CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM
FY24.4 Small Business Innovation Research (SBIR)
Proposal Submission Instructions

July 09, 2024: Topic issued for pre-release
August 22, 2024: CBD begins accepting proposals in DSIP
September 10, 2024: Topic Q&A closes to new questions at 12:00 p.m. ET
September 24, 2024: Deadline for receipt of proposals no later than 12:00 p.m. ET

The approved FY24.4 topics included in the Chemical and Biological Defense (CBD) Small Business Innovation Research (SBIR) Program is provided in this document. Offerors responding to this Announcement must follow all general instructions provided in the Department of Defense (DoD) Program Announcement, as well as the CBD SBIR Open Topic Instructions provided below, detailing specific CBD SBIR program requirements.

Proposers are encouraged to thoroughly review the DoD Program Broad Agency Announcement (BAA), as well as register for the DoD SBIR/STTR Innovation Portal (DSIP) Listserv to remain apprised of important programmatic and contractual changes.

- Full solicitation documents, component-specific instructions, and topic descriptions are available on DSIP at https://www.dodsbirsttr.mil/submissions/solicitation-documents/active-solicitations. Be sure to select the appropriate BAA cycle and Release number.
- Register for the DSIP Listserv at: https://www.dodsbirsttr.mil/

Please read the entire DoD Announcement and these CBD SBIR instructions carefully prior to submitting your proposal. Important programmatic changes have been incorporated as required by the SBIR and STTR Extension Act of 2022 (Pub. L. 117-183). Also, go to https://www.sbir.gov/about/about-sbir#sbir-policy-directive to read the SBIR/STTR Policy Directive issued by the U. S. Small Business Administration (SBA).

INTRODUCTION

In response to Congressional interest in the readiness and effectiveness of U.S. Nuclear, Biological and Chemical (NBC) warfare defenses, Title XVII of the National Defense Authorization Act for Fiscal Year 1994 (Public Law 103-160) requires the Department of Defense (DoD) to consolidate management and oversight of the Chemical and Biological Defense Program (CBDP) into a single office – Office of the Assistant Secretary of Defense for Nuclear, Chemical and Biological Defense Programs. The Joint Science and Technology Office for Chemical and Biological Defense (JSTO CBD), located at the Defense Threat Reduction Agency (DTRA), provides the management for the Science and Technology component of the Chemical and Biological Defense Program. Technologies developed under the Small Business Innovation Research (SBIR) Program have the potential to transition to the Joint Program Executive Office for Chemical Biological Radiological and Nuclear Defense (JPEO CBRND) if the appropriate level of technology maturity is demonstrated. The JSTO CBD Science & Technology programs and initiatives improve defensive capabilities against Chemical and Biological Weapons of Mass Destruction. The SBIR portion of the CBD Program is managed by JSTO CBD.

The mission of the Chemical and Biological Defense Program is to ensure that the U.S. Military has the capability to operate effectively and decisively in the face of chemical or biological warfare threats at home or abroad. Numerous factors continually influence the program and its technology development priorities. Improved defensive capabilities are essential in order to mitigate the overall impact of chemical and biological threats. The U.S. military requires the finest state-of-the-art equipment and instrumentation available to permit our Joint Force to ‘detect to warn’ and avoid contamination, if

possible – and to be able to sustain operations in a potentially contaminated environment. Further information is available at the Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs homepage at https://www.acq.osd.mil/ncbdp/cbd/

The overall objective of the CBD SBIR Program is to improve the transition or transfer of innovative Chem-Bio technologies to the end user – the Joint Force – in addition to commercializing technologies within the private sector for mutual benefit. The CBD SBIR Program targets those technology efforts that maximize a strong defensive posture in a biological or chemical environment using passive and active means as deterrents. These technologies include chemical and biological detection for both point and stand-off capabilities; individual and collective protection; hazard mitigation (decontamination); medical pre-treatments (e.g., vaccine development and delivery); medical therapeutics (chemical and biological countermeasures); medical diagnostics; Digital Battlespace Management (a.k.a., information systems technology) to include but not limited to modeling and simulation (e.g., meteorological dispersion), disease surveillance, data fusion, and health & human effects to include wearable technologies.

