

Space Development Agency (SDA)
24.4 Small Business Innovation Research (SBIR)
Proposal Submission Instructions

November 16, 2023: Topic pre-releases

November 28, 2023: Topic opens, begin submitting proposals in DSIP

December 28, 2023: Topic Q&A closes to new questions at 12:00 p.m. ET

January 10, 2024: Topic closes, full proposals must be submitted in DSIP no later than 12:00 p.m. ET

INTRODUCTION

SDA is responsible for orchestrating the development and fielding of the DoD's future threat-driven Proliferated Warfare Space Architecture (PWSA), a resilient military sensing and data transport capability via a proliferated space architecture primarily in low Earth orbit (LEO). To achieve this mission, SDA uses novel approaches to accelerate the development and fielding of military space capabilities necessary to ensure U.S. technological and military advantage in space for national defense.

While SDA primarily seeks to acquire mature technologies that can be rapidly fielded to address pressing warfighter capability needs, SDA can also make limited but pivotal investments in research and development activities, particularly when the return on those investments can be leveraged in future acquisitions. SDA views small businesses as critical contributors to the performance of research and development activities supporting national security through space and is soliciting small business participation in the advancement of the PWSA through this BAA.

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

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

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

Specific questions pertaining to the administration of the SDA SBIR Program and these proposal preparation instructions should be directed to: Greg Grozdits, greg.g.grozdits.civ@mail.mil, +1 (318) 436-9434.

This release contains an open topic. As outlined in section 7 of the SBIR and STTR Extension Act of 2022, innovation open topic activities—

- (A) Increase the transition of commercial technology to the Department of Defense;
- (B) Expand the small business nontraditional industrial base;
- (C) Increase commercialization derived from investments of the Department of Defense; and
- (D) Expand the ability for qualifying small business concerns to propose technology solutions to meet the needs of the Department of Defense.

Unlike conventional topics, which specify the desired technical objective and output, open topics can use generalized mission requirements or specific technology areas to adapt commercial products or solutions to close capability gaps, improve performance, or provide technological advancements in existing capabilities.

A small business concern may only submit one (1) proposal to each open topic. If more than one proposal from a small business concern is received for a single open topic, only the most recent proposal to be certified and submitted prior to the submission deadline will receive an evaluation. All prior proposals submitted by the small business concern for the same open topic will be marked as nonresponsive and will not receive an evaluation.

DIRECT TO PHASE II PROPOSAL (DP2) GUIDELINES

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

Proposers interested in submitting a DP2 proposal in response to this topic must provide documentation to substantiate that the scientific and technical merit and feasibility described in the Phase I section of the topic has been met and describes the potential commercial applications. Documentation should include all relevant information including, but not limited to: technical reports, test data, prototype designs/models, and performance goals/results. Work submitted within the feasibility documentation must have been substantially performed by the proposer and/or the PI.

SDA will not evaluate the proposer's related Phase II proposal if it determines that the proposer has failed to demonstrate that technical merit and feasibility has been established or the proposer has failed to demonstrate that work submitted in the feasibility documentation was substantially performed by the proposer and/or the PI.

Feasibility documentation cannot be based upon any prior or ongoing federally funded SBIR or STTR work and DP2 proposals MUST NOT logically extend from any prior or ongoing federally funded SBIR or STTR work.

Technical Volume (Volume 2)

The technical volume must contain two parts:

- Part 1: Feasibility Documentation
- Part 2: Technical Proposal

The feasibility documentation must not exceed 6 pages. The technical proposal must not exceed 10 pages and must follow the formatting requirements provided in the DoD SBIR Program BAA. Any pages in the technical proposal over 10 pages will not be considered in proposal evaluations.

Content of the Technical Volume

Submissions should be per instructions in the SDA DP2 proposal template, attached.

Cost Volume (Volume 3)

The Phase II total award amount will not exceed \$2,045,816. Phase II base must not exceed \$1,250,00 for an 18 month duration and Phase II option must not exceed \$795,816 for an 18 month duration. Costs for the Base and Option must be separated and clearly identified on the Proposal Cover Sheet (Volume 1) and in Volume 3. Proposers must utilize the excel cost volume provided in Volume 3 of the DSIP proposal submission

Please review the updated Percentage of Work (POW) calculation details included in the DoD Program BAA.

Company Commercialization Report (CCR) (Volume 4)

Completion of the CCR as Volume 4 of the proposal submission in DSIP is required. Please refer to the DoD SBIR Program BAA for full details on this requirement. Information contained in the CCR will be considered by SDA during proposal evaluations.

