLY.**

Relevant supporting data such as journal articles, literature, Government publications, etc., should be contained or referenced in the proposal and will count toward the page limit.

Phase II Technical Objectives and Key Results: Clearly describe three to five Phase II R/R&D effort and trial objectives. These objectives should be tied to specific proposed Phase II trial tasks. These objectives shall be qualitative and specific to the participating AF end-user(s). The objectives shall be tied to specific time periods, and be tangible and unambiguous about anticipated results. These objectives shall describe end-state outcomes, i.e., what will be done, rather than processes or activities, i.e., how it will be done. Each objective shall be accompanied by three to five specific ‘key results’, measurable throughout Phase II performance. These key results will likely be quantitative in nature, e.g., deliver X widgets to AF end user. Non-quantitative key results shall be clearly measurable.

- Required Stakeholders Needed to Accomplish Phase II: List anticipated interactions with stakeholders necessary to accomplish the Phase II trial. Such stakeholders may include lawyers, test range officials, information assurance officials, system program office engineers, etc. Clearly describe Phase II trial completion requirements not within the offeror’s immediate control and plans to work within those constraints.

NOTE: This includes clearances, e.g., DD Form 254, and Authorities to Operate (ATO) on DoD networks. This is a crucial proposal component.

Phase II Work Plan: For this Phase II topic, a Work Plan, **not** a Statement of Work, is required. For Phase II proposals including private investment cost match, the Work Plan should include those tasks to be supported with SBIR funding. Tasks to be executed with private investment should also be discernable from SBIR-funded tasks. If awarded the SBIR-funded and private investment-funded tasks are included in different parts of the award document. The Work Plan should be structured around the effort’s purpose and requirements set forth in clear, specific, and objective terms with measurable outcomes. The work plan has two mandatory features; (1) Work stated in terms of outcomes or results, rather than performance methods, and (2) measurable performance standards, including assessment methods for these standards. The plan should include the location and mechanics for accomplishing the proposed approach. Phase II projects shall attempt to demonstrate the Phase I-like effort’s technical feasibility, including transition results to the private sector or Government customer.

- **Scope:** List the effort’s major requirements and specifications.
- **Task Outline:** Provide an outline of work to be accomplished throughout the effort. For matching efforts, clearly identifying SBIR-funded tasks and cost match-funded tasks.
- **Milestone Schedule:** The maximum award period of performance will be 27 months. Include a concise program schedule with all key milestones identified. Propose a suggested start date, usually ~three months after Phase II submission deadline. For each milestone, include:

- An expected delivery date, represented in number of months after contract award, e.g., widget delivered at contract award (CA) + 6 months.
- A specific deliverable of value to be provided to the AF end-user.
- Clear acceptance criteria for all parties to determine milestone achievement.
- Proposals shall not include more than 15 milestones/deliverables, including a refined Work Plan (CA + 30 calendar days) and a Final Technical Report, the draft of which is due 30 days after technical performance completion.

Upload suggested payment amounts/references to rationale/supporting information in “Additional Cost Information”, Volume 5, Supporting Documents.

NOTE: If proposing to work with multiple AF end-users, Customer Memoranda must be consolidated into a single, coherent, mutually agreed upon Schedule of Milestones meeting the approval of all.

Chart 2 is a notional construct for the Schedule of Milestones. Each milestone marks the completion of a required deliverable, e.g., baseline execution plan, prototype component, test plan, prototype production, final report submission, etc. Status reports cannot be milestones but are still deliverables as described below. Describe how the milestones will be identified as completed. Milestone payments shall reflect justifiable costs to achieve completion. Supporting rationale, e.g., invoices from non-defense commercial customers, will be included in Volume 5, Supporting Documents. NOTE: Pricing information from non-defense commercial customers is likely proprietary and should be marked as such. See the Section 3.9 for the definition of Proprietary Information, and Section 8.7.b for guidance on marking Proprietary Information.

Chart 2: Contraction of Milestones—Notional

<u>TASK/MILESTONE</u>	<u>EXPECTED DELIVERY (MONTHS AFTER CONTRACT AWARD)</u>	<u>DELIVERABLE</u>	<u>ACCEPTANCE CRITERIA</u>	<u>PAYMENT AMOUNT</u>
EXAMPLE: 01 - Finalize customer requirements for adaptation	Award +1 month	Complete set of specifications for adapted commercial solution and quantitative goals for further R&D and widget tests in the AF operational environment.	AF end-users and customers agree the specifications will meet their needs.	\$50,000 (EVIDENCE: invoice from pilot program with non-defense customer A.)
EXAMPLE: 02 - Deliver 3 adapted commercial widgets	Award + 4 months	Three adapted widgets delivered to the AF end-user meeting specifications described in task 01.	The AF end-user will physically accept the adapted widgets	\$250,000 (EVIDENCE: 2019 sales of non-defense commercial widget)

EXAMPLE: 03 - Training for using widgets	Award + 4 months	The solution provider will train 3 AF end-users to employ the adapted solution in the operational environment.	The 3 AF end-users verify training is sufficient to use the adapted widget.	\$75,000 (EVIDENCE: invoice from pilot program with non-defense customer A)
EXAMPLE: 04 - Test support for widgets	Award + 12 months	The solution provider will support the test, and produce a report the adapted widget's performance success in solving the AF users' needs as described in task 01.	The test report is endorsed by the AF end-users, confirming test results.	\$100,000 (EVIDENCE: invoice from pilot program with non-defense customer B)
EXAMPLE: 05 - Warranty for widgets	Award +15 months	The adapted widgets shall remain in a workable condition throughout project performance.	The AF end-users verify widgets worked during entire project's performance.	\$100,000 (EVIDENCE: invoice from pilot program with non-defense customer C)

- **Deliverables:** Include a section clearly describing the specific sample/prototype hardware/software to be delivered, as well as data deliverables, schedules, and quantities.
- **Unique item identification:** IAW DFARS 252.211-7003, Item Identification and Valuation, may be required. For hardware, more information may be found at <https://www.acq.osd.mil/dpap/dars/dfars/html/current/252211.htm#252.211-7003>.
- **Required Reports:** At a minimum, the following reports are required for ALL Phase II awards and must be included in the Work Plan. All are considered scientific and technical reports.
 - **Final Report:** The draft is due 30 calendar days after completion of the Phase II technical effort. The first page of the final report will include a single-page project summary, identifying the purpose of the work, providing a brief description of the effort accomplished, and listing potential results applications. The summary may be published by DoD; therefore, it shall not contain proprietary information. It shall also contain project objectives met, work completed, results obtained, and technical feasibility estimates.
 - **Status Reports:** Status reports are due quarterly, at a minimum. These shall be concise documents describing progress in meeting the selected AF end-user's needs. Each status report shall be no longer than 15 slides. The status reports shall include progress toward Phase II objectives and key results, as well as a quantitative measure between 0 and 1 of progress toward each.
 - **Phase II Summary Report:** The Phase II summary report is due at technical effort completion. It shall be submitted via email to the cognizant AF Contracting or Agreements Officer. Reports shall not exceed 700 words, including a description of the technology and anticipated applications/benefits for Government and/or private sector use.
 - **Additional Reporting:** The AF end-user or customer may require additional reporting or documentation including:
 - Software documentation and user manuals;
 - Engineering drawings;

- Operation and Maintenance documentation;
- Safety hazard analysis when the project will result in partial or total development/ delivery of hardware; and
- Updated commercialization results.
- Additional Reporting Requirement for Efforts with Cost Match: The final Phase II status report must include a brief accounting, in company format, regarding investor funds' expenditures to support the project.
- **Safety Related Deliverables:** Safety requirements shall be followed in the proposed project's design and performance. The Work Plan must contain separate sections specifically addressing the following:
 - Preliminary Hazard Analysis (Report, if applicable): If hardware is to be developed, the contract shall include at least a preliminary hazard analysis included in the deliverables.
 - Hazardous Material Report: If use of hazardous material is anticipated, the following are required:
 - Materials identification;
 - Materials purpose; and
 - Possible alternative/procedures/safeguards to minimize risk.

Commercialization Strategy:

- **Commercialization Plan:** The SBA and DoD require Phase II proposals include a commercialization plan. The plan should briefly describe the commercialization potential for the proposed project's anticipated results, as well as plans for exploitation in both the Defense and non-Defense markets. The plan must include the following:
 - (i) Company Information. Focused objectives/core competencies; specialization area(s); products with significant sales; and history of previous Federal and non-Federal funding, regulatory experience, and subsequent commercialization.
 - (ii) Customer and Competition. Clear description of key technology objectives, current competition, and advantages compared to competing products or services; description of hurdles to innovation acceptance.
 - (iii) Market. Milestones, target dates, market size analysis, and estimated market share after first year and fifth year sales; plan to obtain market share.
 - (iv) Intellectual Property. Patent status, technology lead, trade secrets, or other demonstration of a plan to achieve sufficient protection to realize the commercialization stage and attain at least a temporal competitive advantage.
 - (v) Financing. Plans for securing necessary funding in Phase (vi) Assistance and Mentoring. Plans for securing needed technical or business assistance through mentoring, partnering, or through arrangements with State assistance programs, Small Business Development Centers, FFRDCs, Manufacturing Extension Partnership centers, the AF Mentor-Protégé Program, or other assistance providers.

Specifically address the following questions:

1. What is the first product into which the technology will be incorporated?
2. Who are the customers and what is the estimated market size? How much money is needed to bring the technology to market? How will the funding be raised?
3. Does the company possess marketing expertise? If not, how will it be obtained?
4. What companies are the proposing firm's competitors, and what is the firm's price and/or quality advantage over them?
5. Are there private sector or non-SBIR/STTR funding sources demonstrating commitment to Phase II results? This includes both outside private investment such as venture capital, angel investors, state or

local government programs, etc., and internal funding sources, such as funding from affiliates. Please delineate past and potential future investments, e.g., currently raising a round, have signed term sheets. Also note if commitments are conditional on receiving a Phase II award.

6. Please note private investment funds from qualified third-party investors potentially available for Phase II enhancements, e.g., matching funds wherein the investor and the SBIR Program provide additional funding for added work to the Phase II award. More information regarding qualified third-party investors may be found at <https://www.acq.osd.mil/osbp/sbir/sb/investment-qualification.shtml>.
7. Has your company received or will it receive any foreign investment? If so, what is the source and the received or anticipated amount?
8. Are there Phase III (Government or commercial) follow-on commitments for the proposed technology?
9. Are there any other commercial potential indicators?
10. What is the last 12 months' total revenue from non-defense commercial solution sales?
11. State the proposed Phase II's anticipated end results, specifically plans to transition to a Phase III with a potential Government customer.

Military Applications/DoD Customers: Briefly describe the proposed solution's existing potential military requirement. Identify the DoD agency/organization most likely to become the solution's customer. In many cases the potential DoD customer will be different than the end user. For example, the user may be in an operational flying unit and the customer in a system program office for the related aircraft. State whether a DoD agency has expressed interest in, or commitment to, a non-SBIR, Federally-funded Phase III effort or a Phase II enhancement with matching SBIR funds. If so, please include relevant details regarding funding availability, e.g., fiscal year, for solution transition, and other relevant funding details, such as funding type, e.g., RDT&E, Operations and Maintenance, etc. Include agency points of contact names, email addresses, and telephone numbers.

