Basic Research Program in Chemical, Biological, Radiological, and Nuclear Defense of the Joint Science and Technology Office
Physical Science and Technology Division
Defense Threat Reduction Agency

2007

ARMY RESEARCH OFFICE BROAD AGENCY ANNOUNCEMENT
W911NF-06-R-0005
This publication constitutes a Broad Agency Announcement (BAA) and sets forth basic research areas of interest to the Joint Science and Technology Office (JSTO) Physical Science and Technology Division Basic Research Program of the Defense Threat Reduction Agency (DTRA). This BAA is issued under the provisions of Federal Acquisition Regulation (FAR) 6.102(d)(2) and Department of Defense Grant and Agreement Regulations (DODGARS) 22.315. Awards based on responses to this BAA are considered to be the result of full and open competition.

OVERVIEW INFORMATION

Agency Name: U.S. Army Research Office, Chemical Sciences Division, P.O. Box 12211, Research Triangle Park, NC 27709-2211

Issuing Acquisition Office: U.S. Army RDECOM Acquisition Center, RTP Contracting Division, P.O. Box 12211, Research Triangle Park, NC 27709-2211

Research Opportunity Title: Basic Research Program in Chemical, Biological, Radiological and Nuclear Defense of the Joint Science and Technology Office, Physical Science and Technology Division - 2007

Announcement Type and Date: Initial Announcement - March 2006

Research Opportunity Number: W911NF-06-R-0005

Catalog of Federal Domestic Assistance (CFDA) Number and Title: 12.431 – Basic Scientific Research

Response Dates: White Papers are due by 4:00 PM Eastern Daylight Saving Time on April 27, 2006. Proposals are due by 4:00 PM Eastern Daylight Saving Time on June 20, 2006. See Section IV.C. for additional information.

I. RESEARCH OPPORTUNITY DESCRIPTION

This program in basic research is aligned with the DoD definition of basic research and the recommendations of the 2005 Report from the National Research Council’s Committee on DoD Basic Research Division on Engineering and Physical Science – “Assessment of DoD Basic Research”. Per recommendation 1 in that assessment - “Basic Research is systematic study directed toward greater knowledge or understanding the fundamental aspects of phenomena and has the potential for broad, rather than specific, application.”

The Physical Science and Technology Basic Research program of the Joint Chemical and Biological Defense Program is encouraging the submission of technical proposals in the basic sciences to include:
Atmospheric and Space Sciences
Biological and Life Sciences
Chemistry
Cognitive and Neural Sciences
Computing and Information Science
Electronics
Mathematical Science
Materials Science
Mechanical Science
Physics
Terrestrial and Ocean Sciences
Nanoscience

A. Atmospheric and Space Sciences – Specific interests in Atmospheric and Space Sciences include the following areas:

1. Meteorology.
   a. Fundamental investigation of the atmospheric boundary layer.
   b. Fundamental meteorological modeling.
   c. Fundamental micro meteorological modeling.

2. Space Science. Fundamental high altitude environments research.


B. Biological and Life Sciences - Specific interests in the Biological and Life Sciences include the following areas:

1. Molecular/Cellular Biology.
   a. Fundamental research in microfluidic separation of particles.
   b. Extraction and purification of macromolecules from cells, spores, and viruses.
   c. Fundamental investigation of viability of bacteria and viruses.
   d. Fundamental studies to define and measure structure function relationships between chemical agents and biological sensors.
   e. Basic research in molecular genetics and genomics.
   f. Molecular responses to pathogens, pathogen identification, pathogen inactivation, and host-pathogen interactions.
   g. Genomic variations – naturally occurring vs. induced.
   h. Fundamental research into elucidating the molecular mechanisms of chemical agent toxicity.
   i. Fundamental studies to measure human dose-response to biological agents.

2. Systems and Organisms.
   a. Fundamental studies on organisms in normal, extreme, and engineered environments.
b. Biochemical and physiological mechanisms, underlying the biodegradative processes.

c. Fundamental studies to measure biological agent variation due to genetic drift.

d. Fundamental studies to measure biological agent variation due to culturing and preparation protocols.
   (1) Antigenic profile.
   (2) EM profile.

e. Fundamental studies to identify and quantify differences in vaporous organic compounds in cultures of biological agents.
   (1) Between agents.
   (2) Differences due to culturing conditions.

f. Fundamental studies to investigate bioremediation techniques that can mitigate operational risk within operational timescales.

g. Fundamental studies to elucidate the human metabolic pathways and enzyme kinetics of chemical agent degradation.

3. Ergonomic Science. Fundamental studies to determine, quantify, and model ‘comfort’ parameters that lead to performance degradation of personnel encapsulated in personal protective equipment and individual protective equipment.

C. Chemistry - Specific interests in Chemistry include the following areas:

1. Materials Chemistry.
   a. Fundamental polymer research on novel polymers, processing, and novel structures.
   b. Fundamental aerosol research including particle interaction, segregation, and chemistry in aerosols.
   c. Fundamental sorbent material research including reactive high surface area materials.
   d. Fundamental surface science exploring the chemistry at surfaces and between materials.
   e. Fundamental chemical research on molecules that can compete with chemical agents for binding to surfaces.
   f. Fundamental studies to define and measure structure function relationships between chemical agents and surfaces of operational interest.
      (1) Homogeneous surfaces, e.g. CARC.
      (2) Heterogeneous surfaces, e.g. concrete, sand, etc.
   g. Novel materials that exhibit a secondary response to a stimulus.
   h. Production of materials and how those processes affect its properties.