Supporting Documents (Volume 5)

All proposing small business concerns are REQUIRED to submit the following documents to Volume 5:

1. Contractor Certification Regarding Provision of Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment
2. Disclosures of Foreign Affiliations or Relationships to Foreign Countries
3. Disclosure of Funding Sources

Please refer to the DoD Program BAA for more information.

DISCRETIONARY TECHNICAL AND BUSINESS ASSISTANCE (TABA)

SDA will not provide TABA.

EVALUATION AND SELECTION

All proposals will be evaluated in accordance with the evaluation criteria listed in the DoD SBIR Program BAA.

Proposing firms will be notified of selection or non-selection status for a Phase 2 award within 90 days of the closing date of the BAA.

Refer to the DoD SBIR Program BAA for procedures to protest the Announcement.

As further prescribed in FAR 33.106(b), FAR 52.233-3, Protests after Award should be submitted to: justin.a.sliverman.mil@mail.mil

AWARD AND CONTRACT INFORMATION

SDA expects to make multiple Phase II awards, with value up to \$2,045,816 and duration between 12 and 24 months.

SDA SBIR 24.4 Topic Index
Release 1

SDA24-P001 Proliferated Warfighter Space Architecture (PWSA) Advanced Capability
Development Open Topic

SDA24-P001 TITLE: Proliferated Warfighter Space Architecture (PWSA) Advanced Capability Development Open Topic

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Trusted AI and Autonomy; Advanced Computing and Software; Integrated Sensing and Cyber; Hypersonics; Microelectronics; Integrated Network Systems-of-Systems; Space Technology; Renewable Energy Generation and Storage; Advanced Infrastructure & Advanced Manufacturing

OBJECTIVE: Provide novel and innovative new technology supporting the USSF Space Development Agency continued development of the PWSA (Proliferated Warfighter Space Architecture). – The Space Development Agency (SDA) is soliciting proposals for novel architecture concepts, systems, technologies, and capabilities that enable leap-ahead improvements for future tranches of currently planned PWSA (Proliferated Warfare Space Architecture) capability layers, or, enable new capability layers to address other emerging or evolving warfighter needs.

DESCRIPTION: SDA is responsible for defining and monitoring the Department’s future threat-driven space architecture and accelerating the development and fielding of new military space capabilities necessary to ensure U.S. technological and military advantage in space for national defense. To achieve this mission, SDA is responsible for unifying and integrating next- generation space capabilities to deliver the Proliferated Warfare Space Architecture (PWSA), a resilient military sensing and data transport capability via a proliferated space architecture in Low Earth Orbit (LEO). SDA will not necessarily develop and field all capabilities of the PWSA but rather orchestrate those efforts across DoD and fill in gaps in capabilities while providing the integrated architecture.

PHASE I: This topic is accepting Direct to Phase II proposals ONLY. Proposers must provide documentation to substantiate that scientific and technical merit and feasibility of their proposed project. Including references and/or documentation in their proposal demonstrating the technology is ready for the Phase II stage of development. If the small business has performed the Phase I stage-type of research through other funding sources or with their own independent research and development funding and show adequate feasibility with existing research, models, analysis, test or verification, that supports a Direct-to-Phase II award. This allows a small business that has already built a technology prototype and tested its feasibility (i.e. completed Phase-I- type R&D) to move directly into a Phase-II-type R&D. The Direct-to-Phase-II SBIR mechanism eliminates the need for the Small Business Concerns to propose or submit additional small feasibility studies.

PHASE II: SDA has multiple themes and will look at work throughout each of these open topic focus areas. Please review and submit proposals that are based on your best skills, experience and capability to deliver innovative technology to support the SDA mission.

- Theme 1: Integrate Commercial Sensing to Transport Layer
 - Support integration of crosslinks into commercial space sensing
 - Potential Deliverables:
 - On orbit demonstration of commercial data crosslinking directly to SDA Transport Layer
 - BMC3 on-orbit software application
 - Demonstration of space-to-space transfer of PWSA Transport timing and positioning to inform and enhance PNT capabilities of commercial space sensing missions.
 - Must maintain conformance to existing SDA RF and optical standards.
- Theme 2: Develop OISL Technology and Industrial Base
 - Focus Area 1: Photonic Integrated Circuit (PIC) technology
 - Potential Deliverables: Packaged modem and amplifier, SDA-compatible