- **Non-Defense Commercial Customers**

- Past revenue from commercial customers of the proposed non-defense commercial solution. Clearly list non-Defense commercial customers, including revenue received as a result of the proposed solution's sales. Do not include other solutions the company may offer.
- Potential revenue-generating projects directly related to the proposed non-Defense commercial solution or adaptation thereof. Separately list potential revenue-generating projects with Defense or non-Defense customers directly related to the proposed solution(s). NOTE: On-going or completed projects/sales, such as those in section 2.5.1, are strongly preferred to potential projects.

- **Key Personnel:** Identify key personnel involved in the project, including subcontractors and consultants. The offeror shall address qualifications for conducting RDT&E in addition to qualifications for commercialization. Include information regarding education, experience, and citizenship. A technical resume for the Principal Investigator, including publications, if any, shall be included.

- **Non-U.S. Citizens:** Identify all non-U.S. citizens and dual citizens proposed as direct employees, subcontractors, or consultants. For these individuals, in addition to technical resumes, please provide countries of origin, type of visas or work permits held, and explanation of their anticipated involvement level in the project, i.e., tasks to be assigned. When the topic area is subject to export control, these individuals, if permitted to participate, are limited to work in the public domain. Further, tasks assigned must not be capable of assimilation into an understanding of the project's overall objectives. This precludes foreign citizens from acting in key positions such as Principal Investigator, Senior Engineer, etc. Additional information may be requested during negotiations to verify foreign citizens' eligibility.

Proposals including the involvement of foreign nationals should include this table:

Full Name	Foreign National (Yes or No)	Country of Origin	T	Description of Involvement (specific task(s) in the work plan)
(LIST)	(LIST)	(LIST)	(LIST)	(LIST)

- **Investors and Partners:** Identify company investors, shareholders, or strategic advisors making significant contributions to support the Phase II effort. Explain how their past experiences or track record will support the technical or commercialization efforts. This could include leveraging other entities in company investors’ portfolios or accessing other capital sources.
- **Related Work:** Describe significant activities directly related to the proposed effort, including previous programs conducted by the Principal Investigator, proposing firm, consultants, or others, and their application to the proposed project. List reviewers providing comments regarding the offeror’s knowledge of the state-of-the-art in the specific approach proposed. Specify related Government efforts, SBIR or otherwise, awarded, previously proposed, or intended for proposal.

Volume 3, Cost Volume: Complete the Cost Volume in the format shown in the Cost Breakdown Guidance by using the online cost volume form on DSIP. Some items may not apply and there is no requirement to provide information for those items. The Cost Volume must be adequate to enable AF personnel to determine the purpose, necessity and reasonability of the proposed price. The on-line Cost Volume and Itemized Cost Volume Information will not count against the 15-page limit/15 slide limit. The itemized listing may be placed in the “Explanatory Material Section of the Online Cost Volume (assuming sufficient space) and be submitted in Volume 5, Supporting Documents, under the “Other” dropdown options. Only one file can be uploaded to DSIP. Ensure this file includes the complete Technical Volume and the information below.

The maximum value of a Phase II award under this CSO will be \$750,000 SBIR funds. Fixed price payments shall be tied to measurable milestones, as agreed to with the Government. For Phase II efforts including Government cost match, the cost proposal should clearly identify SBIR-funded tasks and non-SBIR-funded tasks.

For direct costs, include substantiating information such as vendor quotes, previous orders, historical data, etc. Costs without substantiating justification should be detailed through the cost estimating process. All substantiating evidence should be included in the ‘Additional Cost Information’ section of the Supporting Documents Volume (Volume 5). If selected for award, further documentation may be required by the AF Contracting or Agreements Officer to substantiate costs.

Information included in the online Cost Volume form includes but is not limited to:

- **Direct Labor Costs:** Identify key personnel by name if possible or by labor category if specific names are not available. The number of hours, labor overhead and/or fringe benefits, and actual hourly rates for each individual are required.
- **Direct Material Costs:** Justify cost for materials, parts, and supplies with an itemized list containing types, quantities, price and, where appropriate, purpose.
 - **Other Direct Costs:** This category of costs includes specialized services such as machining or milling, special testing or analysis, specialized equipment leases, etc. Proposals including leased hardware must provide an adequate lease vs. purchase justification or rationale.

- Travel: Include travel costs in “Other Direct Costs.” Travel costs must relate to project needs. Break out travel costs by trip, number of travelers, airfare, per diem, lodging, etc. The number of trips required, as well as the destination and purpose of each trip should be included. Recommend budgeting at least one trip to the AF location managing the project. Actual travel cost may differ from proposed travel; however, information allows the Government to ensure costs are not excessive.
- Subcontracts: Include subcontract/consultant costs in “Other Direct Costs.” Involvement of university or other consultants in the planning and/or research stages of the project may be appropriate. If the offeror intends such involvement, describe in detail and include information in the Cost Volume. The proposed total of all consultant fees, facility leases or usage fees, and other subcontract or purchase agreements may not exceed one-third of the total award price, unless otherwise approved in writing by the Contracting or Agreements Officer. Subcontract costs should be supported by subcontract agreements adequately describing the work to be performed. At a minimum, an offeror must include a Work Plan with a corresponding detailed cost volume for planned subcontracts.
- Consultants: Provide a separate agreement letter for each consultant. The letter should briefly state what will be provided, the number of hours, and the hourly rate.
- Special Tooling and Test Equipment and Material: The inclusion of equipment and materials will be carefully reviewed for need and appropriateness to the work proposed. The purchase of special tooling and test equipment must, in the opinion of the Contracting or Agreements Officer, be advantageous to the Government and relate directly to the specific effort. This 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 the AF unless it is determined title transfer to the awardee would be more cost effective than AF’s equipment recovery efforts.

PLEASE ROUND ALL COSTS TO THE NEAREST DOLLAR!

NOTE: If no exceptions are taken to an offeror’s proposal, the Government may execute award without negotiations. Therefore, the initial proposal should contain the best terms from a price and technical standpoint. The Government reserves the right to award a contract or an Other Transaction for Prototype. For questions regarding the award document, contact the Contracting or Agreements Officer listed on the selection notification. The Government reserves the right to conduct negotiations if the Contracting or Agreements Officer determines them necessary.

VOLUME 4, Company Commercialization Report (CCR): NOT IN USE FOR 20.3.

VOLUME 5, Supporting Documents: Volume 5, Supporting Documents, is NOT optional and allows small businesses to submit additional supporting documentation for the Technical and Cost Volumes (Volumes 2 and 3). Documents acceptable for inclusion in Volume 5 are below.

- Signed Customer Memorandum (*Template at Attachment 1*)
- 15 Page Slide Deck
- Coversheet Supplement
 - Certification/Eligibility Check
 - Prior, Current, or Pending Support of Similar Proposals or Awards
 - Foreign Citizen Table (if applicable)
- Supplemental Cost Information
- Resumes of Key Personnel
- Non-Proprietary Work Plan
- Signed DoD Funding Agreement Certification
- SBIR/STTR Environment, Safety and Occupational Health (ESOH)
- 1-Page ‘Sales Pitch’ Summary

Include if applicable:

Fund Matching Form (*Template found at Attachment 2*)
Additional Fund Matching Documentation, e.g., Private Investor Letter
Technical Data Assertions
Additional Information on Facilities/Equipment
Additional Information on Subcontractor/Consultants
Certified DD Form 2345, Militarily Critical Technical Data Agreement
Lifecycle Certification
Allocation of Rights
Additional Letters of Support in offeror's format

NOTE: Customer Memorandum requirement applies to Topic AF203-DCSO1 ONLY. If proposing to work with more than one AF end-user, all Customer Memoranda must be consolidated into a single, coherent Customer Memorandum reflecting the consolidated Work Plan milestones, signed by the lead AF Phase II point of contact.

- **Signed Customer Memorandum:** The Customer Memorandum formally captures interest from the empowered and committed AF end-users and customers described above. Proposals without a signed Customer Memorandum will not be considered for award. Customer Memoranda must be uploaded to the 'Letters of Support' Section in Volume 5, Supporting Documents. Proposals must include at least one signed memorandum from a specific empowered AF end-user and customer, likely not the same entity, ready and willing to participate in the proposed prototype solution's trial. This should include specific objectives and measurable (quantitative) key results the proposed solution can achieve to meet the AF end-user and customer's needs. See Attachment 1 for mandatory template. Other Federal agencies may provide memorandums as well, but there must be at least one signed memorandum from an AF end-user and customer. **Proposals without a signed Customer Memorandum and/or the Memorandum is not completed IAW the mandatory template at Attachment 1 will not be considered for award.**

Additional Cost Information: A detailed cost proposal must be submitted and uploaded as Additional Cost Information in Volume 5. Cost proposal information will be treated as proprietary. Include detailed cost information to support Cost Volume (Volume 3) inputs in this section. For Phase II efforts including private investment cost match, the cost proposal should clearly delineate SBIR-funded versus private investment-funded tasks.

- **Supplemental Cost Information:**
 - Direct Labor: May include information not identified in Volume 3, Cost Volume.
 - Direct Materials: May include additional supporting documentation for materials, parts, and supplies.
 - Other Direct Costs: May include additional supporting documentation for specialized services or temporary use/lease of specialized facilities/equipment.
- **Facilities/Equipment:** Describe instrumentation and/or physical and digital facilities necessary and available to carry out the Phase II effort. Justify equipment to be purchased and include in 'Additional Cost Information,' as necessary. State whether proposed performance locations meet Federal, state, and local Governments environmental laws and regulations for airborne emissions, waterborne effluents, external radiation levels, outdoor noise, solid/bulk waste disposal practices, toxic/hazardous material handling/storage, and others as identified.
- **Subcontracts:** May include additional supporting documentation for subcontractor/consultant costs. Some proposing firms choose to work with subcontractors or consultants assisting in determining solution feasibility through DoD customer discovery assistance. If the proposing firm is working with a customer discovery firm, the associated agreement must follow the spending caps identified in 15 U.S.C. 638(q) and the agreement shall be included in the proposal.

- Travel: May include additional supporting documentation for travel costs.
- Indirect Costs: Indicate the proposed rates' bases. The proposal should identify the specific rates used and allocation bases to which they are applied. Provide proposed rates and applications per FY throughout the anticipated performance period. Do not propose composite rates.

DD Form 2345: Proposals for technologies subject to export-control (either International Traffic in Arms (ITAR) or Export Administration Regulations (EAR)), a copy of the certified DD Form 2345, Militarily Critical Technical Data Agreement, or evidence of application submission must be included. The form, instructions, and FAQs may be found at the United States/Canada Joint Certification Program website, <http://www.dla.mil/HQ/InformationOperations/Offers/Products/LogisticsApplications/JCP/DD2345Instructions.aspx>. DD Form 2345 approval will be verified if the proposal is selected for award.

NOTE: Technologies may be subject to export-control considerations. See individual topics for further information and guidance.

Signed Funding Agreement Certification: Offerors must complete and include this certification in Volume 5 of the proposal submission. It can be found under "Phase I and II Certification – Funding Agreement <https://www.afsbirsttr.af.mil/Program/Phase-I-and-II/>".