2. Chemical Processes.
   a. Fundamental research on the decomposition and interaction of molecules on well-characterized surfaces, and catalysts.
D. **Cognitive and Neural Sciences** - Specific interests in Cognitive and Neural Sciences include the following areas:


2. Reverse Engineering.

E. **Computing and Information Science** - Specific interests in Computing and Information Science include the following areas:

1. Fundamental understanding of data transmission and integration theory.

2. Fundamentals of data fusion and analysis.

3. Image reconstruction algorithms.

4. Intelligent Data Understanding.
   a. Data clustering.
   b. Large distributed data management.
   c. Distributed sensor management.
   d. High performance computing for modeling and simulation.
   e. Model based reasoning.
   f. Automated reasoning.

5. Data compression.

F. **Electronics** - Specific interests in Electronics include the following areas:

1. Solid-State and Optical Electronics.
   a. Low noise electronics.
   b. Fundamental research of electronic, photonic, acoustic and magnetic properties of solid-state materials, structures and devices.
   d. Nanoscale processing and fabrication science.
   e. Nano/molecular electronic science and technology.
   f. Nanoscale physical modeling and advanced simulation.
   g. Ultrafast electronics.
   h. Terahertz Sciences:
      (1) THz-Frequency Sensing Science & Phenomenology.
      (2) THz-Frequency Sensor Technology.
      (3) THz-Frequency Microscopy.
   i. Nano-Patterning for Microscopic Electronic Analysis.
   j. Molecular Electronic Modeling and Simulation.
   k. Nanoscale Electronic Sensing Architectures.
1. 3D imaging of molecules by magnetically coupling the magnetic resonance of atomic spins to the mechanical resonance of an AFM cantilever.

2. Information Electronics.


G. **Mathematical Science** - Specific interests in Mathematical Science include the following areas:

1. Mathematics.
   a. Development of algorithms for application of arrays of dissimilar detectors and of mobile detectors to radiological searches.
   b. Statistical methods for determining NEW on networks, complex systems and interconnected systems.
   c. Image analysis for spectral signatures (clouds instead of objects).

2. Computer Science. Basic research on innovative, efficient and accurate numerical methods, optimization techniques and scalable scientific software tools.

H. **Materials Science** - Specific interests in Materials Science include the following areas:


   a. Fundamental understanding of material characteristics and how they affect performance of the material.
   b. Fundamental understanding of materials that change their physical and/or chemical characteristics in response to an external stimulus – especially optical materials – ability to fold into a small size and then open to a large rigid set of optics.
   c. Multifunctional materials.

I. **Mechanical Science** - Specific interests in Mechanical Science include the following areas:

   a. Fundamental understanding of the behavior of materials and structures under complex and severe constraints; relations between material behavior, deformation, fracture and failure under physical constraints and loading conditions.
   b. Determination of the influence of inertial, thermal, electrical, magnetic, impact, damping, and aerodynamic forces on the dynamic response of adaptive armament systems, ground vehicles, rotorcraft, missiles, projectiles, gears, parachutes, and shelters.

3. Propulsion and Energy Conversion. Fundamental studies in the area of the extraction of stored, chemical energy and the conversion of that energy into useful work models.

J. Physics - Specific interests in Physics include the following areas:

   a. High voltage gas switch modeling and understanding.
   b. Power flow and breakdown phenomena.
   c. Z-pinch and plasma filled diode understanding.
   d. High-Z atomic physics and hydrogen quenching in plasma radiators.
   e. Broadband X-ray radiation source concepts.
   f. Physics of toroidal plasmas.
   g. Laser plasma interactions.

   a. High voltage breakdown phenomena in water dielectrics.
   b. Superconducting inductors for energy storage.
   c. Vacuum insulator and high dielectric strength materials.
   d. Fundamental studies associated with 2D fields capable of prolonged vapor and aerosol segregation.

3. Sensing and Detection.
   a. Fundamental research in new sensing technologies.
   b. Improved sensitivity of sensing technology.
   c. New neutron and gamma detector materials.
   d. More intense neutron sources for active interrogation.
   e. Non-radiation based remote detection concepts for nuclear materials.
   f. Miniature radiation detection systems.
   g. Quantum physics.
   h. Quantum control (new scenarios, understanding of mechanisms, etc).
   i. Multi-photon processes – multi-energy state changes.
   j. Studies of phase transitions and critical phenomena.
   k. Nonlinear dynamics: as above, can have high sensitivity in certain parameter regimes.

K. Terrestrial and Ocean Sciences - Specific interests in Terrestrial and Ocean Sciences include following areas:

1. Terrestrial Sciences.
   a. Terrain characterization and analysis.
   b. Fundamental understanding of the behavior of the land surface and the near-surface environment, understanding the natural processes operating upon and within these domains, and modeling these environments for predictive and simulation purposes.
   c. Transport and dispersion phenomenology.
d. Fundamental environmental background models.
e. Fundamental study of agent interactions with environmental materials.


L. Nanoscience – Specific interests in Nanoscience include the following areas:

1. Fundamental research that exploits, utilizes, or discovers unique properties or characteristics observed at the nanoscale.
   a. Active nanostructures.
   b. Highly efficient and selective catalysts.

2. Fundamental research that furthers the theoretical understanding of unique nanoscale properties and characteristics.

   a. Fundamental research on processes amenable to biological organisms and materials.
   b. Fundamental research on process design.

