

**Broad Agency Announcement (BAA) N66001-17-S-3601
C4ISR, Information Operations and Information Technology System Research**

**Research Announcement (RA) No. R001
Graphene and Other Nanomaterial-Based Sensor Systems; Cyber; Space ISR; Mobile and Wireless
Communication Systems**

OVERVIEW INFORMATION

- **Federal Agency Name:** Space and Naval Warfare Systems Center, Pacific (SSC Pacific)
- **RA Title:** Graphene and Other Nanomaterial-Based Sensor Systems; Cyber; Space ISR; Mobile and Wireless Communication Systems
- **RA Number:** R001 (BAA No. N66001-17-S-3601)
 - o Posting Date – 19 December 2017
 - o Key Deadlines –
 - **Full Proposals are due 11 January 2018** by 8:00 AM (Pacific Time Zone).
- **Agency Contact:**
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This announcement constitutes RA No. R001 under BAA N66001-17-S-3601, initially provided on the SPAWAR E-Commerce Central website, <https://e-commerce.sscno.nmci.navy.mil/> and the FedBizOpps website, <https://www.fbo.gov/>. The following information is for those wishing to respond to this RA. Offerors will need to download and comply with the applicable sections of BAA N66001-17-S-3601, unless different/conflicting instructions are provided below.

I. FUNDING OPPORTUNITY DESCRIPTION

SSC Pacific, in accordance with Broad Agency Announcement (BAA) N66001-17-S-3601, is soliciting cooperative agreement proposals from accredited educational institutions and affiliated nonprofit institutions.¹ The intent of the resulting cooperative agreement(s) is to conduct research and development of technologies, by means of analysis and investigation, that can be used for the information warfare operational environment. Substantial involvement between the Government and the recipient(s) is expected when carrying out this research and development. Each Cooperative Agreement will be funded by individual Technical Direction Letters (TDLs), as funds become available for a research topic. It is anticipated that performance of any award will begin in January 2018. The total duration of an Agreement, with modifications, is ten years. The period of performance of TDLs will vary depending on the research project.

Each proposal shall address one or more of the following topics:

- A. Novel research and development concepts for new generation of sensors, sensor systems, and sensor system support electronics for information warfare applications. In particular, this effort is to develop

¹ “Accredited” means accredited by an accrediting agency or state approval agency recognized by the U.S. Secretary of Education. See <http://ope.ed.gov/accreditation/> for further information.

variety of graphene and other nanomaterial -based sensor systems. This shall include novel device integration and architecture and several iterations of prototypes to explore different phenomena, and optimize the detector for particular quantum sensing applications. The proposed approaches for this area must address the following technical topics of interest:

1. Exploration of graphene and other two-dimensional based multispectral devices for detection of radio frequency, visible, near and mid-Infrared (IR) signals.
 2. Research and integration of graphene and liquid metal (LM) for developing reconfigurable and flexible integrated circuits (ICs) and sensor systems on a chip (SoC).
 3. Investigation, design, prototyping, and development of support electronic systems for nanomaterial-based sensors.
- B. Research in data science and software development for data analysis and cyber and information technology (IT) research and development. The proposed approaches for this area must address the following technical topics of interest:
1. Conduct research topics including data analytics, trend analysis, discrete feature training data.
 2. Investigate machine learning for training and predictive analysis.
 3. Development of a novel concept that characterizes computer networks for vulnerability and anomaly or change detection.
 4. Construct predictive models for detecting anomalies using machine learning and data processing algorithms to be utilized to model vulnerabilities, change detection, prediction, and clustering tasks.
 5. Investigation and software development for information technology system integration. Such systems may include audio visual, video teleconference, and computer systems.
 6. Virtual reality and augmented reality system-of-systems development.
- C. Research and development in space intelligence, surveillance, and reconnaissance (ISR) technologies. The proposed approaches for this area must address the following technical topics of interest:
1. Evaluate CubeSat components utilizing hardware in the loop and software in the loop testbed and rapid prototyping processes.
 2. Simulate necessary sensor inputs within controlled test bed utilizing software tools required to test onboard star tracker.
 3. Ground station flight planning/CONOPS.
 4. Flight software development.
 5. Develop prototype and testing for rapid deployment of satellite capabilities for Naval space operations.
 6. Research, design, development, and evaluation of ground station systems.
- D. Research, development, and evaluation of mobile and wireless communication systems. The proposed approaches for this area must address the following technical topics of interest:
1. Research and development of mobile and wearable systems.
 2. Research and development of wireless inertial navigation systems.
 3. Model and simulation and design of broadband cellular network systems architecture and protocols.

