

**Defense Threat Reduction Agency (DTRA)**  
**DoD 2024.2 Small Business Innovation Research (SBIR) Program**  
**Proposal Submission Instructions**

**INTRODUCTION**

The Defense Threat Reduction Agency (DTRA) mission is to enable the DoD, the U.S. Government, and International Partners to counter and deter Weapons of Mass Destruction (WMD) Chemical Biological, Radiological, Nuclear) and Improvised Threat Networks. The DTRA SBIR program is consistent with the purpose of the Federal SBIR/STTR Program, i.e., to stimulate a partnership of ideas and technologies between innovative small business concerns and through Federal-funded research or research and development (R/R&D).

The approved FY24.2 topics solicited for the Defense Threat Reduction Agency (DTRA) Small Business Innovation Research (SBIR) Program are included in these instructions followed by the full topic description. Offerors responding to this Broad Agency Announcement (BAA) must follow all general instructions provided in the related Department of Defense Annual Program BAA and submit proposals by the date and time listed in this release. Specific DTRA requirements that add to or deviate from the DoD Annual Program BAA instructions are provided below with references to the appropriate section of the DoD document.

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

- The DoD Annual Program BAA is located at: <https://www.defensesbirsttr.mil/SBIRSTTR/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>.

The DTRA Small Business Innovation Research (SBIR) Program is implemented, administered, and managed by the DTRA SBIR/STTR Program Office. Specific questions pertaining to the administration of the DTRA SBIR program and these proposal preparation instructions should be directed to:

Mr. Mark D. Flohr  
DTRA SBIR/STTR Program Manager  
[Mark.D.Flohr.civ@mail.mil](mailto:Mark.D.Flohr.civ@mail.mil)  
Tel: (571) 616-6066

Defense Threat Reduction Agency  
8725 John J. Kingman Road  
Stop 6201  
Ft. Belvoir, VA 22060-6201

For technical questions about specific topic requirements during the pre-release period, contact the DTRA Technical Point of Contact (TPOC) for that specific topic. To obtain answers to technical questions during the formal BAA open period, visit: <https://www.dodsbirsttr.mil/submissions/login>. For questions regarding the Defense SBIR/STTR Innovation Portal, contact DSIP Support at: [dodsbirsupport@reisystems.com](mailto:dodsbirsupport@reisystems.com).

Proposals not conforming to the terms of this announcement will not be considered. DTRA reserves the right to limit awards under any topic, and only those proposals of superior scientific and technical quality as determined by DTRA will be funded.

DTRA reserves the right to withdraw from negotiations at any time prior to contract award. The Government may withdraw from negotiations at any time for any reason to include matters of national security (foreign persons, foreign influence or ownership, inability to clear the firm or personnel for security clearances, or other related issues).

Please read the entire DoD announcement and DTRA instructions carefully prior to submitting your proposal as there have been significant updates to the requirements.

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

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

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

Specific questions pertaining to the administration of the DTR SBIR Program and these proposal preparation instructions should be directed to: [Mr. Mark Flohr, DTRA SBIR/STTR Program Manager; \(mark.d.flohr.civ@mail.mil\)](mailto:Mr.MarkFlohr@DTRA).

## **PHASE I PROPOSAL GUIDELINES**

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

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

The technical volume is not to exceed a 20-page limit and must follow the formatting requirements provided in the DoD SBIR Program BAA. Any pages in the technical volume over 20 pages will not be considered in proposal evaluations.

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

A Phase I Proposal Template is available to provide helpful guidelines for completing each section of your Phase I technical proposal. This can be found at <https://www.dodsirsttr.mil/submissions/learningsupport/firm-templates>.

Offerors should follow the DoD SBIR Program BAA guidelines regarding Technical Volume content.

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

The Phase I Base amount must not exceed \$200,000. For the Cost Volume, The Defense Threat Reduction Agency requires the use of a Microsoft excel spread sheet which is available on the DSIP portal. Note: The DTRA Cost Volume template will be accessible once the Cost Volume is initiated.

Important: when completing the cost volume, enough information should be provided to allow the agency to understand how you plan to use the requested funds if a contract is awarded. Itemized costs of any subcontract or consultant should be provided to the same level as for the prime small business. If an unsanitized version of costs cannot be provided with the proposal, the Government may request it during negotiations if selected. Refer to the instruction provided in the DoD Annual SBIR program BAA for additional details on the content of the Cost Volume.