4. Supramolecular Assembly.
   a. Fundamental research on design and control.
   b. Aqueous systems.
   c. Responsive supramolecular assemblies.
   d. Biomimetic self-assembling materials and devices.

II. AWARD INFORMATION

The DTRA Chemical and Biological Defense Program, JSTO, and Army Research Office (ARO) expect to make several awards for one- to three-year performance periods, subject to the availability of appropriations. Awards may be made as contracts or grants. Single-year, stand-alone proposals are encouraged; multi-year proposals will be considered, but funding will not be guaranteed for subsequent years. Therefore, multi-year proposals must have clear goals and milestones for each year.

A total of $5 million per year is anticipated to be available under this BAA. It is anticipated that funding for each award will be between $100K - $400K per award per year.

III. ELIGIBILITY INFORMATION

A. Eligible Applicants: Proposals may be submitted by degree-granting universities, nonprofit organizations, or industrial concerns. Proposals are encouraged from Historically Black Colleges and Universities (as determined by the Secretary of Education to meet requirements of Title III of the Higher Education Act of 1965, as amended (20 U.S.C. § 1061)) and from Minority Institutions defined as institutions
“whose enrollment of a single minority or a combination of minorities…exceeds 50 percent of the total enrollment.” [20 U.S.C. § 1067k(3) and 10 U.S.C. § 2323(a)(1)(C)].

B. **Cost Sharing or Matching:** There is no required cost sharing, matching, or cost participation to be eligible under this BAA.

C. **Other:** Federal laboratories, Federally Funded Research and Development Centers, and academic institutions that are federal government organizations (e.g., Naval Postgraduate School) may submit to the federal program for support, but are not eligible to receive funding awarded through this BAA. These organizations are encouraged to contact the technical point of contact listed in Section VII for information on how to submit to the internal research program.

IV. APPLICATION AND SUBMISSION INFORMATION

A. **Application Process:** The application process is in two stages as follows:

Stage 1 - Prospective proposers are encouraged to submit white papers. The purpose of requesting white papers is to minimize the labor and cost associated with the production of detailed proposals that have very little chance of being selected for funding. Based on assessment of the white papers, informal feedback will be provided to the proposers to encourage or discourage them to submit full proposals.

Stage 2 - Interested offerors are required to submit full proposals. All proposals submitted under the terms and conditions cited in this BAA will be reviewed regardless of the feedback on, or lack of, a white paper.

Details, URLs, and other links necessary for submission of white papers and proposals are provided in the subsections below.

B. **Format and Content of White Papers/Proposals:**

1. **White Paper Format and Content.**

   a. White papers must be submitted electronically in the following format:

   - Single PDF formatted file as an email attachment
   - Page Size: 8 ½ x 11 inches
   - Margins – 1 inch
   - Spacing – single
   - Font – Times New Roman, 12 point
   - Number of Pages – no more than four (4) single-sided pages (excluding cover page and curriculum vitae). White papers exceeding the page limit may not be evaluated.
b. White papers must contain the following:
   • Cover page – The cover page shall be labeled “Proposal White Paper” and shall include the BAA number, proposed title, and proposer’s technical point of contact, with telephone number and email address.
   • Identification of the research and issues
   • Proposed technical approach
   • Potential impact on DoD capabilities
   • Potential team and management plan
   • Summary of estimated costs
   • Curriculum vitae of key investigators (no more than one page per person)

2. Proposal Format and Content.

   a. Proposals must be submitted electronically using one of the two following formats:

      (1) Apply through the Grants.Gov APPLY portal, http://www.grants.gov/Apply. A Grant Application Package is available for download through the Grants.Gov Apply portal under CFDA Number 12.431/Funding Opportunity Number W911NF-06-R-0005. The following documents are mandatory: (1) Application for Federal Assistance (Research and Related) (SF 424 (R&R)), and (2) Attachments form.

      (a) The SF 424 (R&R) must be fully completed. Block 11, “Descriptive Title of Applicant’s Project,” must reference the technical area being addressed in the effort by identifying the specific paragraph from Section I (For example, I.B.1.c.) and additionally, should end with “(CBT).”

      (b) The Attachments form must contain the information requested in “Content Instructions” below including three electronic forms as follows: (1) ARO Form 51-GG, Proposal Cover Page; (2) ARO Form 99, Summary Proposal Budget; and (3) ARO Current and Pending Support (unnumbered form). These forms may be accessed at http://www.aro.army.mil/forms/forms2.htm. The PDF Forms may be saved to a working directory on a computer and opened and filled in using Adobe Reader 5.0 or later software application. All documents must be combined into a single PDF formatted file titled “W911NF-06-R-0005 Proposal” and uploaded into the mandatory Attachments form.