Technical Data Rights Assertions: Rights in technical data, including software, developed under the terms of any contract resulting from this solicitation generally rest with the contractor. The Government obtains a royalty-free license to use such technical data only for Government purposes beginning with contract/ Other Transaction award and ending 20 years later. This data should be marked with the restrictive legend specified in DFARS 252.227-7018, Rights in Noncommercial Technical Data and Computer Software – Small Business Innovation Research (SBIR) Program or similar article. Link to full article text available in Section 12.5. Upon expiration of the 20 year protection, the Government has unlimited rights in the SBIR data. During the license period, the Government may not release or disclose SBIR data to any person other than its support services contractors except (1) for peer review purposes, (2) as expressly permitted by the contractor, or (3) a use, release, or disclosure is necessary for emergency repair or overhaul of Government-operated items. Proposing firms wishing to assert data rights shall include the following table in the proposal:

Technical Data or Computer Software to be Furnished With Restrictions	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
	<ul style="list-style-type: none"> • None, • Developed exclusively at private expense, • Developed partially at private expense 	<ul style="list-style-type: none"> • None, • Government Purpose Rights • Limited Rights (Technical Data) • Restricted Rights (Software) • Specifically Negotiated License • Rights in SBIR Data 	
(LIST)	(LIST)	(LIST)	(LIST)

If a proposer plans to submit assertions in accordance with DFARS 252.227-7017, Identification and Assertion of Use, Release, or Disclosure Restrictions, or similar article, those assertions must be identified. Further, assertion of use, release, or disclosure restriction **MUST** be included in this section of the proposal submission. An award cannot be executed until assertions have been approved.

Lifecycle Certification: All SBIR/STTR Phase II awardees must complete a certification document at award, prior to receipt of more than half the total contract award amount, and before final payment receipt. All questions must

be answered and an authorized officer of the company must sign and date prior to submission. The document is found at <https://www.afsbirsttr.af.mil/Portals/60/Pages/Phase%20I-II/SBIR-STTR-Phase-I-II-Life%20Cycle%20Certifications.pdf>.

Allocation of Rights: If subcontracting to a research institution or other organization, the firm may wish to complete an allocation of rights agreement. This is not required for SBIR awards but may be used at the company’s discretion. Example: <https://www.afsbirsttr.af.mil/Portals/60/Pages/Phase%20I-II/Model%20agreement%20for%20the%20allocation%20of%20rights.pdf>.

IAW the SBA SBIR/STTR Policy Directive, an SBC retains ownership of all SBIR/STTR Data it develops or generates during performance. The SBC retains all rights in SBIR/STTR Data not granted to the Federal Government IAW the SBIR/STTR Policy Directive. The SBC’s rights do not expire. However, within the AF SBIR Program, these rights are subject to certain protection periods and Government rights consistent with DFARS 227.7104 and DFARS 252.227-7018, *Rights in Noncommercial Technical Data and Computer Software – Small Business Innovation Research (SBIR) Program*. Further, the SBA SBIR/STTR Policy Directive states for the STTR Program, data rights may be subject to an allocation of rights agreement with a Research Institution. If an STTR Phase I awardee applies for SBIR Phase II under 15 U.S.C. 638(bb), had a Government-approved allocation of rights agreement during the STTR Phase I award, and intends to subcontract to the same research institution for the SBIR Phase II award, then offeror must ensure the allocation of right agreement allows continued engagement of research, including non-STTR follow-on awards. STTR Phase I participants must provide a copy of the current agreed-upon allocation of rights agreement with the proposal. Sample STTR allocation of rights agreement: <https://www.afsbirsttr.af.mil/Portals/60/Pages/Phase%20I-II/Model%20agreement%20for%20the%20allocation%20of%20rights.pdf>

Other: Combine all documents into a single .pdf and upload to the Other section of Volume 5: Supporting Documents.

- SBIR/STTR Environment, Safety and Occupational Health (ESOH) Questionnaire: Include a completed SBIR/STTR Environment, Safety, and Occupational Health (ESOH) Questionnaire in Volume 5, Supporting Documents “Other” section. Form can be found at https://www.afsbirsttr.af.mil/Portals/60/Pages/Phase%20I-II/SBIR_Ph_II_ESOH_Questionnaire.pdf.
- Prior, Current, or Pending Support of Similar Proposals or Awards: Identify proposals for essentially equivalent work submitted to other Federal agencies or DoD components as described in Section 9.7, Volume 1, Proposal Cover Sheet, by providing in Volume 5, Supporting Documents:

Federal agency to which proposal was submitted	Date of Proposal Submission	Proposal title and number	Name of Principal Investigator	Awarded? If so, include contract number.
(LIST)	(LIST)	(LIST)	(LIST)	(LIST)

If this does NOT apply, include a single-page document stating, “No prior, current, or pending US Government support for proposed work”. **Failure to disclose similar proposals or awards will result in proposal disqualification.** Additionally, reusing previously awarded proposals, in part or whole, will likely result in the submission being deemed essentially equivalent.

- 15-Page Slide Deck: Include a 15-page slide deck summarizing the proposal’s main points. It should be clear and concise, as it is the starting point to understanding the proposal.
 - **Slide 1 Summary**: Include an easy-to-understand overview of the product-market fit, proposed trial, proposed customer, and objectives and key metrics.

- **Slide 2 Technical Merit Summary:** Summarize the best points regarding the commercial non-defense solution, its adaptation through R/R&D to meet AF needs, as well as the R/R&D effort proposed to establish scientific and technical feasibility.
 - **Slide 3 Team’s Ability to Accomplish Work Summary:** Summarize the team’s expertise and experience and its influence in meeting the AF end-user’s and associated required stakeholders’ needs.
 - **Slide 4 Commercialization Potential:** Summarize the best points in the potential AF customer’s plans for a Phase III award or non-defense commercialization.
 - **Slide 5 Financial Sustainability:** Describe the product’s and company’s financial sustainability. Include sales/revenue numbers of the specific non-defense commercial solution, if available. This information will not be shared outside the acquisition team. This is an R&D solicitation, not a solicitation for resale of COTS items.
 - **Slide 6 Team Commercialization Overview:** Include team partners, investors, past efforts, and successes. This slide should include the team’s commercialization strengths, not scientific strengths.
 - **Slide 7 Pricing:** The effort’s pricing should be linked to the non-defense commercial solution’s price. Include references to invoices for the non-defense commercial solution.
 - **Slide 8 Non-Defense Commercial Solution:** Clearly describe the non-defense commercial solution, including relevant customers/sales.
 - **Slide 9 R/R&D Adaptations of Commercial Solution:** Describe R/R&D adaptations or changes to the non-defense commercial solution required to meet the AF end-user’s/ customer’s needs.
 - **Slide 10 AF End-User:** Describe in detail the AF end-user and how the solution addresses their needs. Note any Customer Memoranda received.
 - **Slide 11 Key stakeholders:** Describe stakeholders, e.g., safety, range officials, cybersecurity, and information assurance, within and outside the Government key to executing the product’s trial with the AF Customer and how buy-in will be secured. This could be as simple as a signature on an official document.
 - **Slide 12 Objectives and Key Metrics:** Describe how success/failure will be measured during the solution’s trial.
 - **Slide 13 Milestone Schedule:** Include highlights of the milestone schedule with timing, acceptance criteria, and proposed costs.
 - **Slide 14 Results of Feasibility Study:** Include feasibility study highlights of metrics and methods for AF end-user, R/R&D, and customer discovery typically accomplished in Phase I performance.
 - **Slide 15.** The firm may provide additional information, if desired.
- **1-Page ‘Sales Pitch’ Summary:** Include a visually appealing, one-page company ‘sales pitch’ and proposed non-Defense commercial solution R&D to meet an AF need. This portion of the document may be circulated publicly and, therefore, should contain no proprietary, confidential, or Personally Identifiable Information, e.g., names, contact information, etc., for AF employees.
 - **Phase II Cost Match Documentation:** If cost match is proposed, include a Funds Matching package, in Volume 5, Supporting Documents, “Other” section. A Funds Matching package consists of:
 - A completed Funds Matching form, found at Attachment 2 to this CSO.
 - A letter from the private investor to the offeror containing:
 - A commitment to provide Phase II funding in cash, contingent on selection for award. Milestones for funding must be appropriately structured to avoid front-loading and unbalanced SBIR funds expenditure. Specifically, non-SBIR Government or private funds cannot be conditioned on expenditure of all or the majority of SBIR funds before non-SBIR Government or private funds are expended.

- A page or less statement describing the investor's (i) experience evaluating companies' ability to successfully commercialize technology; and (ii) the particular technology's market assessment, including the company's ability to bring it to market.
- Additional Letters of Support: Letters of support are intended to demonstrate the proposed innovation, if developed, would solve a valid market need. More generally, letters of support help validate commercial impact claims made in the proposal. Therefore, letters from potential technology end users, i.e., customers and corporate partners/collaborators, are appropriate, as well as letters from actual or potential investors. All letters should be uploaded in a single .pdf file organized logically. NOTE: When combining .pdf documents, ensure digital signatures are not stripped.

VOLUME 6, Fraud, Waste, and Abuse Certification: The AF SBIR/STTR Program Office has instituted training and certification requirements to combat fraud in the SBIR/STTR Programs. As a result, each offeror is required to complete Fraud, Waste, and Abuse Training as part of the Phase II proposal submission process. When the training is complete and certified, the DoD Submission site will indicate so in the proposal, thereby completing Volume 6. If the training is not completed, the offeror will receive an error message. Proposals cannot be submitted until training is complete.

10.0 DIRECT TO PHASE II REVIEW CRITERIA

All Phase I and II proposals will be evaluated and judged on a competitive basis. Proposals will be initially screened to determine responsiveness. Proposals passing this initial screening will be peer reviewed by engineers or scientists to determine the most promising technical and scientific approaches. Each proposal will be judged on its own merit. AF is under no obligation to fund any proposal or any specific number of proposals under this topic. It also may elect to fund several or none of the topic's proposed approaches.

Proposals will be peer reviewed based on the criteria below. Selections will represent best value to the Government considering the following factors listed in descending order of importance:

1. The potential for commercial (Government or private sector) application and benefits expected to accrue from commercialization. The SBC's record of commercializing SBIR or other research, the existence of Phase II follow-on commitments for the subject research, matching funding, and whether from Government or private sources, are evidence of commercialization potential. Additionally, a sound transition strategy in Section 9 of the Air Force Customer Memorandum is evidence of commercialization potential.
2. The appropriateness, relevance, and specificity of an identified Defense Need. A complete and cogent Air Force Customer Memorandum (using the required template provided as an attachment to this solicitation), which is signed by an appropriate end-user and customer, indicates the appropriateness, relevance, and specificity of an identified Defense Need.
3. Adequacy of the proposed effort and its relationship to fulfilling the identified Defense Need. The soundness, technical merit, and innovation of the proposed approach and its incremental progress toward fulfilling the identified Defense need. Includes the proposed Principal Investigators/Project Managers, supporting staff, and consultants' qualifications to execute the proposed approach.

Price reasonableness and realism will be considered to the extent appropriate.

Peer reviewers will base their conclusions only on information contained in the proposals. It cannot be assumed that reviewers are acquainted with the firm or key individuals or any referenced experiments.