- Focus Area 2: Low SWaP OISL user terminal for space, air, maritime or ground, asymmetric solutions, such as a modulated retroreflector, that minimize SWaP burden on spacecraft, SDA interoperable
 - Potential Deliverables: EDU, automation of OCT – reduce dependency on satellite bus (give power, data, pointing vector)
- Focus area 3: OCT components and subsystems to reduce SWaP
 - Potential deliverables: Lasers and optical amplifiers (EDFA, SOA, high power, low noise), increased sensitivity optical detectors
- Focus area 4: Technologies to mitigate atmospheric effects of an optical ground station
 - Potential deliverables: Technologies to simplify or eliminate adaptive optics, devices to couple light into single mode fiber for space-to-ground, ground telescope arrays, reducing atmospheric effects on ground-to-space uplink
- Focus area 5: Position, Navigation and Timing (PNT)
 - Deliverables: technologies to achieve sub-nanosecond time transfer, integration of PNT calculations into the OCT as an intrinsic capability
- Focus area 6: All-optical routing / networking
 - Deliverables: optical amplifiers, optical ROADM and related technologies to demonstrate multi-hop routing of data in the optical domain
- Focus Area 7: Transportable Lasercom Ground Station
 - Transportable lasercom ground station, fits within ISO shipping container volume
 - Potential Deliverables
 - Prototype ground terminal
 - Interoperable with SDA, eventually SpaceBACN
 - Tested with SDA space assets
 - Ground modems compliant with SDA standard
 - Provides time transfer to user applications
- Focus Area 8: Non-mechanical beam steering
 - Potential Deliverables: Low reaction-mass gimbal, SDA-compatible
- Theme 3: Cyber
 - Advanced encryption technology
 - Higher throughput
 - Cross domain solution in space
 - Potential Deliverables: Brass board prototype
- Theme 4: Networking
 - High throughput packet router in space
 - Potential Deliverables: Router prototype, ground test
- Theme 5: In-Space Processing
 - Flexible on-orbit processing for sensor fusion
 - Use of artificial intelligence and machine learning
 - Potential Deliverables: Prototype cards ready for integration
 - On-orbit lightweight, distributed, geospatially-enabled database--to maintain near-real time structured or unstructured data on heterogenous processing platforms
 - Potential Deliverable: new or existing modified database technology
- Theme 6: Increase Power for Spacecraft Bus
 - Double the power capability for SDA sized buses
 - Potential Deliverables: Engineering architectures, brass board prototypes
- Theme 7: Generic BMC3 hardware and middleware solutions providing varieties of compute capabilities
 - BMC3 Modules in space
 - a) Image and/or Signal processing

- b) Artificial Intelligence/Machine Learning (AI/ML)
- c) Parallel processing
- d) Multi-INT fusion – Multi-Hypothesis Tracking/Increased Tracking Sensor Mix/Tracking problems
- e) CDS in space – MLS (multi-level security), ingesting commercial ISR data into the PWSA to transport data
- f) Distributed Database/Storage Nodes
- g) Translator / Firewall Router - extending National vs. commercial capabilities
- h) Application specific implementation of Cloud solutions
- Theme 8: Seamless multi-level security (MLS)
 - Robust MLS solution(s) to protect and defend SDA’s proliferated architecture operations across heterogeneous platforms, multiple warfighting domains, and at multiple levels of security
 - Potential Deliverables:
 - Prototype cards ready for on-orbit MLS processing
- Theme 9: High performance, low size, mass, and power clocks for space
 - Advancement of clocks and frequency sources for space-based timekeeping in proliferated LEO space vehicles maintaining synchronization of < 100 ns / day and using no more than 3 W of power.
 - Candidate clocks proven at TRL6 and clearly demonstrate manufacturing readiness for incorporation into LEO space vehicles by 2028
 - Potential Deliverables:
 - Clock and frequency system ready for risk reduction space-based test by 2026

PHASE III DUAL USE APPLICATIONS: Phase III work can apply to providing proliferated low earth orbit communication systems and space based processing that allows the effective and efficient distribution of overhead sensor data. Improving the industrial base to provide more effective optical satellite communications, with more power for the satellite bus and high performance clocks will enhance Phase III development.

REFERENCES:

1. <https://www.sda.mil/home/work-with-us/resources/>

KEYWORDS: Space Platforms; Space Systems; Space Sensors; On-orbit processing; optical inter-satellite links; position, navigation and timing; MLS (Multi-Level Security); Effective Space Power Systems; High performance clocks for space