NOTE: Prospective grantees must complete several steps in order to participate in the Grants.Gov application process. Starting early is extremely important as it may take several weeks to complete the processes necessary to submit an application through the Grants.Gov Apply portal. See Section VII.C. for additional information on electronic proposal submission through Grants.Gov.
(2) E-mail directly to baa@arl.army.mil. All e-mailed proposals must contain the information requested in “Content Instructions” below including three electronic forms as follows: (1) ARO Form 51, Proposal Cover Page; (2) ARO Form 99, Summary Proposal Budget; and (3) ARO Current and Pending Support (unnumbered form). These forms may be accessed at http://www.aro.army.mil/forms/forms2.htm. The fillable PDF forms may be saved to a working directory on a computer and opened and filled in using Adobe Reader 5.0 or later software application. The ARO Proposal Cover Page (ARO Form 51) must be completed, printed, signed, and scanned into a PDF document. All documents must be combined into a single PDF formatted file titled “W911NF-06-R-0005 Proposal” to be attached to the e-mail.

b. Proposal documents (excluding required forms) must use the following format:
   • Page Size – 8 ½ x 11 inches
   • Margins – 1 inch
   • Spacing – single
   • Font – Times New Roman, 12 point

c. Number of Pages – The proposal must contain a Technical Portion (See Section IV.B.2.d.(2)), which shall not exceed 30 single-sided pages, excluding the required forms, and a Financial Portion (See Section IV.B.2.d.(3)) with no page limitation. Failure to provide the requested information or exceed page limits may render the proposal non-responsive, and the proposal may not be evaluated.

d. Content Instructions. Proposals must include:

   (1) Cover Page (excluded from page count).
      • ARO Form 51-GG. Required for Grants.Gov submission (See Section IV.B.2.a.(1)). Complete Blocks 1-9, as applicable. In Block 1, check “Chemistry.”
      OR
      • ARO Form 51. Required for E-mail submission (See Section IV.B.2.a.(2)). Complete Blocks 2-27d, as applicable. In unnumbered block titled Solicitation Number (upper left hand corner of form), type “W911NF-06-R-0005.” In Block 2, check “Chemistry.” In Block 19, check “Other” and specify “CBT.” The project title (Block 20) must reference the technical area being addressed in the effort by identifying the specific paragraph from Section I (For example, I.B.1.c.) and additionally, should end with “(CBT).”

   (2) Technical Portion (not to exceed 30 single-sided pages). The Technical Portion must include:
      (a) Summary page with the proposal title, the principal investigator(s), institution affiliation and a brief summary/abstract of the proposal. (Not to exceed 1 page)
(b) Objective, background and significance. A description of the objective, significance and applicability of the proposed research, appropriate scientific background, and a concise description of the advantages gained from the proposed technology. (Not to exceed 6 pages)

(c) Work to be performed. A detailed list that describes major tasks and supporting subtasks, expected results of each major task, and how the task will be accomplished. (Not to exceed 19 pages)

(d) Proposed schedule, milestones, and deliverables – technical and financial reports, data, hardware, software and documentation, as applicable. (Not to exceed 2 pages)

(e) Summary of qualifications of key personnel. (Not to exceed 1 page per person)

(f) Facilities available for accomplishment of research objective. Describe the equipment planned for acquisition under this program and its application to the objective. When possible, equipment should be purchased very early in the research award period. (Not to exceed 1 page)

(g) Statement of Current and Pending Support. A statement of current and pending support must be included for each investigator listed in the proposal. Use the ARO Current and Pending Support form to submit this information. This statement requires that each investigator specify all grants and contracts through which he or she is currently receiving or may potentially receive financial support. (Excluded from page count)

(3) Financial Portion (no page limitation). The Financial Portion should contain cost estimates sufficiently detailed for meaningful evaluation. Use ARO Form 99, Summary Proposal Budget, to submit budget data for each year of support requested and a cumulative budget for the full term of requested support. In addition to the ARO Form 99, provide a budget explanation to clearly justify costs for each year. For budget purposes, use an award start date of February 1, 2007 (the earliest anticipated start date for awards under this BAA). The budget should also provide a breakdown of the amount(s) by source(s) of funding (e.g., funds requested under this BAA, non-federal funds to be provided as cost sharing). Budgeted cost elements should reflect the following:

(a) Time being charged to the project, for whom (principal investigator, graduate students, etc.), and the commensurate salaries and benefits. Allowable charges for graduate students include salary, appropriate research costs, and tuition. Allowable charges for undergraduate students include salary and research training costs, but not tuition.
(b) Cost of equipment, based on most recent quotations and broken down in sufficient detail for evaluation.

(c) Travel costs and time, and the relevance to stated objectives.

(d) Estimate of material and operating costs.

(e) Publication and report costs.

(f) Consultant fees (indicating daily or hourly rate) and travel expenses and the nature and relevance of such costs.

(g) Computer services.

(h) Sub-award costs and type (the portion of work to be sub-awarded and rationale). Include detailed cost summary.

(i) Communications costs not included in overhead.

(j) Other direct costs.

(k) Indirect costs.

(l) Fee, if any, which an industrial/commercial organization proposes.

(m) Facilities Capital Cost of Money: When an offeror elects to claim facilities capital cost of money as an allowable cost, the offeror should submit Form CASB-CMF and show the calculation of the proposed amount. (See FAR 31.205-10.)

C. Submission Dates and Times:

1. White Papers. White papers must be submitted electronically via e-mail to whitepapers@arl.army.mil and received at the Army Research Office by 4:00 PM Eastern Daylight Saving Time on April 27, 2006. The email subject line should contain the following: W911NF-06-R-0005 White Paper. White papers received after the deadline will not be reviewed.

Feedback on white papers will be emailed directly to the proposer’s technical point of contact on or about May 5, 2006.