All proposals submitted to the CBD SBIR program must comply to the terms of this Announcement. CBD SBIR reserves the right to limit awards under any topic, and only those proposals of superior scientific and technical quality, as determined by Technical Evaluation Team and the CBD SBIR program office will be funded. CBD SBIR 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, or other related issues).

Use of Foreign Nationals (also known as Foreign Persons), Green Card Holders, and Dual Citizens

See the "Foreign Nationals" section of the DoD SBIR Program Announcement for the definition of a Foreign National (also known as Foreign Persons).

It is the responsibility of ALL offerors proposing who use foreign nationals, green-card holders, or dual citizens, to disclose this information regardless of whether the topic is subject to export control restrictions. Offerors MUST identify any foreign nationals or individuals holding dual citizenship expected to be involved on this project as a direct employee, subcontractor, or consultant. For these individuals, 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 the project. You may be asked to provide additional information during contract negotiations in order to verify the foreign citizen's eligibility to participate on a SBIR 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)).

Proposers responding to this Open Topic BAA must follow all general instructions provided in the Department of Defense (DoD) SBIR Program BAA, paying special attention to the new requirements under the SBIR and STTR Extension Act of 2022 (Pub. L. 117-183). The Chemical and Biological Defense SBIR Program requirements are provided in the instructions below.

Specific questions pertaining to the administration of the Chemical and Biological Defense SBIR Program and these proposal preparation instructions should be directed to: Ms. Abigail L. Roots, Chemical and Biological Defense SBIR/STTR Program Manager, JSTO CBD, at dtra.belvoir.rd.mbx.jsto-cbd-chem-bio-defense-sbir@mail.mil.

FY24.4 Annual BAA Schedule

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 (SBC) may only submit one (1) proposal to each Open Topic. If more than one proposal from a SBC 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 SBC for the same Open Topic will be marked as nonresponsive and will not receive an evaluation.

PHASE I PROPOSAL GUIDELINES

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

Proposal Coversheet (Volume 1)

The proposal coversheet must follow the instructions and requirements provided in the DoD SBIR Program BAA.

The offeror shall certify that to the best of its knowledge and belief, its eligibility information under the SBIR Program is accurate, complete, and current as of the date of the offer.

Technical Volume (Volume 2)

The technical volume is not to exceed 20-pages and must follow the formatting requirements provided in the DoD SBIR Program BAA. No other information included in the other proposal volumes will count against the 5-page Proposal Technical Volume page limit. Pages provided exceeding this length will not be considered for review. The proposal must not contain any font type smaller than 10-point font size (except as a legend on reduced drawings, but not in the tables).

The maximum dollar amount for a Phase I proof-of-concept/feasibility study is $204,582.00 for a period of performance (PoP) of up to six (6) months. The CBD SBIR Program will not accept proposals exceeding this amount for the Phase I effort.

The entire proposal submission must be through the Defense SBIR/STTR Innovation Portal (DSIP) located at: https://www.dodsbirsttr.mil. Any questions pertaining to the DoD SBIR/STTR submission process and system should be directed to DSIP Support: DoDSBIRSupport@reisystems.com

Selection of Phase I proposals will be based upon the three (3) evaluation criteria as mentioned in the DoD BAA. The CBD SBIR Program reserves the right to limit awards under any topic, and only those proposals of superior scientific and technical quality deemed by the Technical Evaluation Team will be funded. All SBIR contract awards, both Phase I and Phase II, are subject to availability of funding.

The brief Period of Performance available for a Phase I project precludes plans that include research involving human or animal subjects as all associated DoD requirements and the necessary approvals must be strictly adhered to and require considerable coordination and significant time for final protocol approvals. See "Research Involving Human Subjects, Biospecimens, and/or Animal Use," below for further information.

Proposals not conforming to the terms of this Announcement, and any unsolicited proposals, will not be considered. All awards are subject to the availability of funding and successful completion of contract negotiations. The Chemical and Biological Defense Program is not responsible for any funds expended by the proposer prior to contract award.