II. AWARD INFORMATION

Reference BAA N66001-17-S-3601, Section II for details.

III. ELIGIBLE APPLICANTS

Notwithstanding the language in BAA N66001-17-S-3601, Section III, all respondents (including teaming partners) to this announcement and parties to any resultant cooperative agreements must be accredited educational institutions or affiliated nonprofit institutions. Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals.

IV. APPLICATION AND SUBMISSION INFORMATION

Reference BAA N66001-17-S-3601, Section IV.4 for details.

V. PROPOSAL INFORMATION

Notwithstanding the language in BAA N66001-17-S-3601, Section V, respondents shall:

- A. Complete and submit the SF-424 (R&R) “Application for Federal Assistance” provided with the Grants.gov package. Proposers shall complete all required fields in accordance with the “pop-up” instructions on the SF-424 (R&R) form. The completion of most fields is self-explanatory. You can turn on Grants.gov “Help Mode” to provide additional instructions for forms. “Help Mode” is turned on by the icon with the pointer and question mark at the top of the form.
- B. Complete and submit a Technical Volume in accordance with Attachment 1 – Technical Volume Instructions. Respondents shall submit the Technical Volume as “Attachment 1” through the “Attachments” form provided with the Grants.gov package.
- C. Complete and submit the “R&R Budget” form provided with the Grants.gov package. Respondents must provide all information requested. Respondents must estimate the total cooperative agreement cost. Respondents must categorize funds by year and provide separate annual budgets for projects lasting more than one year. Additionally, a budget justification must be attached.

You must include enough budget related information in your proposal to support your costs as reasonable and realistic, and in compliance with 2 CFR 200 Subpart E - Cost Principles. Not having enough information in your proposal to understand if your costs are reasonable and realistic is the most common reason awards are delayed.

- D. Complete and submit a Budget Justification. Proposers must provide a detailed budget justification for each year that clearly explains the need for each item. The entire budget justification and supporting documentation must be combined into a single file and attached to field L of the R&R Budget form.

Proposers should itemize travel. State the purpose of each trip proposed, the number of trips, the number of travelers, the destination, the duration, and the basis for calculating costs such as airlines and hotels.

Proposers should itemize materials, supplies, and equipment. List all material/equipment by type and kind with associated costs. Indicate what your costs are based on, such as vendor quotes, historical data and/or engineering estimates. You should include vendor quotes and/or catalog pricing data.

If you have any subaward(s), you should describe how you determined subaward costs were determined fair and reasonable. Your business office usually makes this determination.

If you use a Government rate agreement to propose indirect cost rates and/or fringe benefit rates, you should attach a copy of the agreement you used.

Helpful Cost Principle Reference Information:

- 2 CFR 200, Subpart E – Cost Principles
- General Provisions for Selected Items of Cost in 2 CFR 200.420 through 2 CFR 200.475

- E. Complete and submit a “R&R Budget” form for each subawardee. Proposers must attach all subaward budgets to the R&R Subaward Budget Attachment provided with the Grants.gov package.

Proposers must provide a budget at the same level of detail as the “prime” (i.e. awardee) budget for each proposed subaward. Also, a subaward budget justification must be attached.

- F. Complete and submit a Budget Justification for each proposed subawardee. The entire budget justification and supporting documentation for each subawardee must be combined into a single file and attached to field L of the respective subawardee R&R Budget form.

For each proposed subaward, proposers must provide a subaward budget justification at the same level of detail as the “prime” (i.e. awardee).