2. Proposals.

   a. Proposals transmitted online via the Grants.gov APPLY portal must be date/time stamped by the server as submitted by 4:00 PM Eastern Daylight Saving Time on June 20, 2006.
b. Proposals submitted electronically via e-mail to baa@arl.army.mil must be received at the Army Research Office by 4:00 PM Eastern Daylight Saving Time on June 20, 2006. The e-mail subject line should contain the following: W911NF-06-R-0005 Proposal.

c. Proposals received after the deadline will be handled in accordance with the provisions detailed in Section IV.D.

d. Questions concerning electronic proposal submission may be addressed to the Army Research Office at (919) 549-4219. Proposals submitted by facsimile or hard copy will not be accepted.

e. Acknowledgment of receipt of a proposal under this BAA will be accomplished via email to the addressee submitting the proposal.

D. Late Submission and Withdrawal of Proposals: Offerors are responsible for submitting electronic proposals so as to reach the Government office designated in this BAA by the time specified in this BAA. If the electronic proposal is received at the Government office designated in this BAA after the exact time and date specified for receipt of offers, it is "late" and will not be considered. Acceptable evidence to establish the time of receipt at the Government office includes documentary evidence of receipt maintained by the Government office.

If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at the office designated for receipt of proposals by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation closing date, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

Proposals may be withdrawn by written notice received at any time before award. Withdrawals are effective upon receipt of notice by the Contracting/Grants Officer.

V. PROPOSAL REVIEW INFORMATION

A. Criteria: Proposals submitted in response to this BAA will be evaluated primarily on the following criteria, both of equal weight:

   a. The overall scientific and technical merits of the proposed research.

   b. Potential contributions of the research to the JSTO chemical, biological, radiological, and nuclear defense program and the extent to which the research will contribute to balancing the overall research program.
Other evaluation criteria, of lesser importance, but weighted equal to each other are:

c. Offeror's capabilities, related experience, facilities, techniques, or unique combinations of these, which are integral factors for achieving the proposed objectives.

d. Qualifications, capabilities, and experience of the proposed principal investigator, team leader, or other key personnel who are critical to achievement of the proposed objectives.

e. Offeror's record of past projects to include assessment of duplication with already completed or ongoing work.

f. Realism and reasonableness of proposed costs.

NOTE: Cost sharing will not be considered in the evaluation.

B. Review and Selection Process: The proposal selection process will be conducted based upon a technical peer review according to the evaluation criteria specified in Section V.A. Each proposal will be evaluated based on the merit and relevance of the specific proposal as it relates to the JSTO program rather than against other proposals for research in the same general area.

VI. AWARD ADMINISTRATION INFORMATION

A. Award Notices: Notification of acceptance of proposals will be mailed or e-mailed by ARO to successful offerors on or about November 1, 2006. Unsuccessful offerors will be notified shortly thereafter.

Offerors whose proposals are accepted for funding will be contacted by a Contract/Grant Specialist before award to discuss additional information required for award. This may include representations and certifications, revised budgets or budget explanations, certificate of current cost or pricing data, subcontracting plan for small businesses, and other information as applicable to the proposed award. The award start date will be determined at this time. A contract or grant document signed by the Contracting/Grants Officer is the authorizing award document.

B. Administrative and National Policy Requirements:

1. Central Contractor Registration (CCR). Successful offerors must be registered in the DoD CCR database prior to award of any agreement. By submission of an offer resulting from this BAA, the offeror acknowledges the requirement that a prospective contractor/grantee must be registered in the CCR database prior to award, during performance, and through final payment of any agreement resulting from this BAA. The CCR may be accessed at http://www.ccr.gov. Assistance with registration is available by phone at 1-888-227-2423.
2. Certifications Required for Grant Awards.

Certification at Appendix A to 32 CFR Part 28 Regarding Lobbying

By signing and submitting a proposal that may result in the award of a grant exceeding $100,000, the prospective awardee is certifying, to the best of his or her knowledge and belief, that:

(a) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(b) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.

(c) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty or not less than $10,000 and not more than $100,000 for each such failure.

Certification at Appendix A to 32 CFR Part 25 Regarding Debarment, Suspension, and Other Responsibility Matters --Primary Covered Transactions

(1) By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

(2) The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.

(3) The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

(4) The prospective primary participant shall provide immediate written notice to the department or agency to which this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
(5) The terms "covered transaction," "debarred," suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive order 12549. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.

(6) The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

(7) The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

(8) A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the List of Parties excluded from Federal Procurement and Nonprocurement Programs.

(9) Nothing contained in the foregoing shall be construed to require establishment of a system or records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(10) Except for transactions authorized under paragraph 6 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

Certification Regarding Debarment, Suspension, and Other Responsibility Matters--Primary Covered Transactions

The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

Where the prospective primary participant is unable to certify to any of the statements in this certification such prospective participant shall attach an explanation to this proposal.

Certification at Appendix C to 32 CFR Part 25 Regarding Drug-Free Workplace Requirements

(1) By signing and/or submitting this application or grant agreement, the grantee is providing the certification set out below.

(2) The certification set out below is a material representation of fact upon which reliance is placed when the agency awards the grant. If it is later determined that the grantee knowingly rendered a false certification, or otherwise violates the requirements of the Drug-Free Workplace Act, the agency, in addition to any other remedies available to the Federal Government, may take action authorized under the Drug-Free Workplace Act.

(3) For grantees other than individuals, Alternate I applies.

(4) For grantees who are individuals, Alternate II applies.