Cost Volume (Volume 3)

The Cost Volume must follow all instructions and requirements provided in the DoD SBIR Program BAA. The Phase I Base amount must not exceed $204,582.00. Total Base cost for Phase I must be clearly identified on the Proposal Cover Sheet (Volume 1) and in Volume 3.

Company Commercialization Report (CCR) (Volume 4)

Completion of the CCR is required and included in Volume 4 of the DSIP portal. Please refer to the DoD SBIR Program BAA for full details on this requirement. Information contained in the CCR will not be considered by the Chemical and Biological Defense Program in the proposal evaluations.

Supporting Documents (Volume 5)

Offerors are welcome to provide Supporting Documents in this section, however these documents will not be considered by the Chemical and Biological Defense Program in the proposal evaluations.

Please note, under the SBIR and STTR Extension Act of 2022 and the SBA SBIR/STTR Policy Directive, proposals are required to include additional forms, as listed below:

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

Fraud, Waste and Abuse (Volume 6)

All offerors must complete the Fraud, Waste, and Abuse training through the DSIP portal (https://www.dodsbirsttr.mil). Please follow the guidance provided via DSIP to complete the required training prior to proposal submission.

To Report Fraud, Waste, or Abuse, please contact:

DoD Inspector General (IG) Fraud, Waste & Abuse
Hotline: (800) 424-9098
hotline@dodig.mil

Additional information on Fraud, Waste and Abuse may be found in the DoD Announcement.

Disclosures of Foreign Affiliations or Relationships to Foreign Countries (Volume 7)

Under the SBIR and STTR Extension Act of 2022 and the SBA SBIR/STTR Policy Directive, proposal submissions are required to submit the Disclosures of Foreign Affiliations or Relationships to Foreign Countries webform as part of Volume 7 (NOTE: PDF uploads will no longer be accepted). Full proposal submissions cannot be certified and submitted by the Corporate Official until Volume 7 is fully completed and the webform is submitted.

Please be aware that the Disclosures of Foreign Affiliations or Relationships to Foreign Countries WILL NOT be accepted as a Supporting Document in Volume 5 of the DSIP proposal submission. Do not upload any previous versions of this form to Volume 5.

For additional details, please refer to Section 2.2 and 4.3 of the DoD BAA Preface.

DIRECT TO PHASE II PROPOSAL GUIDELINES
The Chemical and Biological Defense SBIR Program is not currently participating in Direct to Phase II topics.

PHASE II PROPOSAL GUIDELINES
Offerors may only submit a Phase II proposal after receipt of a Phase I award.

Phase II is the demonstration of the technology that was found feasible in Phase I. A Phase II proposal may not be submitted until sufficient Phase I progress can be evaluated and assessed, and the PoP is nearing completion. The SBC may not submit a Phase II proposal sooner than five (5) months from the date of the Phase I contract award, and upon receiving instructions from the CBD program office.

All Phase II proposal submissions must be submitted on the DSIP portal:
https://www.dodsbirsttr.mil.

At the DSIP website, Phase II proposals MUST be submitted to 'CBD SBIR' regardless of which DoD contracting office negotiated and awarded the Phase I contract. Additional instructions regarding the Phase II proposal submission process including submission dates will be provided to Phase I awardees after the Phase I contract is awarded.

The Phase II proposal must include a concise summary of the Phase I project including the specific technical problem or opportunity addressed in the proposal. The proposal must also include an objective statement, the type of research conducted, findings and/or results of the research, and technical feasibility of the technology. Due to limited funding, the CBD SBIR program reserves the right to limit awards under any topic and only proposals considered to be of superior quality will be funded.

All proposers are required to submit a commercialization plan that describes the SBC's marketing and manufacturing approach to developing the technology. The Offeror is required to submit a budget for the entire 24-month Phase II Period of Performance. During contract negotiation, the Contracting Officer may require a Cost Volume for a base year and an option year; thus, proposers are advised to be aware of this possibility. These costs must be submitted using the Cost Volume format within the DSIP website. The total proposed amount should be indicated on the Proposal Cover Sheet as the Proposed Cost. At the Contracting Officer's discretion, Phase II projects may be evaluated for technical progress prior to the end of the base year (year one), to decide whether to extend the funding for the option year (year two).