IAW 15 USC 638(dd)(7), investment by venture capital, private equity firms, or hedge funds shall not be used as an award criterion.

Other Factors Considered During the Selection Process:

- Possible duplication with other R/R&D;
- Potential integration with other Air Force or DoD Programs;
- Phase III potential;
- Funding limitations;
- Innovativeness;
- USAF SBIR program balance;
- Applicant small business size/status pursuant to 13 CFR 121.701-705; demonstrations of eligibility through registrations pursuant to FAR Subpart 4.11 and 4.18; and applicant responsibility pursuant to FAR Part 9;
- National security concerns.

The effort's cost to the Government may be considered to determine the successful offeror when more than one proposal is found to be essentially equal in merit.

11.0 CONTRACTUAL REQUIREMENTS

11.1 Other Contractual Requirements: Awardees will be required to make certain legal commitments through acceptance of Government contract clauses or OT articles. The following outline is illustrative of provisions required by the FAR or statute for inclusion in Phase II awards. This is not a complete list, nor does it contain specific clause/ article wording.

- a. **Standards of Work.** Work performed under the award must conform to professional standards.
- b. **Inspection.** Work performed under the award is subject to Government inspection and evaluation at all reasonable times.
- c. **Examination of Records.** The Comptroller General (or a fully authorized representative) shall have the right to examine any directly pertinent awardee records involving award transactions.
- d. **Default.** The Government may terminate the award for failure to perform the negotiated effort.
- e. **Termination for Convenience.** The Government may terminate the award at any time if it deems termination in its best interest. The firm will be compensated for work performed and reasonable termination costs.
- f. **Disputes.** Any award dispute not resolved by agreement shall be decided by the Contracting or Agreements Officer with right of appeal.
- g. **Contract/OT Work Hours.** The awardee may not require an employee to work more than eight hours a day or forty hours a week unless compensated accordingly through overtime pay.
- h. **Equal Opportunity.** The firm will not discriminate against any employee or employee applicant because of race, color, religion, sex, or national origin.
- i. **Affirmative Action for Veterans.** The awardee will not discriminate against any employee or applicant for employment because he or she is a disabled veteran.
- j. **Affirmative Action for Handicapped.** The awardee will not discriminate against any employee or applicant for employment because he or she is physically or mentally handicapped.
- k. **Officials Not to Benefit.** No member of or delegate to Congress shall benefit from the award.
- l. **Covenant Against Contingent Fees.** No person or agency has been employed to solicit or secure the award upon an understanding for compensation except bona fide employees or commercial agencies maintained by the awardee for the purpose of securing business.
- m. **Gratuities.** The Government may terminate the contract if gratuities have been offered to any Government representative to secure the awardee.
- n. **Patent Infringement.** The awardee shall report each notice or patent infringement claim based on contract performance.
- o. **Military Security Requirements.** The awardee shall safeguard classified information associated with the contracted work IAW applicable regulations.
- p. **American Made Equipment and Products.** The awardee will purchase equipment and/or products in support of the SBIR award from U.S.-based sources whenever possible.
- q. **Unique Identification (UID).** If hardware will be delivered to the Government under the award, there is potential unique item identification will be required IAW DFARS 252.211-7003.
- r. **Publication Approval.** Government review and approval will be required prior to dissemination or publication, except within and between the awardee and its subcontractors (if any), of classified and non-fundamental information developed under this award or contained in reports to be furnished pursuant to this award.
- s. **Animal Welfare.** Awards involving research, development, test, evaluation, or training on vertebrate animals will incorporate DFARS clause 252.235-7002 or similar verbiage.
- t. **Protection of Human Subjects.** Effective 29 July 2009, contracts including or potentially including research involving human subjects IAW 32 CFR Part 219, DoD Directive 3216.02, and 10 U.S.C. 980, including research meeting exemption criteria under 32 CFR 219.101(b), will incorporate DFARS clause 252.235-7004 or similar verbiage.
- u. **E-Verify.** Contracts exceeding the simplified acquisition threshold may include the FAR clause 52.222-54 "Employment Eligibility Verification" unless exempted by the conditions listed at FAR 22.1803.

Similar verbiage will be included in OT awards unless determined exempt through comparable determination.

- v. **ITAR.** IAW DFARS 225.7901-4, Export Control Contract Clauses, the clause found at DFARS 252.225-7048, Export-Controlled Items (June 2013), must be included in all solicitations and contracts; therefore, all awards resulting from this CSO will include DFARS 252.225-7048 or similar verbiage. Full text: http://farsite.hill.af.mil/reghtml/Regs/far2afmcfars/fardfars/Dfars/Dfars252_220.htm?zoom_highlight=dfars+252%2E225-7048#P4543_324418.
- w. **Cybersecurity.** Awardees are required to provide adequate security on all covered business information systems. Specific security requirements are listed in DFARS 252.204.7012, and compliance is mandatory.

11.2 Commercialization Updates in Phase II: After Phase II award, the awardee shall be required to periodically update the following Phase II commercialization results at <https://www.dodsbirsttr.mil/submissions>.

- a. Sales revenue from Phase II-developed new products and non-R&D services;
- b. Additional investment from non-Federal SBIR/STTR Program in activities furthering Phase II technology development and/or commercialization;
- c. Phase II technology used in a fielded DoD system or acquisition program and, if any, which system or program;
- d. The number of patents resulting from SBIR/STTR Program awards;
- e. Growth in number of firm employees; and
- f. Completion of an initial public offering of stock (IPO), if any, resulting all or in part from the Phase II project.

Project updates will be required one year after Phase I performance starts, at Phase II completion, and when the firm submits a new SBIR or STTR proposal to DoD. Firms not submitting new proposals to DoD will update annually after Phase II completion.

11.3 Copyrights: With the Contracting or Agreements Officer's prior written permission, the awardee may copyright (consistent with appropriate national security considerations, if any) material developed with DoD support. DoD receives a royalty-free license for the Federal Government and requires each publication contain an appropriate acknowledgment and disclaimer statement.

11.4 Patents: Awardees normally may retain the principal worldwide patent rights to Government-funded inventions. The Government receives a royalty-free license, reserves the right to require the patent holder to license others in certain limited circumstances, and requires anyone exclusively licensed to sell the invention in the United States to manufacture it domestically. As authorized by 35 USC 205, the Government will not publically disclose a Government-supported invention for a period of five years to allow the awardee to pursue a patent. See also Invention Reporting in Section 12.6.

11.5 Technical Data Rights: Rights in technical data, including software, developed under the award terms resulting from proposals submitted under this CSO, generally remain with the awardee. The Government obtains a royalty-free license to use such technical data only for Government purposes during the period commencing with contract/Other Transaction award and ending after 20 years. This data should be marked with the restrictive legend specified in DFARS 252.227-7018 or similar. Upon expiration of the 20 year restrictive license, the Government has Government Purpose Rights in the SBIR data. During the license period, the Government may not release or disclose SBIR data to any entity other than its support services contractors except (1) for evaluation purposes; (2) as expressly permitted by the contractor; or (3) use, release, or disclosure is necessary for emergency repair or overhaul of Government-operated items. See DFARS clause 252.227-7018, "Rights in Noncommercial Technical Data and Computer Software – Small Business Innovation Research (SBIR) Program" at https://www.ecfr.gov/cgi-bin/text-idx?rgn=div5;node=48%3A3.0.1.8.48#se48.3.252_1227_67018.

If a proposer plans to submit assertions IAW DFARS 252.227-7017 or similar award term, those assertions must be identified and restrictions MUST be included in the proposal submission. Award cannot be executed until assertions are approved or mutually agreed-upon during negotiations.

11.6 Invention Reporting: SBIR awardees must report inventions to the Component within two months of the inventor's report to the awardee. The inventions report may be accomplished by submitting paper documentation, including the Edison Invention Reporting System at www.iedison.gov for those agencies participating in iEdison.

11.7 Final Technical Reports:

a. **Content:** A final report is required for each award. The reports must contain detail regarding the project objectives, work performed, results obtained, and estimates of technical feasibility. A completed SF 298, "Report Documentation Page," will be used as the report's first page. The Report Documentation Page may be prepared and printed from Defense Technical Information Center's (DTIC's) site at http://www.dtic.mil/dtic/submit/guidance_on_submitting_docs_to_dtic.html. Additionally, the final technical report shall contain a completed DD Form 882, "Report of Inventions and Subcontracts."

b. SF 298 Form "Report Documentation Page" Preparation:

1. For unclassified reports, the submitting company should fill in Block 12 (Distribution/ Availability Statement) of the SF 298, "Report Documentation Page," with the following statement: "Distribution authorized to U.S. Government only; Proprietary Information, (Date of Determination). Other requests for this document shall be referred to the Component SBIR Program Office." Note: Data developed under SBIR/STTR awards is subject to DFARS 252.227-7018 or similar protection. AF will review the awardee's Block 12 information and assign the final distribution statement.

2. For additional distribution statement guidance, visit the DTIC site: http://www.dtic.mil/dtic/pdf/distribution_statements_and_reasons.pdf

Block 14 (Abstract), "Report Documentation Page" must include as the first sentence, "Report developed under SBIR/STTR contract (or OT) for topic [insert topic number]. [Follow with the topic title, if possible.]" The abstract must identify the work's purpose and briefly describe that conducted, the findings/results, and potential applications. The abstract will be published by the DoD. Therefore, **it shall not contain proprietary or classified data.** Type "UU" in Block 17.

3. Block 15 (Subject Terms) 298 must include the term "SBIR Report".

c. **Submission:** All final reports are submitted to the awarding AF organization IAW the award document. Companies shall not submit Final Reports directly to DTIC. Delivery is normally required within 30 calendar days after technical program completion.

Requirements regarding other deliverables' submission will be defined in Sections B and C of contract, and Appendix A of Other Transaction for Prototype, award documents. Special submission instructions for CLASSIFIED reports will be defined in the award's delivery schedule.

DO NOT E-MAIL classified or controlled unclassified reports, or reports containing SBIR/STTR Data Rights protected under DFARS 252.227-7018.

d. **Proprietary Information in Proposals:** Information contained in unsuccessful proposals will remain the property of the Applicant. However, the Federal Government may retain copies of all proposals. Public release of information in any proposal submitted will be subject to existing statutory and regulatory requirements. If proprietary information is provided by an Applicant in a proposal, which constitutes a trade secret, commercial or financial information, , it will be treated in confidence, to the extent permitted by law,

provided that the proposal is clearly marked by the offeror as follows:

- 1) The following legend must appear on the title page of the proposal: This proposal contains information that shall not be disclosed outside the Federal Government and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than evaluation of this proposal, unless authorized by law The Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract if award is made as a result of the submission of this proposal. . . The information subject to these restrictions are contained on all pages of the proposal except for pages [*insert page numbers or other identification of pages that contain no restricted information.*] (End of Legend); and
- 2) The following legend must appear on each page of the proposal that contains information the offeror wishes to protect: Use or disclosure of information contained on this sheet is subject to the restriction on the title page of this proposal.

12.0 PHASE II VOLUNTARY MATCHING FUNDS GUIDANCE

Below guidance discusses relationships between small companies and outside investors for voluntary matching. Matching fund commitments are evidence of commercial potential pursuant to 15 USC 638(e). There is no requirement to provide cost share or match, and proposals including either does not receive preference during peer review. Each applicant's commercial potential is evaluated on its own merits IAW non-exclusive criteria in 15 USC 638(e).