(5) Workplaces under grants, for grantees other than individuals, need not be identified on the certification. If known, they may be identified in the grant application. If the grantee does not identify the workplaces at the time of application, or upon award, if there is no application, the grantee must keep the identity of the workplace(s) on file in its office and make the information available for Federal inspection. Failure to identify all known workplaces constitutes a violation of the grantee's drug-free workplace requirements.

(6) Workplace identifications must include the actual address of buildings (or parts of buildings) or other sites where work under the grant takes place. Categorical descriptions may be used (e.g., all vehicles of a mass transit authority or State highway department while in operation, State employees in each local unemployment office, performers in concert halls or radio studios).

(7) If the workplace identified to the agency changes during the performance of the grant, the grantee shall inform the agency of the change(s), if it previously identified the workplaces in question (see paragraph five).

(8) Definitions of terms in the Nonprocurement Suspension and Debarment common rule and Drug-Free Workplace common rule apply to this certification. Grantees' attention is called, in particular, to the following definitions from these rules;

Controlled substance means a controlled substance in schedules I through V of the Controlled Substances Act (21 U.S.C. 812), and as further defined by regulation (21 CFR 1308.11 through 1308.15);
Conviction means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes;
Criminal drug statute means a Federal or non-Federal criminal statute involving the manufacture, distribution, dispensing, use, or possession of any controlled substance;
Employee means the employee of a grantee directly engaged in the performance of work under a grant, including: (i) All "direct charge" employees; (ii) all "indirect charge" employees unless their impact or involvement is insignificant to the performance of the grant; and, (iii) temporary personnel and consultants who are directly engaged in the performance of work under the grant and who are on the
grantee's payroll. This definition does not include workers not on the payroll of the grantee (e.g.,
volunteers, even if used to meet a matching requirement; consultants or independent contractors not on the
grantee's payroll; or employees of subrecipients or subcontractors in covered workplaces).

Certification Regarding Drug-Free Workplace Requirements
(Alternate I - Grantees Other Than Individuals)

The grantee certifies that it will or will continue to provide a drug-free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing,
   possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the
   actions that will be taken against employees for violation of such prohibition;

(b) Establishing an ongoing drug-free awareness program to inform employees about--

   (1) The dangers of drug abuse in the workplace;

   (2) The grantee's policy of maintaining a drug-free workplace;

   (3) Any available drug counseling, rehabilitation, and employee assistance programs; and

   (4) The penalties that may be imposed upon employees for drug abuse violations occurring in the
       workplace.

(c) Making it a requirement that each employee to be engaged in the performance of the grant be given a
    copy of the statement required by paragraph (a);

(d) Notifying the employee in the statement required by paragraph (a) that, as a condition of
    employment under the grant, the employee will--

   (1) Abide by the terms of the statement; and

   (2) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute
       occurring in the workplace no later than five calendar days after such conviction;

(e) Notifying the agency in writing, within ten calendar days after receiving notice under paragraph
    (d)(2) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted
    employees must provide notice, including position title, to every grants officer or other designee on whose
    grant activity the convicted employee was working, unless the Federal agency has designated a central
    point for the receipt of such notices. Notice shall include the identification number(s) of each affected
    grant;

(f) Taking one of the following actions, within 30 calendar days of receiving notice under paragraph
    (d)(2), with respect to any employee who is so convicted--

   (1) Taking appropriate personnel action against such employee, up to and including termination,
       consistent with the requirements of the Rehabilitation Act of 1973, as amended; or

   (2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation
       program approved for such purposes by a Federal, State, or local health, law enforcement, or other
       appropriate agency;

   (g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of
       paragraphs (a), (b), (c), (d), (e) and (f).

The grantee may insert in the space provided below the site(s) for the performance of work done in
connection with the specific grant:

18
Check if there are workplaces on file that are not identified here.

(Alternate II - Grantees Who Are Individuals)

(a) The grantee certifies that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any activity with the grant;

(b) If convicted of a criminal drug offense resulting from a violation occurring during the conduct of any grant activity, he or she will report the conviction, in writing within 10 calendar days of the conviction, to every grants officer or other designee, unless the Federal agency designates a central point for the receipt of such notices. When notice is made to such a central point, it shall include the identification number(s) of each affected grant.

3. **Certifications Required for Contract Awards.** Certifications and representations shall be completed by successful offerors prior to award. Federal Acquisition Regulation (FAR) Online Representations and Certifications Application (ORCA) is at website http://orca.bpn.gov. Defense FAR Supplement and contract specific certification packages will be provided to the contractor for completion prior to award.

4. **Protection of Human Subjects.** All research involving human subjects must be conducted in accordance with 32 CFR 219, 10 USC 980, and DoDD 3216.2, as well as other applicable federal and state regulations. Contractors/grantees must be cognizant of and abide by the additional restrictions and limitations imposed on the DoD regarding research involving human subjects, specifically as regards vulnerable populations (32 CFR 219 modifications to subparts B-D of 45 CFR 46), recruitment of military research subjects (32 CFR 219), and surrogate consent (10 USC 980). DTRA Directive 3216.01 establishes the DTRA Human Subjects Protection Program, sets forth the policies, defines the applicable terms, and delineates the procedures necessary to ensure DTRA compliance with federal and DoD regulations and legislation governing human subject research. The regulations mandate that all DoD activities, components, and agencies protect the rights and welfare of human subjects of study in DoD-supported research, development, test and evaluation, and related activities hereafter referred to as “research”. The requirement to comply with the regulations applies to new starts and to continuing research.