The CBD SBIR Program is committed to minimizing the funding gap between Phase I and Phase II activities. The CBD SBIR Program typically funds a cost-plus fixed fee Phase II award at the discretion of the Contracting Officer but may award a firm fixed price contract.

It is recommended that Phase II awardees have a Defense Contract Audit Agency (DCAA) approved accounting system. If you do not have a DCAA approved accounting system, this could delay/prevent a Phase II contract award. Visit https://www.dcaa.mil/Customers/Small-Business for more information on DCAA approved accounting systems.

DISCRETIONARY TECHNICAL AND BUSINESS ASSISTANCE (TABA)
Currently, the CBD SBIR Program does not participate in the Technical and Business Assistance (TABA) Program.

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

Offerors will be notified of selection or non-selection within the 90-day window requirement at the close of the BAA. The CBD SBIR Program office will notify the firm via e-mail to the firm's Corporate Official (Business Point of Contact) and Principal Investigator, as listed on the Cover Page of the proposal.

The firm may submit an email request to the CBD SBIR/STTR inbox (https://dtra.belvoir.rd.mbx.jsto-cbd-chem-bio-defense-sbir@mail.mil) to request a technical debrief. The CBD SBIR Program Office will send a debriefing statement within 30-days of the request. The debriefing statement will only be provided to the Corporate Official and the Principal Investigator on the Cover Page of the proposal. Requests made by the offeror for further information will not be provided.

Refer to the DoD SBIR Program BAA for guidance concerning protests.

As further prescribed in FAR 33.106(b), FAR 52.233-3, Protests after Award should be submitted to Ms. Abigail L. Roots, Chemical and Biological Defense (CBD) SBIR/STTR Program Manager, Joint Science and Technology Office for Chemical and Biological Defense (JSTO CBD), dtra.belvoir.rd.mbx.jsto-cbd-chem-bio-defense-sbir@mail.mil.

RESEARCH INVOLVING HUMAN SUBJECTS, BIOSPECIMENS, AND/OR ANIMAL USE
Any research under a Phase I or Phase II contract involving human subjects, human anatomical substances (e.g., whole blood, cell lines, tissue), and/or animal use must undergo the regulatory review requirements per DoD Instruction 3216.02 and DoD Instruction 3216.01, respectively.

DoD-level review and approval of human and/or animal use are separate from, and in conjunction with the Institutional Review Board (IRB) and/or the Institutional Animal Care and Use Committee (IACUC).

CBD SBIR Projects Requiring Animal Subjects

Refer to the DoD Program BAA for Research Involving Animal Subjects.

Companies should plan carefully for any research involving animal subjects, in addition to the use of any chemical or biological warfare agents, and use of any agents associated with "Dual Use Research of Concern (DURC)". The mandatory DoD level review of this research is typically a period of no greater than four (4) months.

Projects under CBD SBIR awards involving the use of animal subjects shall not be proposed for any Phase I Period of Performance but may be proposed during the Phase II proposal submission.

Written authorization to begin animal research under the applicable protocol(s) proposed as part of the CBD SBIR/STTR program will be issued after the contract award in the form of an approval memo from the U.S. Army Medical Research and Development Command (MRDC), Animal Care and Use Review Office (ACURO), and the Research Oversight Board (ROB) of the Defense Threat Reduction Agency (DTRA), both of which provide DoD compliance oversight to the CBD SBIR and STTR program office.

The offeror is expressly forbidden from using or subcontracting for the use of animals in any manner prior to these approvals. Furthermore, modifications to approved protocols require review and approval by the ACURO prior to implementation.

Non-compliance with these terms and conditions may result in withholding of funds and/or the termination of the award. The ACURO and DTRA ROB reviews are separate from, and in addition to the responsible Institutional Animal Care and Use Committee (IACUC) review(s). Further information may be required if the proposal is successful.

CBD SBIR Projects Requiring Human Subjects, Human Anatomical Substances, and/or Human Data

Refer to the DoD Program BAA for Research Involving Human Subjects and Recombinant DNA Molecules.

Companies should plan carefully for any research involving human subjects, human data, and/or human biospecimens (e.g., blood, saliva, tissue), to include cadaveric specimens, hereafter referred to as "research", in addition to the use of any chemical or biological warfare agents, and use of any agents associated with "Dual Use Research of Concern (DURC)". The mandatory DoD level review of this research is typically no greater than four (4) months.