12.1 Examples of voluntary cost share or match sources:

- Funding from small business affiliates in support of the proposed R/R&D is generally considered cost share.
- Investment from **outside** sources, which includes other companies, state or local Governments, venture capital firms, individual "angel" investors, non-SBIR/non-STTR Federal Government programs, or any combination thereof, is considered cost match. This does not include the small business's owner, their family members, and/or "affiliates" of the small business, as defined in 13 CFR Section 121.103, as highlighted below:
 - Concerns are affiliates when one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.
 - Factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships are considered in making affiliation determinations.
 - Individuals or firms with identical or substantially identical business or economic interests, such as family members, persons with common investments, or firms economically dependent through contractual or other relationships, may be treated as one party with such interests aggregated. While the proposal must state whether funding is from external or internal sources, the Contracting Officer and the SBA have the discretion to designate an entity as an "outside investor," regardless of the designation in the proposal.
- In contrast to cost-sharing, cost match must be an arrangement by which the outside party provides cash to the small company in return for such items as equity; a share of royalties; rights in the technology; a percentage of profit; an advance purchase order for products resulting from the technology; Federal funds transferred to the AF SBIR/STTR Center of Excellence Finance Division (AFRL/SBRF) via Military Interdepartmental Purchase Request (MIPR), or any combination thereof.

The AF SBIR/STTR CoE reserves the right to adjust these guidelines at any time. Any changes to these guidelines will be sent to the eligible companies and posted online via amendment to this solicitation.

12.2 Voluntary Matching Investment Timing/Logistics

(1) Can Entity E's investment in Small Company S during the first month of S's Phase I SBIR performance qualify as a matching contribution to qualify S for Matching?

Yes, provided E is an outside investor and the other Voluntary Matching conditions are met. The investment can occur at any time after the start of Phase I performance.

(2) Small Company A, which won a Phase I award, spins off Small Company B to commercialize the SBIR technology. A then convinces Angel Investor I to invest funds in B. Is I's investment in B considered a matching contribution to qualify A for Voluntary Matching?

For Angel Investor I's investment in Small Company B to qualify Small Company A for Matching, USAF must determine if A and B are substantially the same entity as evidenced, for example, by meeting the "affiliates" definition " in 13 C.F.R. Sec.121.103. If USAF determines A and B are substantially the same entity, I's investment in B could qualify A for Voluntary Matching. Of course, the parties must also meet the other

conditions for Voluntary Matching, e.g., I must be an outside investor.

(3) Can Entity E's investment in Small Company S before the submission of S's Direct to Phase II SBIR proposal qualify as a matching contribution to qualify S for Matching?

Yes, provided E is an outside investor and the other Matching conditions are met. The investment can occur at any time after the **pre-release date** of Phase II proposal instructions, and no later than 90 calendar days after award.

13.0 AIR FORCE X20.3 SBIR CSO TOPIC INDEX

- 13.1 AF203-CSO1 Phase I Open Call for Innovative Defense-Related Dual-Purpose Technologies/
Solutions with a Clear AF Stakeholder Need
- 13.2 AF203-CSO2 Space and Missiles Center (SMC) Pitch Day
- 13.3 AF203-CSO3 AF Life Cycle Management Center Rapid Sustainment Office (AFLCMC/RSO) Pitch
Day
- 13.4 AF203-DCSO1 Direct to Phase II Call for Innovative Defense-Related Dual-Purpose
Technologies/Solutions with a Clear Air Force Stakeholder Need
- 13.5 AF203-DCSO2 Simulators Pitch Day Project for Lightweight or Modular Simulators
- 13.6 AF203-DCSO3 Digital Engineering Pitch Day
- 13.7 AF203-DCSO4 Industry Technologies Advancing Materials and Manufacturing Processes for
Attritable Structures, Engines, and Sensors of Autonomous Unmanned Aerial
and Space Systems

AF203-CSO1 TITLE: Phase I Open Call for Innovative Defense-Related Dual-Purpose Technologies/
Solutions with a Clear AF Stakeholder Need

RT&L FOCUS AREA(S): Biotechnology Space; Quantum Sciences; Microelectronics; Hypersonics; Directed Energy; Cybersecurity; Network Command, Control and Communications; Nuclear; Autonomy; Artificial Intelligence/ Machine Learning; 5G; General Warfighting Requirements (GWR)
TECHNOLOGY AREA(S): Ground Sea, Nuclear, Weapons, Bio Medical, Sensors, Electronics, Chem Bio Defense, Space Platform, Materials, Information Systems, Human Systems, Air Platform Battlespace

OBJECTIVE: This is an AF Special Topic in partnership with AFWERX. Please see the above AF Special Topic instructions for further details. Phase I awards will have a maximum of \$50,000 SBIR funds. The period of performance will be three months, including two months technical effort and one month for reporting. Phase II awards will have a maximum of \$750,000 SBIR funds. The period of performance will be 15 months, including 12 months technical performance and three months for reporting. The objective of this topic is to explore Innovative Defense-Related Dual-Purpose Technologies not covered by other specific SBIR topics. Therefore, the topic will explore options for solutions outside the AF's current focus fields but could be useful. An additional objective is to grow the AF's industrial base. This topic is intended to reach companies capable of completing a feasibility study and prototype validated concepts under accelerated Phase I and II schedules. This topic is specifically aimed at later stage development rather than earlier stage basic science and research.

DESCRIPTION: The AF is a large and complex organization consisting of many functions with similar counterparts in the commercial sector. The AF wishes to explore innovative technology domains with demonstrated commercial value in the non-Defense sector, i.e., through existing products/solution, in order to obtain Air Force applications, i.e., Dual-Purpose Technologies/ Solutions. It is impossible to release SBIR topics addressing every AF technological area. Therefore, this topic is seeks open ideas and technologies covering topics not currently covered. It is important potential solutions have a high probability of keeping pace with the technological change. Thus, they should be closely tied to commercial technologies and solutions supporting the solution's development. This topic is meant for non-Defense commercial solutions to innovatively adapt to meet DoD stakeholders' needs in a short timeframe, at a low cost. Solutions should be focused on the three areas listed below, meeting as many as possible.

1. Financial Sustainability – Offeror(s) should demonstrate financial sustainability in both the solution and company. This is most relevant when supported by sales to non-Defense clients and other private investment sources.
2. Defense Need – Offeror(s) should demonstrate understanding of the fit between their solution and Defense stakeholders. Offeror(s) may provide indication of a Defense 'need' by including evidence of preliminary discussions with AF stakeholders.
3. Technical/Team – The proposed approach's soundness, technical merit, and innovation and incremental progress toward fulfilling a need. It also includes proposed team members' qualifications and ability to execute the proposed approach.
4. In summary, proposals for this topic should demonstrate a high probability of identifying a product-market fit between an AF end user and the proposed solution through a non-Defense commercial solution's adaptation. This is initiated through proposal of a mature non-Defense technical solution and a starting point to find an AF customer.

BROAD TECHNOLOGY AREAS AND SPECIFIC USER NEEDS FOR AFWERX' 20.2 OPEN TOPICS

The topic is truly 'Open' (agnostic of industry, technology, and problem area), to facilitate streamlined customer discovery for Phase I companies. In Phase I, certain problem areas for which potential Customers and/or funding exists have already been identified. These areas, which are broken out into broad Technology Areas as described in Section 2.0.

Technology Areas – The list of Technology Areas may be found in Section 2.0 of this document. If a Technology Area is applicable, please note this on the application slide deck's first slide. Also include the Technology Area ID # in the 'Keywords' areas of the online SBIR application, e.g., TA-001. The alignment between a proposal and a Technology Area can strengthen an application. Note, this does not change the requirement to demonstrate the Defense need as listed above, but may complement it. This also does not preclude companies looking to solve other problems not listed in the Technology Areas to submit to this topic; it is simply intended to give indications of AF special emphasis areas at this time.

PHASE I: Conduct feasibility-related experimental or theoretical R/R&D to validate the product-market fit between the proposed solution and a potential AF stakeholder. Define a clear, immediately actionable plan for a trial with the proposed solution and the AF customer. This feasibility study should directly address:

1. Clearly identify the prime potential AF end user(s) from the non-Defense commercial offering to solve the AF need, i.e., how it has been modified.
2. Describe integration cost and feasibility with current mission-specific products.
3. Describe if and how the demonstration can be used by other DoD or Governmental customers

The funds obligated on the resulting Phase I SBIR contracts will be used solely to conduct a thorough feasibility study. Prototypes may be developed during Phase I to better address the innovative technology's risks and potential payoffs.

PHASE II: Continue R/R&D to develop, install, integrate and demonstrate a prototype system determined to be the most feasible solution during the Phase I feasibility study. This demonstration should focus specifically on:

1. Evaluating the proposed solution against the objectives and measurable key results defined in the Phase I feasibility study.
2. Describing in detail how the solution differs from the non-Defense commercial offering to solve the AF need and how to scale to be adopted widely, i.e., how it can be modified for scale.
3. The proposed solution's clear transition path including consideration of all affected stakeholders' inputs. This would include, but not be limited to, end users, engineering, sustainment, contracting, finance, legal, and cyber security.
4. Providing specific details about the solution's integration with other current and future solutions.
5. Explaining the solution's sustainability, i.e., supportability.
6. Identifying other DoD or Governmental customers interested in the solution.

PHASE III DUAL USE APPLICATIONS: Some solutions may go straight from Phase I to Phase III as soon as the product-market fit is verified. The contractor will transition the adapted non-Defense commercial solution to provide expanded mission capability for a broad range of potential Governmental and civilian users and alternate mission applications.

NOTES:

- a. To answer questions about this topic, AFWERX will utilize teleconferences. Details will be made available when plans are finalized. The SITIS Q&A system is available until then.
- b. AF SBIR/STTR Phase I awards are FAR-based firm fixed price purchase orders. Phase II awards are either FAR-based firm fixed price contracts or Other Transactions for Prototype. Firms' SAM registrations shall reflect "Yes" for 'Do you wish to bid on contracts?' to be eligible for awards. Otherwise, the proposal will not be considered for award. For more information, visit SAM.gov.
- c. If already registered in SAM, ensure the CAGE code, company name, address information, DUNS numbers, etc., are correct and current. In the 15 slide deck, insert a SAM.gov screenshot including the current CAGE code, DUNS number, and business address, as well as the registration for 'All Contracts'.
- d. Purchase orders shall be signed and emailed back to AFRL/SBRK at sbrk.sprints@us.af.mil within five business days of receipt or the award will not be issued.
- e. The 'DoD SBIR/STTR Programs Funding Agreement Certification' form must be completed and signed at the time of *Proposal Submission* and can be found at:
<https://www.afsbirsttr.af.mil/Portals/60/Pages/Phase%20I-II/SBIR-STTR-Phase-I-II-Funding%20Agreement%20Certification.pdf>
- f. It is the offeror's responsibility to answer the SBIR Cover Sheet and 'DoD SBIR/STTR Programs Funding Agreement Certification' questions, assuring data in the proposal and SAM.gov are aligned.
- g. While these are firm fixed price purchase orders, it is important companies include the cost volume in the SBIR online application with reasonable fidelity for Government Contracting Officers to determine the proposed efforts' reasonableness
- h. Proposed technologies may be restricted under the International Traffic in Arms Regulation (ITAR) which controls defense-related materials/services import/export, or the Export Administration Regulation (EAR), controlling dual use items. Offerors must review the U.S. Munitions List, <https://www.law.cornell.edu/cfr/text/22/121.1>, and provide a tentative determination regarding applicability to their proposed efforts. If determined applicable, a certified DD Form 2345, Militarily Critical Technology Agreement, must be submitted with the proposal. Information regarding the application process and instructions for form completion are found at <https://www.dla.mil/HQ/LogisticsOperations/Services/JCP/DD2345Instructions/>.