Note: Cost for travel funds must be justified and related to the needs of the project.

The Phase I Base amount, notwithstanding the amount allocated for TABA, must not exceed \$200,000.00. All costs must be clearly identified on the Proposal Cover Sheet (Volume 1) and in Volume 3. [DTRA requires the use of an excel spreadsheet for the Cost Volume. The cost template becomes visible to the offeror when the Cost Volume is initiated.]

Please review the updated Percentage of Work (POW) calculation details included in the DoD Program BAA. For SBIR projects, DTRA normally will not accept any deviation to the POW requirements however if discovered during review in Contracting the offeror may be allowed to revise the cost proposal to be in line with the POW requirements.

Page Limit, Cost and Duration:

Project Phase	Technical Vol Page Limit	Cost	Duration
Phase I	20 pages	\$200,000.00	7 Months
Phase II	40 pages	\$1,300,000.00	24 Months

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

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

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

Volume 5 is provided for proposing small business concerns to submit additional documentation to support the Coversheet (Volume 1), Technical Volume (Volume 2), and the Cost Volume (Volume 3). Please refer to the DoD Program BAA for more information as to additional supporting documents or information that may be included in 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

Note 1: Offerors having any concerns pertaining to mandatory requirements number 2 as stated above should provide a mitigation plan addressing the concerns.

Note 2: A completed proposal submission in DSIP does NOT indicate that the mandatory supporting documents have been uploaded. It is the responsibility of the proposing small business concern to ensure that the mandatory documents listed above have been included with the proposal submission.

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

The Defense Threat Reduction Agency does not participate in the Direct to Phase II (DP2) proposal submission program.

#### **PHASE II PROPOSAL GUIDELINES**

Phase II proposals may only be submitted by Phase I awardees.

Those small business concerns submitting a Phase II proposal should plan to submit a fully developed proposal into the DSIP proposal system within thirty (30) days after the end of the Phase I period of performance. The small business concern may or may not be automatically notified of the recommended proposal due date.

The Phase II proposal Technical Volume should generally follow the outline and structure of the Phase I to include benefits or lessons learned from the Phase I effort.

DTRA plans on a Phase II project not to exceed \$1,300,000.00 notwithstanding TABA, and two (2) years duration.

#### **DISCRETIONARY TECHNICAL AND BUSINESS ASSISTANCE (TABA)**

In accordance with the Small Business Act (15 U.S.C. 632), DTRA will authorize the recipient of a Phase I or Phase II SBIR award to purchase Discretionary Technical & Business Assistance services, such as access to a network of scientists and engineers engaged in a wide range of technologies, or access to technical and business literature available through on-line data bases, for the purpose of assisting in areas such as:

- making better technical decisions concerning such projects;
- solving technical problems which arise during the conduct of such projects;
- minimizing technical risks associated with such projects;
- developing/ commercializing new commercial products/processes resulting from such projects; and,
- meeting cyber security requirements.

If you are proposing use of Discretionary Technical and Business Assistance (TABA), you must provide a cost breakdown in the Cost Volume under “Other Direct Costs (ODCs)” and provide a one-page description of the vendor you will use and the Technical and Business Assistance you will receive. For the Phase I project, the amount for TABA may not exceed \$6,500 per award. For the Phase II project, the TABA amount may be less than, equal to, but not more than \$50,000 per project. The description should be included in Volume 5 of the proposal.

Approval of Discretionary Technical and Business Assistance is not guaranteed and is subject to review of the contracting officer.

For Discretionary Technical and Business Assistance, small business concerns may propose one or more vendors. Additionally, business-related services aimed at improving the commercialization success of a small business concern may be obtained from an entity, such as a public or private organization or an agency or other entity established or funded by a State that facilitates or accelerates the commercialization of technologies or assists in the creation and growth of private enterprises that are commercializing technology.

#### **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 I award within 90 days of the closing date of the BAA. DTRA has a single Evaluation Authority (EA) for all proposals received under this solicitation. The EA either selects or rejects Phase I and Phase II proposals based upon the results of the review and evaluation process plus other considerations including limitation of funds, and investment balance across all the DTRA topics in the solicitation. To provide this balance, a lower rated proposal in one topic could be selected over a higher rated proposal in a different topic. DTRA reserves the right to select all, some, or none of the proposals in a particular topic.