Projects under CBD SBIR awards involving the use of human subjects shall not be proposed for any Phase I Period of Performance but may be proposed during the Phase II proposal submission.

Written authorization to begin the research under the applicable protocol(s) proposed as part of the CBD SBIR/STTR program will be issued after the contract award in the form of an approval memo from the U.S. Army Medical Research and Development Command (MRDC), Office of Human Research Oversight (OHRO), and the Research Oversight Board (ROB) of the Defense Threat Reduction Agency (DTRA), both of which provide DoD compliance oversight to the CBD SBIR and STTR program office.

The offeror is expressly forbidden from beginning the research in any manner prior to these approvals. Furthermore, modifications to approved protocols require review and approval by the OHRO prior to implementation.

Non-compliance with these terms and conditions may result in withholding of funds and/or the termination of the award. The OHRO and DTRA ROB reviews are separate from, and in addition to the responsible Institutional Review Board (IRB) review(s). Further information may be required if the proposal is successful.

CBD SBIR 24.4 Open Topic Index
Release 1

CBD244-P001 Host Directed Therapeutics for treatment for viral disease – Open Topic

CBD244-P002 Quantum Chemical Sensing – Open Topic

CBD244-P001 TITLE: Host Directed Therapeutics for treatment for viral disease – Open Topic

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Biotechnology

OBJECTIVE: The goal of this SBIR is to develop and demonstrate efficacy of broadly active host directed therapeutics to be used as treatment, either as sole agents or as combination agents, in the event of disease or as prophylactic medical countermeasures (MCM) following human exposure or threat of exposure to viral infections of interest.

DESCRIPTION: Host-directed Therapeutics (HDTs) are therapies that target either human host factors or pathways that are necessary for a virus to replicate/propagate, or the host responses to infection that lead to disease symptoms. HDTs increase or decrease the production of host factors that affect viral replication and propagation, and other target host antiviral responses. In contrast, direct-acting antiviral (DAAs) therapeutics directly target the function of viral proteins. Unlike DAAs, HDTs are generally expected to be effective against drug resistant mutants and some HDTs would provide a higher barrier to resistance. HDTs are expected to be effective against multiple serotypes (e.g., Dengue), clades (HIV) or genotypes (HCV). HDTs can potentially be broad acting (activity against several families) counter measures that can be used either as a PEP or treatment in conjunction of DAAs. Disease signs (measurable medical responses to infection) and symptoms (infection responses felt by the patient such as headache) including hemorrhagic fevers, encephalitis, musculoskeletal disease, acute respiratory distress syndrome, and paralysis are largely dependent upon the viral pathogen's mechanism of pathogenesis, including cell tropism, pathogen mechanism of immune evasion, and specific-host pathogen interactions (intra- and extracellular).

Viral biothreat families of interest to the DOD include: Filoviruses, Togaviruses (Alphaviruses), Arenaviruses, Paramyxoviruses, Poxviruses (Orthopoxviruses), and Hantaviruses. Currently, there are some approved directly acting antivirals for some of these pathogens (ex. TPOXXTM for smallpox treatment, InmazebTM and EbangaTM for Ebola Zaire treatment), however, there are gaps in treatment options for these serious viral infections. This topic solicitation focuses on funding innovative host-directed therapeutic solutions for treatment of infections caused by one or more of these viral families.

PHASE I: The objective of this Phase is to identify broadly-acting host-directed therapeutics against infection by viruses of interest. This Phase will be accomplished by: A) Identification and development of working stocks of appropriate strains of virus(es) for testing. Alternatively, surrogate assays (e.g. pseudotyped particles, replicase assays) in lower safety containment laboratories are sufficient for early screening. B) Identify inhibitors to virus replication of one or more of the members of the virus families discussed previously. Modeling data for broad-spectrum inhibition of replication can be used to begin intermediate development at the Phase II stage. The screening should assess in vitro antiviral activity, in vitro parameters of host response, and cytotoxicity.