If subject to ITAR, involvement of foreign nationals may be restricted. "Foreign National" is defined in 22 CFR 120.16 as a natural person who is neither a lawful permanent resident (8 U.S.C. § 1101(a)(20)), nor a protected individual (8 U.S.C. § 1324b(a)(3)). It also includes foreign corporations, business associations, partnerships, trusts, societies, other entities/groups not incorporated/organized to do business in the United States, international organizations, foreign governments, and their agencies/subdivisions. Offerors must identify foreign national team members and provide their countries of origin, visa/work permits possessed, and Work Plan tasks assigned. Additional information may be required during negotiations to verify eligibility. Even if eligible, participation may be restricted due to U.S. Export Control Laws. NOTE: Export control compliance statements are not all-inclusive and do not remove submitters' liability to 1) comply with applicable ITAR/EAR export control restrictions or 2) inform the Government of potential export restrictions as efforts proceed.

REFERENCES:

- FitzGerald, B., Sander, A., & Parziale, J. (2016). Future Foundry: A New Strategic Approach to Military- Technical Advantage. Retrieved 12 June 2018, <https://www.cnas.org/publications/reports/future-foundry>. ;
- Blank, S. (2016). The Mission Model Canvas: An Adapted Business Model Canvas for Mission-Driven Organizations. Retrieved 12 June 2018, <https://steveblank.com/2016/02/23/the-mission-model-canvas-an-adapted-business-model-canvas-for-mission-driven> ;
- DoD 2018 National Defense Strategy of the United States Summary, 11. Retrieved from <https://www.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>

KEYWORDS: Open, Other, Disruptive, Radical, Dual-Use, Commercial

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AF203-CSO2 TITLE: Space and Missile Systems Center (SMC) Pitch Day

RT&L FOCUS AREA(S): Space; Microelectronics; Cybersecurity; Network Command, Control and Communications; Artificial Intelligence/ Machine Learning; General Warfighting Requirements (GWR)
TECHNOLOGY AREA(S): Sensors, Electronics, Space Platform, Materials, Information Systems, Human Systems, Battlespace

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), 22 CFR Parts 120-130, which controls the export and import of defense-related material and services, including export of sensitive technical data, or the Export Administration Regulation (EAR), 15 CFR Parts 730-774, which controls dual use items. Offerors must disclose any proposed use of foreign nationals (FNs), their country(ies) of origin, the type of visa or work permit possessed, and the statement of work (SOW) tasks intended for accomplishment by the FN(s) in accordance with section 3.5 of the Announcement. Offerors are advised foreign nationals proposed to perform on this topic may be restricted due to the technical data under US Export Control Laws.

OBJECTIVE: The Space and Missile Systems Center, a subordinate unit of U.S. Space Force, is the center of technical excellence for developing, acquiring, fielding and sustaining military space systems. SMC's mission is to deliver resilient and affordable space capabilities. The center is responsible for on-orbit check-out, testing, sustainment and maintenance of military satellite constellations and other Department of Defense space systems.

DESCRIPTION: A Phase I award will be completed over three months with a maximum award of \$50K. The Space Force is seeking commercial solutions to improve our portfolio of military space systems. These include, but are not limited to:

- Battle Management Command and Control (BMC2): Ability to observe, control, and assess the space domain on tactically relevant timelines to support joint, multi-domain operations. Secure interoperability and networking of multiple proliferated military and commercial 100+ satellite constellations
- Data Analytics: Ability to quickly convert data, stored in various locations and levels, to actionable information for Space Domain Awareness (SDA), Intelligence and Warning (I&W), Battle Management Command and Control (BMC2), anomaly detection and predictive analysis, etc. Distributed on-orbit automated processing of sensor data to reduce downlink requirements. Capture lessons learned, best practices, and repeated errors to inform operator training and battle plans.
- Combat Cloud: Secure communication options to create path diversity between operations center and satellite for Telemetry, Tracking, and Commanding (TT&C) and mission data. Ubiquitous satellite communication to include crosslinks, multi-purpose ground antennas, and automated data routing creating a robust data transport layer.
- Theater Delivery/Integration: Collect, process, exploit, and disseminate data to support warfighter Intelligence, surveillance, and reconnaissance (ISR), missile warning, Positioning, Navigation, and Timing (PNT), Space Domain Awareness (SDA), weather, and Satellite Communication (SATCOM) requirements.
- Warfare Center: Enhanced, end-to-end combined architectures, infrastructure and tools that enable enterprise scheduling, testing, training, and Tactics, Techniques, and Procedures (TTP) development against realistic, representative threats. Virtual environment enabling rapid architectural design studies and change analysis enabling data-driven decision making.

- **Advanced Production/Scalability of Capability:** Options such as non-traditional weather sensors, launch, data exploitation, and use of allied and commercial capabilities. Affordable employment of on-orbit servicing, hosted payloads, proliferation, diversification, and production on demand (both ground and on-orbit). Rapid/innovative production technologies such as additive manufacturing and enabling factors such as standardized interfaces and common components. Machine learning to accelerate analysis of SV payload/sensor integration using 3-D digital models.
- **Space Logistics:** Opportunities to provide mission capabilities in non-traditional orbits, including sub-orbital, very low LEO, beyond GEO, and cis-lunar space. Enable resiliency through maneuverability by opening up trade spaces for high delta-v propulsion systems and on-orbit refueling/servicing
- **Space Domain Awareness:** Knowledge of space objects, status, activities, threats and environments to enable courses of action.
- **Space Cyber:** Capabilities to enhance space system mission assurance across all segments and across highly cyber-contested system lifecycles, including cyber-secure processing architectures, and tailorable assurance modules. Interest in machine learning and Artificial Intelligence for increased system efficiency, network security monitoring, autonomy, and resilience (AIC2, etc.).
- **Commercial Cyber Threat Intelligence:** Capability/Options to gather and provide commercial intelligence for current and advance persistent threat (APT) on cyber vulnerabilities. Capability to provide threat agent's Tactics, Techniques and Procedures (TTPs) for use in weapons system cyber risk determination.
- **Adopting Commercial Technologies and Practices by the DoD:** Opportunities for the DoD to leverage best commercial practices while meeting strict mission requirements and system certifications. Enable incorporation of cutting edge technologies and practices into solutions that will be accepted by United States Space Force (USSF). Leverage cradle-to-grave Digital Engineering practices to achieve greater performance and affordability in space programs and space enterprise (from requirements development, through system design, V&V, operation, and disposal.)
- **Space hardware/software test:** Enhancing and accelerate test data reviews through continuous aggregation of component, subsystem, and system levels test results, utilizing data analytics (AI/ML) to identify and/or predict defects, bad trends, triage test results.
- **Interactions between on-orbit AI and the production environment:** Integrating the results of on-orbit AI experiences and learning with the production floor to accelerate the transfer of real-world experience to responsive changes/updates to the product.
- **Confidence in AI/ML:** How to gain confidence that a non-deterministic, self-directed, learning system operates as intended. As AI/ML become more prevalent, how to gain incremental confidence prior to fielding.
- **Weather Monitoring:** Technologies to enhance existing space and terrestrial monitoring capabilities to contribute towards a future DoD proliferated weather architecture:
- **Terrestrial:**
- Enhanced scatterometer technology (terrestrial monitoring for high-resolution boundary layer ocean winds)
- Enhanced Microbolometer technology to contribute to future Electro-Optical Infrared (EO/IR) weather mission

- Terrestrial Weather using Space Based Infrared System (SBIRS): Use SBIR/OPIR Data Records to forecast low atmospheric turbulence in order to enhance mission operations for UAVs and aircraft.
- Space Weather:
- Enhanced Far Ultra-Violet technologies (day/night ionospheric LIMB profiles) for space environment monitoring
- Position Navigation & Timing (PNT): Devise and deliver technologies, systems, and techniques to improve PNT accuracy and availability, especially in contested environments. Specific areas of interest include
- Resilient and rapid signal acquisition and signal tracking in adverse conditions (spoofing, jamming, urban canyons, etc.)
- Ability for deployed receivers to use non-core GPS signals
- Reduced SWAP-C for resilient military PNT receiver systems
- Information assurance for use of non-GPS GNSS signals
- Advanced high-speed (100+ MSPS), high-accuracy (14 ENOB) A/D converters for GPS receivers
- Innovative multi-GNSS solutions for assured PNT applications that are resilient to jamming, spoofing, and other emerging threats, employ software defined security features, have low size, weight, and power characteristics.
- Real time signal analysis, playback, and simulation reference systems are needed to support GPS program activities.
- Satellite Communications (SATCOM): Devise and deliver technologies, systems, and techniques to improve SATCOM link resilience, throughput, and reduce user equipment.
- Missile Warning: Devise and deliver technologies, systems, and techniques to improve MW detection and tracking in contested environments.
- Operator Training: Training capabilities that enhance operator's understanding of satellite structure, terminology, fuel usage, orbital elements, command and control, etc that could be accessed and edited anywhere by multi-modal means.
- Miscellaneous: Other missions and focus areas not listed above may be the breakthrough that the Space Force needs to maintain its competitive edge - but doesn't yet realize (e.g. Advanced Telemetry, Tracking, & Commanding (TT&C) Communication, range management and logistics, etc.)

PHASE I: Phase I efforts will focus on technical feasibility. This may include but is not limited to: analysis of existing technologies, conceptualization of new technologies, prototyping activities, user needs identification, and systems integration requirements.

PHASE II: Phase II efforts will focus on prototyping, demonstration, integration, and analysis of innovative technologies.

PHASE III DUAL USE APPLICATIONS: Phase III efforts will focus on transitioning the developed technology to a working commercial or warfighter solution.

REFERENCES:

- Chaplain, C. T. (2016). Space Acquisitions: Challenges Facing DOD as it Changes Approaches to Space Acquisitions. US Government Accountability Office Washington United States.

KEYWORDS: space; command and control; logistics; cyber

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AF203-CSO3 TITLE: AF Life Cycle Management Center Rapid Sustainment Office (AFLCMC/RSO)
Pitch Day

RT&L FOCUS AREA(S): Microelectronics; Autonomy; General Warfighting Requirements (GWR)
TECHNOLOGY AREA(S): Sensors, Electronics, Materials, Human Systems, Air Platform

OBJECTIVE: The Rapid Sustainment Office mission is to leverage mature, new, and emerging technology to reduce sustainment costs and improve readiness.