The DTRA directive requires that research using human subjects may not begin or continue until the DTRA’s Human Research Oversight Board (HROB) has reviewed and approved the proposed protocol. Awardees and subawardees are required to submit a valid federal assurance for their organization (institution, laboratory, facility) that has been issued by either DoD or the Department of Health and Human Services, and documentation of review of proposed protocols by the local Institutional Review Board (IRB) to include consent forms for any planned research using human subjects to the DTRA HROB for its review through the contracting officer’s representative (if assigned)
or the contracting/grants officer. The HROB review is separate from, and in addition to, local IRB review.

Written approval to begin research or subcontract for the use of human subjects under the proposed protocol will be provided in writing from the DTRA HROB, through the contracting/grants officer. Both the contractor/grantee and the government shall maintain a copy of this approval. Any proposed modifications or amendments to the approved protocol or consent forms must be submitted to the local IRB and the DTRA HROB for review and approval. Examples of modifications/amendments to the protocol include but are not limited to:

1) a change of the Principal Investigator;
2) changes in duration or intensity of exposure to some stimulus or agent;
3) changes in the information requested of volunteers, or changes to the use of specimens or data collected; or
4) changes in perceived or measured risks or benefits to volunteers that require changes to the study.

Research pursuant to such modifications or amendments shall not be initiated without IRB and HROB approval except when necessary to eliminate apparent and immediate hazards to the subject(s).

Research projects lasting more than one year require IRB review at least annually, or more frequently as required by the responsible IRB. HROB review and approval is required annually. The awardee or subawardee must provide documentation of continued IRB review of protocols for HROB review and approval in accordance with the Contract Data Requirements List. Research must not continue without renewed HROB approval unless necessary to eliminate apparent and immediate hazards to the subject(s).

Non-compliance with the provisions may result in withholding of payments under the award pursuant to the award’s payments clause(s) and/or award termination pursuant to the award’s termination clause(s). The government shall not be responsible for any costs incurred for research involving human subjects prior to protocol approval by the HROB.

5. Animal Use. DOD Directive 3216.1, dated April 17, 1995, provides policy and requirements for the use of animals in DOD-funded research. The DoD definition of animal is any live nonhuman vertebrate. All proposals that involve the use of animals must address DoD compliance with Directive 3216.1.

Provisions include rules on animal acquisition, transport, care, handling, and use in 9 CFR parts 1-4, Department of Agriculture rules implementing the Laboratory Animal Welfare Act of 1966 (7 U.S.C. 2131-2156), and guidelines in the National Academy of Sciences (NAS) “Guide for the Care and Use of Laboratory Animals” (1996), including the Public Health Service Policy and Government Principles Regarding the Care and Use of Animals in Appendix D to the Guide.

C. Reporting Requirements: Reporting requirements for contracts and grants awarded under this BAA will be as described in ARO Form 18 located at http://www.aro.army.mil/forms/forms2.htm. Additional reports (e.g., monthly status reports) will be specified in the award document.

VII. AGENCY CONTACTS

Technical point of contact for this BAA is Dr. Stephen J. Lee, Chemical Sciences Division, (919) 549-4365, email: stephen.lee2@us.army.mil. Questions regarding the administrative content of this BAA may be addressed to ARO at (919) 549-4375.

VIII. OTHER INFORMATION

A. Marking of Proposal and Disclosure of Proprietary Information Outside the Government: The proposal submitted in response to this BAA may contain technical and other data that the offeror does not want disclosed to the public or used by the Government for any purpose other than proposal evaluation. Public release of information in any proposal submitted will be subject to existing statutory and regulatory requirements. If proprietary information which constitutes a trade secret, proprietary commercial or financial information, confidential personal information, or data affecting the national security, is provided by an offeror in a proposal, it will be treated in confidence, to the extent permitted by law, provided that the following legend appears and is completed on the front of the proposal: “For any purpose other than to evaluate the proposal, this data shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed in whole or in part, provided that if an award is made to the 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 agreement. This restriction does not limit the right of the Government to use information contained in the data if it is obtained from another source without restriction. The data subject to this restriction is contained in page(s) _____ of this proposal.” Any other legend may be unacceptable to the Government and may constitute grounds for removing the proposal from further consideration without assuming any liability for inadvertent disclosure. The Government will limit dissemination of properly marked information to within official channels. In addition, the pages indicated as restricted must be marked with the following legend: “Use or disclosure of the proposal data on lines specifically identified by asterisk (*) are subject to the restriction on the front page of this proposal.” The Government assumes no liability for disclosure or use of unmarked data and may use or disclose such data for any purpose.
In the event that properly marked data contained in a proposal submitted in response to this BAA is requested pursuant to the Freedom of Information Act, 5 USC 552, the offeror will be advised of such request and, prior to such release of information, will be requested to expeditiously submit to ARO a detailed listing of all information in the proposal which the offeror believes to be exempt from disclosure under the Act. Such action and cooperation on the part of the offeror will ensure that any information released by ARO pursuant to the Act is properly determined.

By submission of a proposal, the offeror understands that proprietary information may be disclosed outside the Government for the sole purpose of technical evaluation. The ARO/RDECOM Acquisition Center will obtain a written agreement from the evaluator that proprietary information in the proposal will only be used for evaluation purposes and will not be further disclosed or utilized.

B. Government Obligation: Offerors are cautioned that only an appointed Contracting/Grants Officer may obligate the Government to the expenditure of funds. Offerors who make financial or other commitments for a research effort in the absence of an actual legal obligation signed by a Contracting/Grants Officer do so at their own risk.