PHASE II: The objective of this phase is to optimize the lead compound identified in Phase 1 through medicinal chemistry, formulation or bioengineering approaches to enhance in vitro activity against viral infections of interest . Further assessment of antiviral activity will be provided through preclinical efficacy studies. This stage will require development of working stocks of appropriate strains of virus(es) for testing if not developed in Phase I and performance within high containment laboratories.

PHASE III DUAL USE APPLICATIONS: PHASE III: Preclinical development of down-selected candidates to support submission of an application for an IND. Construction of a Development Plan through consultation with a sponsor and the U.S. Food and Drug Administration (FDA). Discussions and preparations would include identification of appropriate lead therapeutic(s), animal models, additional

animal model studies, development of Good Manufacturing Practices (GMPs) and the conduct of safety trials.

PHASE III DUAL USE APPLICATIONS: Some of the agents listed here lack treatment options, and any therapeutic derived from this research will be of significant use for both civilian and military populations at risk.

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KEYWORDS: host-directed, antiviral, small molecule, biopharmaceutical, Bunyavirus, Arenavirus, Viral Hemorrhagic Fever, Alphavirus, Ebolavirus, Filovirus, Paramyxovirus

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CBD244-P002 TITLE: Quantum Chemical Sensing – Open Topic

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Biotechnology

OBJECTIVE: To develop quantum sensors that can detect chemical threats at low concentrations with high specificity.

DESCRIPTION: Quantum sensing involves leveraging quantum behavior (spin state, superposition, entanglement) to interrogate the environment. CB sensors require distinguishing metrics and performance goals, including enhanced sensitivity and specificity against similar analytes, along with reduced size, weight, power, cost, and rapid readout. Challenges include design and synthesis of sensing materials, investigation and optimization of the sensing mechanism, miniaturization of devices, and complex operational environments. A quantum sensing approach is predicted to provide new solutions to these challenges by enabling us to observe and record quantum behaviors of material interactions (e.g., atomic spin, superposition, and entanglement). Quantum sensors can detect local perturbations at thresholds that are not feasible with traditional sensors.

Despite recent substantial advancements in quantum sensing, problems such as scalability and difficulties in integrating with existing semiconductor technologies remain. Quantum effects require local coherence at the qubit level. Longer coherence dephasing times are needed along with lateral precision and inter-defect distances at nanometer resolution to effect efficient spin manipulation. A quantum sensor is characterized by discrete energy levels (Bloch sphere representation). A quantum sensor typically has quantized energy levels, uses quantum coherence to measure a physical quantity, or uses entanglement to improve measurements beyond what can be done with classical sensors.

PHASE I: Evaluate the feasibility of utilizing a quantum sensor for chemical detection. Investigate hardware and software enhancements to enhance the signal-to-noise ratio, accelerate the speed, and improve the accuracy of chemical detection. Develop a design for a low-cost, compact quantum chemical detection system capable of detecting and accurately identifying chemical threats. Offers of market surveys will be considered non-responsive. Feasibility for scale-up fabrication considered value added.

PHASE II: Assemble and showcase a functional prototype of the portable quantum chemical detection system following the Phase I design. Software and algorithms for detection, processing, and thresholding for potential presence of chemical threat should be integrated into the hardware threat chemicals at low concentrations. Demonstrate the ability of the new sensor to detect and identify hazardous chemicals. Deliver the operational prototype to the government for additional testing. Feasibility for scale-up fabrication considered value added.

PHASE III DUAL USE APPLICATIONS: PHASE III: Further research and development during Phase III efforts will be directed toward refining the final deployable equipment and procedures. Manufacturability specific to U.S. Army CONOPS and end-user requirements will be examined. Continue research and development efforts with a focus on refining the deployable equipment and procedures. Any necessary design adjustments derived from Phase III test outcomes will be integrated into the system for its finalization.
PHASE III DUAL USE APPLICATIONS: Beyond DoD applications, the technology should have transitions into various applications beyond the detection of explosives, including drug analysis, medical imaging, food analysis, environmental monitoring, and material (polymers, ceramics, and superconductors) analysis.

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KEYWORDS: Chemical detection, Threat Detection, Quantum Sensor, quantized energy levels, quantum coherence

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