DESCRIPTION: Six lines of effort have been established to focus the office, simplified to five here: 1. Automation & Robotics, 2. Advanced Manufacturing (AM), 3. Condition Based Maintenance Plus (CBM+), 4. Digital, Rapid, Austere, and 5. Augmented/Virtual Reality (AR/VR) for Geo-Separated Expert & Trainer One. There are eight technical focus areas that cross-cut the six lines of effort: 1. Artificial Intelligence/Machine Learning, 2. Advanced Manufacturing, 3. AR/VR/Extended Reality, 4. Automation and Robotics, 5. Data & Digital Environments, 6. Low Observable Maintenance, 7. Rapid/Austere, and 8. Sustainment Modernization. More detailed descriptions of each can be found at afonso.com. Pain points have been identified from users and used as examples of areas of interest, but are not limited to the following:

- Automation/Robotics:
 - Smart Tool Boxes
 - Vision systems (enabling the robot to detect, orient to and execute work)
 - Mobile automation for depot and flightline sustainment (Move the system to the platform for sustainment activities)
- Advanced Manufacturing (AM):
 - Automated reverse engineering tool with minimal required user interface
 - Part printing method for easily damaged composite components during facilitation of other maintenance (FOM) (i.e. blade seals and bull noses)
- CBM+ Tech Insertion:
 - Ideal Work Unit Code (WUC) Tool—reads narrative and useful fields (i.e. HMC, P/N, etc.), compares WUC selected with available WUC from technical manuals and suggests idealized WUC for use during maintenance forms (i.e. AFTO Form 781A) Quality Control process. Needs to be able to be run in AWS enclave (open source-ideal, Python-current utilization).
- Digital & Rapid/Austere:
 - Disposable containers for harsh or temporary environments to support Low Observable and composite repair, corrosion control, and/or AM
 - Rapidly constructed maintenance structures
 - Predictive Analytics/Algorithm Development (PAD), speech to text for various career fields
 - Components that reduce the need for large logistics tail
 - Parts-supportable high reach capability
 - Multi-platform Test Equipment
- AR/VR:
 - Method to track job status as they are performed
 - Augmented/Extended Reality for maintenance accomplishment
 - Content development enterprise (creation, testing, and life-cycle support)
 - Quick, cost effective process to convert to S1000D format to leverage into a common operating picture for Technical Order viewing at weapon system while performing maintenance

- Geo-separated expert access while performing tasks

The technical areas highlighted above are not meant to be exhaustive as this focus area is designed to be an open topic for any Rapid Sustainment effort that may impact future Air Force missions.

PHASE I: Phase I efforts will focus on technical feasibility. This may include but is not limited to: analysis of existing technologies, conceptualization of new technologies, prototyping activities, user needs identification, and systems integration requirements.

PHASE II: Phase II efforts will focus on prototyping, demonstration, integration, and analysis of innovative technologies.

PHASE III DUAL USE APPLICATIONS: Phase III efforts will focus on transitioning the developed technology to a working commercial or warfighter solution.

REFERENCES:

Gill, J. C. (2019). A Feasibility Study of Additive Manufacturing for Rapid Prototyping at an Air Force Depot (Doctoral dissertation, Northcentral University).

KEYWORDS: Advanced manufacturing; automation; robotics; sustainment

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AF203-DCSO1 TITLE: Direct to Phase II Call for Innovative Defense-Related Dual-Purpose Technologies/Solutions with a Clear Air Force Stakeholder Need

RT&L FOCUS AREA(S): Biotechnology Space; Quantum Sciences; Microelectronics; Hypersonics; Directed Energy; Cybersecurity; Network Command, Control and Communications; Nuclear; Autonomy; Artificial Intelligence/ Machine Learning; 5G; General Warfighting Requirements (GWR)
TECHNOLOGY AREA(S): Ground Sea, Nuclear, Weapons, Bio Medical, Sensors, Electronics, Chem Bio Defense, Space Platform, Materials, Information Systems, Human Systems, Air Platform Battlespace

OBJECTIVE: A Direct to Phase II may be awarded for a maximum period of 15 months, including 12 months technical performance and three months for reporting, at a maximum of \$750,000 SBIR funds. The objective of this topic is to explore Innovative Defense-Related Dual-Purpose Technologies not be covered by other specific SBIR topics, exploring options for solutions potentially outside the current Technology Areas but useful to the AF. This topic seeks companies with capability to complete a feasibility study and prototype validated concepts under an accelerated Phase II schedule. This topic is aimed at later stage development rather than basic science and research.

DESCRIPTION: The Air Force is a large and complex organizations consisting of many functions with similar commercial sector counterparts. The AF is interested in exploring innovative technology domains with demonstrated clear commercial value in the non-defense sector through existing products/solutions for potential AF applications. It is impossible to cover all technology areas with SBIR topics. Thus, this topic is a call for open ideas and technologies covering topics not currently listed. It is important potential solutions have a high probability of keeping pace with technological change. They should be closely tied to commercial technologies supporting solution development. This topic is intended to identify non-Defense commercial solutions to be adapted and expanded innovatively through R/R&D to meet DoD stakeholders' needs in a short timeframe at low cost. Solutions should be focused on the three areas listed below, meeting as many as possible.

1. Financial Sustainability – The offeror(s) should demonstrate financial sustainability for both the solution and the firm. The best solutions demonstrate this by sales to non-Defense clients and other private investment sources.
2. Defense Need – The offeror(s) should demonstrate understanding of the fit between the solution and Defense stakeholders. The best solutions demonstrate this with a signed memo from a specific, empowered AF end-user and customer (likely not the same person) ready and willing to participate in the proposed prototype solution's trial. This should include specific objectives and measurable (quantitative) key results the proposed solution can achieve to meet AF end-user and customer needs.
3. Technical/Team – The proposed approach's soundness, technical merit, and innovation and incremental progress toward fulfilling an AF need and the qualifications of the proposed Principal Investigators/Project Managers, supporting staff, and consultants to execute against the proposed approach.

Proposals should demonstrate a product-market fit between an AF end-user and the proposed R/R&D adaptation of an existing or emerging non-Defense commercial solution. This is accomplished most effectively through a proposal with a mature non-Defense technical solution and a clear understanding of its adaptation to meet an AF customer's specific need, supported by documentation from a specific

motivated, empowered AF end-user and customer ready and willing to participate in the proposed prototype solution's trial.

AREAS OF DEFENSE NEED: There is a significant amount of potential AF defense end-users with interest in the topics found in Section 2.0. Offerors who believe their solution can help address a Technology Area should identify it in the application slide deck. This does not change the requirement to demonstrate the defense need as listed above. Companies with solutions to other problems not listed are also invited to submit under this topic. Technology Areas are simply intended to indicate particular AF interests at this time.

PHASE I: This topic is intended for technology proven ready to move directly into a Phase II SBIR. Therefore, a Phase I award is not required.

PHASE II: Proposals should include development, installation, integration and demonstration of the proposed solution prototype system. This demonstration should focus specifically on:

1. Evaluating the proposed solution against the proposed objectives and measurable key results.
2. Describing in detail how the installed solution differs from the non-defense commercial offering to solve the Air Force need, as well as how it can be scaled for wide adoption, i.e., modified for scale.
3. Identifying the proposed solution's clear transition path, taking into account input from affected stakeholders, including but not limited to, end users, engineering, sustainment, contracting, finance, legal, and cyber security.
4. Specifying the solution's integration with other current and potential future solutions.
5. Describing the solution's sustainability, i.e., supportability.
6. Identifying other specific DoD or Governmental customers for the solution

PHASE III DUAL USE APPLICATIONS: Phase II solutions may transition quickly to Phase III after the product-market fit is verified. The firm will transition the adapted non-defense commercial solution to provide expanded mission capability to a broad range of potential Government/civilian users and alternate mission applications.

NOTES:

- a. Due to heavy interest in this topic, the AF will not answer questions via email, except in rare cases. Teleconferences will be held to efficiently address all questions. Please monitor <https://af-ventures.com/> for specific telecom details.
- b. SBIR solicitations result in contracts and Other Transactions for Prototype, NOT grants. Therefore, SAM.gov registration should include the answer 'YES' to the question 'Do you wish to bid on contracts?' Firms registered to compete for grants only will be ineligible for award under this topic.
- c. Registration in SAM is required to be eligible for award. Please verify the firm's CAGE code, company name, address information, DUNS numbers, etc., prior to submitting a proposal. In the proposal's 15-slide deck, include a screenshot from SAM.gov showing the company's CAGE, DUNS number, and current business address, with verification the firm is registered to receive "All Contracts". It is the firm's responsibility to ensure proposal and SAM data are consistent.
- d. The firm is required to answer all questions on the SBIR proposal cover sheet and 'DoD SBIR/STTR Programs Funding Agreement Certification' completely and accurately.

- e. While awards will firm fixed price, companies must complete the cost volume in the SBIR online application in sufficient detail for the Government to determine costs fair and reasonable.
- f. Proposed technologies may be restricted under the International Traffic in Arms Regulation (ITAR), which controls defense-related materials/services import/export, or the Export Administration Regulation (EAR), controlling dual use items. Offerors must review the U.S. Munitions List, <https://www.law.cornell.edu/cfr/text/22/121.1>, and provide a tentative determination regarding applicability to their proposed efforts. If determined applicable, a certified DD Form 2345, Militarily Critical Technology Agreement, must be submitted with the proposal. Information regarding the application process and instructions for form completion are found at <https://www.dla.mil/HQ/LogisticsOperations/Services/JCP/DD2345Instructions/>.

If subject to ITAR, involvement of foreign nationals may be restricted. "Foreign National" is defined in 22 CFR 120.16 as a natural person who is neither a lawful permanent resident (8 U.S.C. § 1101(a)(20)), nor a protected individual (8 U.S.C. § 1324b(a)(3)). It also includes foreign corporations, business associations, partnerships, trusts, societies, other entities/groups not incorporated/organized to do business in the United States, international organizations, foreign governments, and their agencies/subdivisions. Offerors must identify foreign national team members and provide their countries of origin, visa/work permits possessed, and Work Plan tasks assigned. Additional information may be required during negotiations to verify eligibility. Even if eligible, participation may be restricted due to U.S. Export Control Laws.

NOTE: Export control compliance statements are not all-inclusive and do not remove submitters' liability to 1) comply with applicable ITAR/EAR export control restrictions or 2) inform the Government of potential export restrictions as efforts proceed.