C. Electronic Proposal Submission through Grants.Gov:

1. Registration. Each organization that desires to submit applications via Grants.Gov must complete a one-time registration. See http://www.grants.gov/GetStarted. The following steps are required:

   a. Request a DUNS Number – Follow the instructions at: http://www.grants.gov/RequestaDUNS to obtain a DUNS number. It is highly recommended that you request the number by telephone at 1-866-705-5711. This will take about 10 minutes to complete and there is no charge. NOTE: Once the telephone registration is completed, you must wait 24 hours before attempting to use that DUNS for registration in the Central Contractor Registry (CCR).

   b. Register in the Central Contractor Registry (CCR) – Go to http://www.grants.gov/CCRRRegister and click on the “Help” button to locate the tutorial. It is recommended that you print the tutorial for reference and follow the instructions in the link above. It is also recommended that you print and complete the 7-page CCR Worksheet at http://www.ccr.gov/CCRRRegTemplate.pdf prior to registration, as it may take several days to gather the information needed for the worksheet. You are required to designate an Electronic Business Point of Contact (E-Business POC) and a Marketing Partner Identification Number (MPIN) in CCR. It is important to provide the MPIN to the E-Business POC. For assistance with the CCR, contact the Assistance Center at 1-888-227-2423 or at CCR@dlis.dla.mil. You may also access the CCR Handbook at http://www.ccr.gov/handbook.asp. VERY IMPORTANT: Knowing the MPIN and who is designated as your organization’s E-Business POC in the CCR is a significant step in the process. This person will function as the organizational agent to approve personnel who can submit binding proposals on behalf of your organization.
c. Install the PureEdge Viewer – Authorized Organizational Representatives (AORs) approved by the E-Business POC are the individuals that will be given the authority to submit proposals on behalf of your organization. All AORs must download and install the PureEdge Viewer on their computer workstation by following the instructions at [http://www.grants.gov/DownloadViewer](http://www.grants.gov/DownloadViewer). This small, free program will allow AORs to access, complete, and submit applications electronically and securely. If you encounter any problems, contact customer support at 1-800-518-4726 or support@grants.gov.

d. Register with the Credential Provider – AORs must register with the Credential Provider. AORs must wait a minimum of 3 business days for the CCR to activate the organization’s account before attempting to register with the Credential Provider at [https://apply.grants.gov/OrcRegister](https://apply.grants.gov/OrcRegister) and click on the “Help” button to locate the tutorial. Print the tutorial for reference and follow the instructions in the link above. Record the user ID and the password that you enter because you will need this information to register with Grants.gov as an AOR. AORs must wait approximately 20 minutes after completing the Credential Provider registration before proceeding to the next step of registering with Grants.Gov. If you encounter any problems, the Credential Provider may be reached at 1-800-386-6820 or via email at pkihelp@orc.com.

e. Register with Grants.Gov – AORs must register with Grants.Gov, utilizing their User ID and Password obtained from registering with the Credential Provider. Go to [https://apply.grants.gov/GrantsgovRegister](https://apply.grants.gov/GrantsgovRegister) and click on the “Help” button to locate the tutorial for reference and follow the instructions in the link above. After you have completed the Grants.Gov registration process, you will receive a confirmation that indicates whether your registration was successful. After an AOR successfully registers with Grants.Gov, an email will be generated to your organizations E-Business POC to notify them that an individual has registered in Grants.Gov to be an AOR capable of submitting applications in Grants.Gov on behalf of your organization. AORs will not be able to submit electronic applications until they receive authorization from the E-Business POC. Normally, the E-Business POC should process these requests within 1 Business Day. If you encounter any problems, please contact customer support at 1-800-518-4726 or support@grants.gov.

f. Designation of Privileges to the AOR – The E-Business POC is the sole authority of the organization with the capability of designating or revoking an individual’s ability to submit grant applications on behalf of their organization through Grants.Gov. Once the E-Business POC receives the email notification from the individual wishing to be recognized as an AOR, the E-Business POC should go to: [https://apply.grants.gov/agency/AorMgrGetID](https://apply.grants.gov/agency/AorMgrGetID) and click on the “Help” button to locate the tutorial, then log into the system using the DUNS number and Marketing Partner Identification Number (MPIN) designated for their organization when CCR registration was performed. Once in the system the E-Business POC should follow the instructions for designating privileges to the AOR. If the E-Business POC cannot locate the CCR MPIN, contact the CCR Assistance Center at 1-888-227-2423 or at [CCR@dlis.dla.mil](mailto:CCR@dlis.dla.mil).
2. Submission of Grant Applications to Grants.Gov. Once the E-Business POC has authorized privileges to the AOR, the AOR will receive an email notification that they have been given authorization. The AOR may then proceed to submit applications to Grants.Gov. For application instructions, go to http://www.grants.gov/Apply. The training demonstration at http://www.grants.gov/CompleteApplication will assist AORs in the application process. Remember that you must open and complete the Application for Federal Assistance (Research and Related) (SF 424 (R&R)) first, as this form will automatically populate data fields in other forms. If you encounter any problems, contact customer support at 1-800-518-4726 or at support@grants.gov. If you forget your user name or password, follow the instructions provided in the Credential Provider tutorial.

NOTE: Tutorials may be printed by right-clicking on the tutorial and selecting “Print”.