#### **Notifications.**

Following the EA decision, the DTRA SBIR/STTR office will release notification e-mails of selection or non-selection status for a Phase I award within 90 days of the closing date of the BAA. The E-mails will be sent to the addresses provided for the Principal Investigator and Corporate Official.

Offerors may request a debriefing of the evaluation of their not selected proposal and should submit this request via email to: [dtra.belvoir.RD.mbx.sbir@mail.mil](mailto:dtra.belvoir.RD.mbx.sbir@mail.mil) and include "SBIR 24.2 / Topic XX Debriefing Request" in the subject line. Debriefings are provided to help improve the offeror's potential response to future solicitations. Debriefings do not represent an opportunity to revise or rebut the EA decision.

For selected offers, DTRA will initiate contracting actions which, if successfully completed, will result in contract award. DTRA Phase I awards are issued as fixed-price purchase orders with a maximum period of performance of seven-months. DTRA may complete Phase I awards without additional negotiations by the contracting officer or without opportunity for revision for proposals that are reasonable and complete.

### **DTRA Support Contractors**

Select DTRA-employed support contractors may have access to contractor information, technical data or computer software that may be marked as proprietary or otherwise marked with restrictive legends. Each DTRA support contractor performs under a contract that contains organizational conflict of interest provisions and/or includes contractual requirements for nondisclosure of proprietary contractor information or data/software marked with restrictive legends. These contractors require access while providing DTRA such support as advisory and assistance services, contract specialist support, and support of the Defense Threat Reduction Information Analysis Center (DTRIAC). The contractor, by submitting a proposal or entering into this contract, is deemed to have consented to the disclosure of its information to DTRA's support contractors.

The following are, at present, the prime contractors anticipated to access such documentation: Broadleaf Inc. (contract specialist support); Kent, Campa and Kate, Inc. (contract closeout support), ARServices (Program Management Advisory and Assistance Services A&AS), Systems Planning and Analysis, Inc. (Subject Matter Expertise A&AS), Amentum (A&AS), Polaris Consulting (Small Business Program Support), Seventh Sense Consulting, LLC (Acquisition Support), Savantage Solutions (Accounting and Financial Systems Support); TekSynap Corporation and Kapili Services, LLC (DTRIAC). This list is not all inclusive (e.g., subcontractors) and is subject to change.

### **Protests.**

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: (a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the Government Accountability Office (GAO), shall be served on the Contracting Officer (addressed to Mr. Herbert Thompson, Contracting Officer, as follows) by obtaining written and dated acknowledgment of receipt from (if mailed letter) Defense Threat Reduction Agency, ATTN: AL-ACQ (Mr. Herbert Thompson), 1680 Texas Street, Kirtland AFB, NM 87117. If Federal Express is used for the transmittal, the appropriate address is: Defense Threat Reduction Agency, ATTN: AL-ACQ (Mr. Herbert Thompson), 8151 Griffin Avenue SE, Building 20414, Kirtland AFB, NM 87117-5669.

### **AWARD AND CONTRACT INFORMATION**

DTRA plans on Phase I projects for a seven (7) month period of performance with six months devoted to the research and the final month for the final report. The award size of the Phase I contract is no more

than \$200,000.00 notwithstanding a maximum of \$6,500.00 for Discretionary Technical and Business Allowance (TABAs). For a Phase II project, DTRA plans on a 24-month period of performance. The award size of a Phase II contract is no more than \$1,300,000.00 notwithstanding a maximum of \$50,000.00 for Discretionary Technical and Business Allowance (TABAs) for the entire project.

#### **ADDITIONAL INFORMATION**

The International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through 130, and the Export Administration Regulations (EAR), 15 CFR Parts 730 through 799, will apply to all projects with military or dual-use applications that develop beyond fundamental research, which is basic and applied research ordinarily published and shared broadly within the scientific community. More information is available at [https://www.pmddtc.state.gov/ddtc\\_public](https://www.pmddtc.state.gov/ddtc_public).