REFERENCES:

- FitzGerald, B., Sander, A., & Parziale, J. (2016). Future Foundry: A New Strategic Approach to Military-Technical Advantage. Retrieved June 12, 2018: <https://www.cnas.org/publications/reports/future-foundry> ;
- Blank, S. (2016). The Mission Model Canvas – An Adapted Business Model Canvas for Mission-Driven Organizations. Retrieved June 12, 2018: <https://steveblank.com/2016/02/23/the-mission-model-canvas-an-adapted-business-model-canvas-for-mission-driven> ;
- US Department of Defense. (2018). 2018 National Defense Strategy of the United States Summary, 11. Retrieved from: <https://www.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>

KEYWORDS: Open, Other, Disruptive, Radical, Dual-Use, Commercial

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AF203-DCSO2 TITLE: Simulator Pitch Day 2020 Projects for Lightweight or Modular Simulators

RT&L FOCUS AREA(S): General Warfighting Requirements (GWR); Cybersecurity; Artificial Intelligence/ Machine Learning

TECHNOLOGY AREA(S): Sensors; Electronics; Battlespace

OBJECTIVE: This topic seeks projects that apply one or more focus areas for aircrew training systems:

1. Virtual reality, augmented reality, mixed reality, extended reality gaming tools applied to aircrew simulation and training
2. Gaming technologies and gamification concepts applied to simulation and training
3. Artificial intelligence, machine learning, and data analytics applied to simulation training
4. High-fidelity, visual, and physics-based effects within the training simulator
5. Cloud computing applied to the development, deployment, and operation of simulation training
6. Secure remote training and instruction
7. Multi-player, multi-aircraft, multi-role networked training simulation environment
8. Advanced computer generated entities within training simulation and synthetic environments
9. Securing commodity hardware and software for military training needs
10. Data analytics applied to the collection and synthesis of design criteria data for simulator development and concurrency modifications

Together, these focus areas can be considered part of the Lightweight Simulator Ecosystem (LSE) - a simulator system based on commodity hardware, providing a low-cost, modular, potentially deployable training system for aircrew positions. These training systems are targeted at the simple end of the training spectrum, yet still strives to incorporate as much capability and fidelity as possible, starting simply and adding capability as experiments and development continues.

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DESCRIPTION: Simulators Pitch Day 2020 Projects target using Commercial Off-the-Shelf (COTS) gaming/training hardware components and gaming software, along the lines of the Pilot Training Next

and other prototype trainers. The modular nature of the design should allow for swap out of components, switching between fixed screens or head-mounted displays for example. The projects shall be designed to be extended and refined over time, starting with a minimum viable product, and adding/improving features and functionality in rapid, initiative releases. This concept is described as the Lightweight Simulator Ecosystem (LSE), an ecosystem as it incorporates individual devices as well as the network in which these are developed and operate.

- Gaming industry hardware, software, and learning tools
- DevSecOps and software factory techniques like Platform One
- Modular Open Systems Architecture approach for building and maintaining a training/simulator system
- Reusable digital components library, e.g. reusable 3D models of aircraft
- Service based architecture
 - Simulation Services: terrain, weather, threat entities, other virtual “players”
 - Learning Services: IOS, Debrief, performance data collection & analytics, course creation & management
 - Control/backend Services: security, authentication, data management, configuration management

Simulators Pitch Day 2020 Projects, contributing to the Lightweight Simulator Ecosystem (LSE) will be developed using current techniques, utilizing a DevSecOps and Continuous Integration/Continuous Delivery model, leveraging PlatformOne and CloudOne or similar accredited infrastructures. Designed using a Modular Open Systems Architecture (MOSA) that allows and encourages multiple vendors to participate and contribute toward the common ecosystem. Development for projects is in IL-4 (unclassified) cloud, accessible by commercial partners for development, with intent of broad participation in development. This development environment will focus on security from the start, targeting a continuous Authority to Operate (ATO).

Projects for Simulators Pitch Day 2020 shall contribute components to an open development library, so that projects of different contributors can reuse components, accelerating project development. Configuration data of weapon system within these projects shall be parameterized, so that the development platform and resulting simulator system can remain at unclass level. Future deployments could update parameters with classified data if installed in a suitable environment.

The Simulators Pitch Day projects shall leverage data collection and analytics for feedback on user performance, providing foundation for performance based training. Of interest are projects that support and utilize virtual flight instruction, remote instruction, group instruction and assessment (multi-student to one instructor). Variations and/or expansions of the projects shall support simulations of multiple crew members on an aircraft. Projects shall operate in a single ship and multi-ship configurations, with shared content such as threats, weather, and terrain.

Multiple awards are expected under the Simulators Pitch Day 2020 topic, with targeted aircraft and crew position training dependent on a match between proposals and available resources at time of award. We anticipate development of any given project to start with basic familiarization training, then adding additional feature/functions to encompass increasing use cases. Projects can build upon existing lightweight training efforts incorporating these into the Lightweight Simulator Ecosystem. Project description will need to collect training tasks and capabilities needed, laying out a development plan for

the rapid build out of capabilities in each iteration. Some sources of training tasks are RAP Checklists, Emergency Procedures, and Weapons & Tactics Training.

PHASE I: Direct to Phase 2 Only

PHASE II: The Direct to Phase IIs for Simulators Pitch Day shall be a multi-award, seeking projects that coordinate to integrate into the overall ecosystem, and address the Simulators Focus Areas in reference 1 below.

Goals and deliverables for Phase II are:

- Develop MOSA for Lightweight Simulator Ecosystem (LSE), building on existing prototypes of game technology based training systems.
- Establish a library of reusable code components, and a development and deployment strategy that can obtain Continuous ATO certification.
- Establish baseline assessment of COTS gaming hardware and tools for inclusion in Authority to Connect, ATO documentation.
- Build a distribution ‘App Store’ for lightweight simulator training content.
- Deploy one or more minimum viable product level aircrew training simulation modules within the LSE.

PHASE III DUAL USE APPLICATIONS: Phase IIIs projects out of this Direct to Phase II Simulators Pitch Day 2020 Topic shall address components and training systems developed herein. We expect projects/companies awarded Direct to Phase II prototypes in this effort to move into production/sustainment under Phase III efforts. In particular, we expect the standup and sustainment of the LSE is an operational environment hosting lightweight simulator training modules developed under Simulators Pitch Day and by similar prototype efforts. Additional major deliverable of Phase III are to publish the MOSA and other standards and documentation for the development of simulator modules in the LSE. As modules and components of the LSE mature, these migrate into the Simulator Common Architecture Requirements & Standards (SCARS) Program of Record.

REFERENCES:

- Simulators Pitch Day Focus Areas, Attachment Simulators-Focus-Areas-D2P2-SBIR-20.3(10Jun2020).pdf;
- Modular Open Systems Approach Memo.
https://www.dsp.dla.mil/Portals/26/Documents/PolicyAndGuidance/Memo-Modular_Open_Systems_Approach.pdf

KEYWORDS: Simulation & Training; Aircraft Simulators; Aircrew Training; Virtual Reality; Gaming Systems, Immersion Training

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AF203-DCSO3 TITLE: Digital Engineering Pitch Day

RT&L FOCUS AREA(S): General Warfighting Requirements; Cybersecurity; Network Command, Control and Communications

TECHNOLOGY AREA(S): Air platform; battlespace; information systems; weapons

OBJECTIVE: This is an AF Direct to Phase 2 Pitch Day Topic. A Phase II may be awarded for a maximum period of 27 months and \$1,000,000.

DESCRIPTION: The AF is seeking to identify innovative Digital Engineering (DE) technologies and processes to field weapon systems more rapidly. These DE innovations include, but are not limited to, virtual work environments, rapid prototyping and demonstration, infrastructure operability, big data management, analysis, and visualization, linking disparate data sources and systems, digital thread and digital twin, 3D printing/additive manufacturing, advanced architecture tools, advanced logistics tools, 2D to 3D conversion/validation, augmented/virtual reality, cyber security, decision analysis, model based systems engineering, model based engineering, software visualization, and cloud/high performance computing (HPC) cost effective infrastructure. The technical areas discussed are not all inclusive and this focus area is designed to be an open topic for any technologies that may impact present or future Air Force missions. In addition, awardees of this topic area will be invited to attend the Air Force Digital Engineering Pitch Day, where companies, along with an identified Air Force transition partner, will be able to pitch their concepts and transition plans for a Phase II Award.

In support of this Air Force Digital Engineering Pitch Day, collider events will be held to facilitate understanding of PEO and private industry challenges and to resolve capability gaps. Finalist chosen will be given sample/mock data sets to demonstrate proof of conceptual design of proposed solutions.

PHASE I: D2P2 Topic

PHASE II: The Direct to Phase II contract period of performance is up to 27 months, including 24 months for technical performance and three months for reporting. The award value will not exceed \$1M. Companies with solutions requiring further prototyping and demonstration prior to a SBIR Phase III award may apply. Awards will provide additional funds to conduct further R/R&D effort on solutions related to digital engineering for Air Force applications. These Phase II awards are intended to provide a path to commercialization, not the final step for the proposed solution. Matching funds from non-SBIR Federal and non-Federal sources are not mandatory. Cost-sharing is also not required. However, cost share or match serves as evidence of commercial potential in accordance with 15 USC 638(e)(4)(B)(ii).

PHASE III DUAL USE APPLICATIONS: Phase III efforts will focus on transitioning the developed technology to a working commercial or warfighter solution.

REFERENCES:

Department of Defense. Office of the Deputy Assistant Secretary of Defense for Systems Engineering. (2018). Digital Engineering Strategy. Washington, DC. <https://fas.org/man/eprint/digeng-2018.pdf>

KEYWORDS: digital engineering; digital twin; digital thread; big data; architecture

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AF203-DCSO4 TITLE: Industry Technologies Advancing Materials and Manufacturing Processes for Attributable Structures, Engines, and Sensors of Autonomous Unmanned Aerial Systems and Space Systems

RT&L FOCUS AREA(S): General Warfighting Requirements; Microelectronics
TECHNOLOGY AREA(S): Sensors; Materials; Air Platform

OBJECTIVE: The objective of this topic is to identify and demonstrate dual-industry technologies, with both defense and commercial applications, of materials and manufacturing processes that can be applied to attributable Unmanned Air Systems (UAS) and low cost space systems. The specific systems and subsystems of interest for this topic include space systems, subsystems, and components AND UAS structures, engines, and sensors. This topic applies to companies capable of completing a feasibility study and demonstrating validated concepts by manufacturing a relevant prototype(s) in an accelerated Phase II schedule. This topic assumes offerors have already completed early stage research and development independent of the SBIR or STTR Phase I processes and are prepared to demonstrate prototype manufacturing capabilities at TRL/MRL 5-6 during Phase II execution.

DESCRIPTION: Legacy and contemporary Air Force systems technologies exhibit high per-unit cost, assume long-term use, exquisite performance and air breathing systems rely heavily on lifetime sustainment and maintenance support. Increasing production, operation, and sustainment systems costs impedes the acquisition of new Air Force technology. Additionally, the Air Force has experienced an increasing time-to-market for fielded systems. Commercially available manufacturing materials and processes are preferred to reduce time-to-market, blunt soaring acquisition costs of complicated, monolithic weapon systems and identify materials and manufacturing processes supporting a range of system manufacturing rates.

PHASE I: D2P2 Topic

PHASE II: Mature the manufacturing process and apply it to the fabrication of a DoD prototype system or major system component. A successful Phase II will 1) make material/process improvements as needed to apply the proposed technology relevant DoD systems'/components' manufacture cost and manufacturing cycle time of the proposed system/component ; (3)Specify in detail how the technology prototype solves an Air Force need and how it can be scaled to meet future anticipated rate production needs; (4) Specify in detail how the manufacturing technology can be applied to a commercial consumer need and how it can be scaled to meet that need

PHASE III DUAL USE APPLICATIONS: Phase III efforts will focus on transitioning the developed technology to a working commercial or warfighter solution.

REFERENCES:

- Baur, Jeffery W., et al. "Experimental Mechanics for Multifunctional Composites and Next Generation UAVs." Mechanics of Composite and Multi-functional Materials, Volume 6. Springer, Cham, 2018. 215-221.

KEYWORDS: manufacturing; low cost components; sensors

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