- G. Complete and submit Attachment 2 – “Recipient Certifications and Representations.” Respondents shall submit the “Recipient Certifications and Representations” as “Attachment 2” through the “Attachments” form provided with the Grants.gov package.

- H. Complete the SF-LLL “Disclosure of Lobbying Activities” provided with the Grants.gov package **IF** you have lobbying activity that you must disclose under 31 U.S.C. 1352 as implemented by the DoD in 32 CFR Part 28. If applicable, you can find instructions for completing this form at <http://www.whitehouse.gov/sites/default/files/omb/grants/sflllin.pdf>. When required, attach this completed form to field 18 of the SF-424 (R&R).

VI. ADMINISTRATIVE INFORMATION

Reference BAA N66001-17-S-3601, Section V for details.

VII. AGENCY CONTACTS

Reference BAA N66001-17-S-3601, Section VII for details.

ATTACHMENT 1 – Technical Volume Instructions

The Technical Volume shall not exceed fifty (50) pages and should be consecutively numbered to facilitate verification of page limitation compliance. The technical volume shall contain the below information in the prescribed order and shall be clearly identified using the associated numbers below. Proposals that do not clearly identify the below information using the associated numbers will be considered to have not conformed to the parameters of this RA and may be considered non-responsive. Proposals considered non-responsive shall not be further evaluated. The Technical Volume shall contain the following information:

1. RA title and number, and RA topic area(s) addressed by the proposal;
2. A summary of key elements within the proposal;
3. Describe the ability of the proposed work to satisfy RA/BAA goals;
4. A motivation of value and purpose (i.e., if this is successful what impact it would have to the commercial and/or military world?);
5. A concise technical scope and/or goal;
6. A detailed explanation of proposed work, technical approach, critical issues, risks, and innovative claims for the proposed research. This section is the centerpiece of the proposal and should succinctly describe the uniqueness and benefits of the proposed approach relative to the current state-of-art alternate approaches;
7. An explanation of how the proposed effort satisfies the definition(s) of basic research, applied research, or development that is not related to the development of a specific system; the definitions are available in Appendix A of this document.
8. Complete technical details, technical rationale, and constructive plan for accomplishment of technical goals in support of innovative claims and deliverable production;
9. A draft statement of work (SOW) that must provide a detailed task breakdown, citing specific tasks and their connection to the interim milestones and metrics, as applicable. Each year of the project should be separately defined. The SOW must not include proprietary information. For each defined task/subtask, provide:
 - A general description of the objective.
 - A detailed description of the approach to be taken to accomplish each defined task/subtask.
 - Identification of the primary organization responsible for task execution (prime contractor, subcontractor(s), consultant(s)), by name.
 - A measurable milestone (e.g., a deliverable, demonstration, or other event/activity that marks task completion).
 - A definition of all deliverables (e.g., data, reports, software) to be provided to the Government in support of the proposed tasks/subtasks.
10. A detailed schedule showing tasks (task name, duration, work breakdown structure element as applicable, performing organization), anticipated milestones or checkpoints and deliverables - both reports and software/hardware, and the interrelationships among tasks. The task structure must be consistent with that in the SOW. Milestones should capture key development points in tasks and should be clearly articulated and defined in time relative to start of effort;
11. Discussion of the Offeror's/Offeror team's past and present work in this area, and related work, so as to demonstrate the Offeror's knowledge and experience and put the proposed work into context; to include a clearly defined organization chart for the program team (prime, subrecipients, team members, by name, etc.) which includes, as applicable: (1) the programmatic relationship of team members; (2) the unique capabilities of team members; (3) the tasks and responsibilities of team members; (4) the teaming strategy among the team