The technology within some DTRA topics is restricted under export control regulations including the International Traffic in Arms Regulations (ITAR) and the Export Administration Regulations (EAR). ITAR controls the export and import of listed defense-related material, technical data and services that provide the United States with a critical military advantage. EAR controls military, dual-use and commercial items not listed on the United States Munitions List or any other export control lists. EAR regulates export-controlled items based on user, country, and purpose. **The offeror must ensure that their firm complies with all applicable export control regulations.**

NOTE: Export control compliance statements found in these proposal instructions are not meant to be all inclusive. They do not remove any liability from the submitter to comply with applicable ITAR or EAR export control restrictions or from informing the Government of any potential export restriction as fundamental research and development efforts proceed.

#### **Cyber Security**

Any Small Business Concern receiving an SBIR award is required to provide adequate security on all covered contractor information systems. Specific security requirements are listed in DFARS 252.204.7012, and compliance is mandatory.

#### **Feedback**

In an effort to encourage participation in, and improve the overall SBIR award process, offerors may submit feedback on the SBIR solicitation and award process to: [dtra.belvoir.RD.mbx.sbir@mail.mil](mailto:dtra.belvoir.RD.mbx.sbir@mail.mil) for consideration for future SBIR BAAs.

**\*END\***

## **DTRA SBIR 24.2 Topic Index**

DTRA242-001 Statistical Analysis of Neutron Relative Biological Effectiveness

DTRA242-002 Understanding Fragment Impact on Responding Surfaces

DTRA242-001 TITLE: Statistical Analysis of Neutron Relative Biological Effectiveness

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Advanced Computing and Software; Biotechnology; Directed Energy

OBJECTIVE: To develop a statistical or computational model to accurately calculate neutron relative biological effectiveness for lethality based on historical data

DESCRIPTION: In a nuclear detonation, gamma and neutron radiation is released. This radiation can have detrimental effects on a human body. Methods to calculate casualties, fatalities, and performance capabilities due to radiation effects require combining the gamma and neutron doses. This is done by multiplying the neutron dose by a factor called the neutron relative biological effectiveness (RBE), and adding that value to the gamma dose. Neutron RBE is part of every radiation injury calculation which is important to many areas of the government from NIAID to COCOMS. It is then important to have an accurate neutron RBE value. Unfortunately, experimentally measuring neutron RBE is very difficult. Neutron RBE is dependent on many biological and physical factors such as tissue type, energy, gamma to neutron ratio, and dose rate. This makes comparing experimental data sets challenging. There have been tens of thousands of experiments probing neutron RBE dating back from the 1950s producing a large dataset. Although these experimental setups differ or their methods are lacking compared to modern abilities, they all are probing the same physical and biological processes. We believe that this data should not be disregarded, and applying modern machine learning or statistical or other computational techniques to this historical data, a model can calculate neutron RBE accurately. Based on time limits of SBIR, we would limit the scope to calculating neutron RBE to lethality endpoint.

PHASE I: Phase I will focus on collecting experimental data in a searchable database that will aid in the model development. Offerors should be able to understand the previous experiments and how they differ from each other. Phase I deliverables will include a final report and a demonstration of the architecture. The report should include statistical analysis of the experimental data.

PHASE II: Phase II effort will focus on the model construction from the collected data. Phase II deliverable will be a prototype demonstration and a final report. The demonstration will showcase calculating lethal neutron RBE value with confidence intervals. The final report should include explanation on the model including advantages, disadvantages and assumptions made, and it can include suggestions for experimental data that can improve the results. The performer will include details about user interfaces (if applicable), any associated executables, and software requirements.

PHASE III DUAL USE APPLICATIONS: The performer should refine the model based on feedback from the demonstration. The data need to be updated according to the newest research. Maintenance and update will be performed in phase III.

#### REFERENCES:

1. Amy Creel, Tyler Dant, Rachel Jennings, Darren Oldson, Aaron Parks, Kiran Sewsankar, Christina Wagner. HENRE 4.0 Technical Reference Manual (DTRA-TR-23-011). Fort Belvoir: DTRA, 2023.
2. Bruce A. Carnes, Douglas Grahm. Neutron Issues in the JANUS Mouse Program. Argonne, Illinois: Biological and Medical Research Division, Argonne National Laboratory, 1990.
3. Daniela L. Stricklin, Jama VanHorne-Sealy, Carmen I. Rios, Lisa A. Scott Carnell, Lany P. Taliaferro. "Neutron Radiobiology and Dosimetry." Radiation Research 195 (2021): 480-496.
4. Daniela Stricklin, Kevin Kramer, Dave Crary, Robert Prins. Review of Deterministic Neutron RBEs for Survivable Personnel Radiation Exposures from Nuclear Detonation Simulations (DTRA-TR-19-001). Fort Belvoir: DTRA, 2019.

5. Hall, Eric J. Radiobiology for the Radiologist. Hagerston, MD: Harpers & Row, 1978.
6. James J. Conklin, Richard I. Walker. Military Radiobiology. San Diego, CA: Academic Press, 1987.
7. Robert E. George, Raymond L. Chaput, David M. Verrelli, Edward L. Barron. "The Relative Effectiveness of Fission Neutrons for Minature Pig Performance Decrement." Radiation Research 48 (1971): 332-345.
8. Strike, T. A. Acute Mortality of Mice and Rats Exposed to 14 MeV Neutrons. Bethesda, MD: Armed Forces Radiobiology Research Institue, n.d.

KEYWORDS: Relative Biological Effectiveness, lethal dosage, Radiation Exposures, NUDET simulations, radiobiology, deep learning, statistical analysis

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DTRA242-002    TITLE: Understanding Fragment Impact on Responding Surfaces

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Advanced Computing and Software; Advanced Materials

OBJECTIVE: Develop techniques for characterization of dust and debris from fragment impacts on responding structures.

DESCRIPTION: Real world CWMD strike kinetic weapons often encounter responding structures such as concrete walls. Fragments from weapons striking responding walls generate dust and debris. It has been shown that dust and debris quench the late-time chemistry that is necessary for agent defeat. The mass, geometry and velocity of fragments are anecdotally believed to change the amount of dust and debris generated; however, no good data sets exist to develop models. Well-characterized experiments and accompanying modeling and simulation (M&S) are needed to determine the amount of dust and debris generated in weapon strike scenarios. Uncertainty quantification and statistical analysis is critical in understanding the stochastic fragmentation process and the accompanying debris generation.

This topic looks to develop new diagnostics, experimental techniques, and modeling to understand fragment impact on responding surfaces such as walls made from concrete, dry wall, geo-materials, or other materials found in target sets as required. This effort would address the impact, fragment-structure interaction, and response including ejected dust and debris. The goal of this effort is the characterization of dust and debris from building surfaces as a function of different impacts. This effort should be able to scale from single lab size fragments and velocities to generic fielded weapons with multiple fragments and post detonation weapon environments.

Prior and concurrent efforts by DTRA and others can and should be utilized for efforts but expectation for this topic is that novel diagnostics, M&S, and experimental techniques will be developed to optimize understanding of fragment impact.

This effort will be linked with other efforts on understanding the effect of dust and debris on the late-time chemistry.

PHASE I: Initial M&S, diagnostics, and experiments

- Initial experiments and modeling of fragmentation – expectation is Phase I will be at the laboratory scale with characterized materials to scope out techniques.
- Develop plans for more complex scenarios with different materials.

PHASE II: Prototype M&S program characterized with complex conditions

- Model able to provide statistical range (particle size, velocity, direction) of dust and debris ejected from a provided generic fragment size and velocity.
- Model capable of multiple impacts from different fragments – incorporating pre-damaged scenarios.
- Model the interaction of the ejected solid with the surrounding environments.
- Develop experimental technique(s) to validate model over a range of fragment and impact velocities that can be used to evaluate weapon effects.

PHASE III DUAL USE APPLICATIONS: Full-scale tests and accompanying model predictions

- Capability to predict dust and debris from various weapons and target scenarios.
- Diagnostics and testing protocol for characterizing dust and debris in full-scale weapon testing.
- Linking this effort with Agent Defeat mission and planning codes such as IMEA.
- Marketing of capability across DoD/DOE.

#### REFERENCES:

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10. Wu, C.T., Wu, Y., Crawford, J.E. & Magallanes, J.M. Three-dimensional concrete impact and penetration simulations using the smoothed particle Galerkin method. Int. J. Impact Eng. 106, 1–17 (2017);
11. H Wang, J Xiao, Y Zheng, Q Yu, Failure and ejection behavior of concrete materials under internal blast. Shock and Vibration, 2016;
12. Meyers, M.A., Dynamic Behavior of Materials. J. Wiley, 1994

KEYWORDS: Dust; Debris; M&S; Responding Surfaces; Testing; Fragment Impact; Diagnostics; Concrete

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