- members; and (5) the key personnel along with the amount of effort to be expended by each person during each year;
12. Deliverables associated with the proposed research and the plans and capability to accomplish technology transition and commercialization. A clear description of any technical data or computer software deliverables that would be provided to the Government with other than unlimited rights; A description of why any limitation on the Government's proposed rights in a data or software deliverable will satisfy the program objectives of this RA and, in particular, the specific topic. Any designs, computer software, test results, etc. should be listed as separate data deliverables separated out by tasks. Note: Should an Offeror's proposal be selected for award, the Government and the Offeror will negotiate the list of data/software deliverables;
- Identify and assert rights to all technical data and computer software that will be delivered with less than "unlimited rights," as defined in DFARS 252.227-7013 and 252.227-7014, in accordance with Attachment 1. For computer software or computer software documentation, identify the software or documentation by specific name or module or item number.
 - Both noncommercial and commercial data/software should be identified and any restrictions should be asserted. Should the Offeror propose a specially negotiated license or a commercial license with respect to a data or software item, then the Offeror must describe, in general terms, the use limitations of the license. If an Offeror makes no assertions in Attachment 1, the Government will assume that the Offeror will deliver all data/software with "unlimited rights."
13. A description of the facilities that would be used for the proposed effort;
14. Clearly identify any other funding agencies for which the proposal has been submitted; and
15. In addition to the proposal, in a **separate Adobe Portable Document File**, provide a short executive summary of the proposed effort. This executive summary will not contain any proprietary or business sensitive information and as such should only contain FOUO markings. Executive summaries containing legends source selection sensitive, proprietary, or any other identifiable markings- will be treated as source selection sensitive material. Executive summaries, containing the appropriate FOUO markings, will be used within the command to identify interested parties for the purpose of conducting evaluations. This summary will not affect the evaluation of the proposal. All proposals will be evaluated in accordance with the criteria of this BAA. Only US Government personnel will view the executive summary. Executive Summaries should include:
- i. Proposal title,
 - ii. Submission date,
 - iii. Organization name,
 - iv. Technical topic areas (include section reference(s) and description(s)), and
 - v. Summary of the science and technology research effort proposed, not to exceed 1,000 characters (does not include white spaces).

ATTACHMENT 2 – Recipient Certifications and Representations

CERTIFICATIONS REGARDING ASSERTION OF RESTRICTIONS ON THE GOVERNMENT'S USE, RELEASE, OR DISCLOSURE OF TECHNICAL DATA OR COMPUTER SOFTWARE; DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS; RESTRICTIONS ON LOBBYING; AND DRUG-FREE WORKPLACE REQUIREMENTS.

REPRESENTATION REGARDING AN UNPAID DELINQUENT TAX LIABILITY OR A FELONY CONVICTION UNDER ANY FEDERAL LAW – DOD APPROPRIATIONS

Proposal Title:

Proposal Number and Date:

The above referenced proposal was submitted in response to the following:

Title of Research Announcement:

Date Published in the Fedbizopps/Grants.gov:

Applicants should refer to the regulations cited below to determine the certifications to which they are required to attest. All applicants are required to complete the certification on the identification and assertion of restrictions on the Government's use, release, or disclosure of technical data or computer software. Applicants should also review the instructions for certification requirement under 32 CFR Part 25, "Government-wide Debarment and Suspension (Nonprocurement)"; and 32 CFR Part 28, "New Restrictions on Lobbying"; and 32 CFR Part 25, "Government-wide Requirements for Drug-Free Workplace (Grants)". The certifications shall be treated as a material representation of fact upon which reliance will be placed when SPAWARSCEN Pacific determines to award the covered transaction, grant, or cooperative agreement.

CERTIFICATION REGARDING IDENTIFICATION AND ASSERTION OF RESTRICTIONS ON THE GOVERNMENT'S USE, RELEASE, OR DISCLOSURE OF TECHNICAL DATA OR COMPUTER SOFTWARE

The applicant shall identify below, to the extent known at the time the certification is made, the technical data or computer software that the applicant, its subawardees or suppliers, or potential subawardees or suppliers, assert should be furnished to the Government with restrictions on use, release, or disclosure.

The applicant asserts for itself, or the persons identified below, that the Government's rights to use, release, or disclose the following technical data or computer software should be restricted:

Technical Data and/or Computer Software to be Furnished With Restrictions*	Basis for Assertion**	Asserted Rights Category***	Name of Person Asserting Restrictions****
(LIST)*****	(LIST)	(LIST)	(LIST)

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*For technical data (other than computer software documentation) pertaining to items, components, or processes developed at private expense, identify both the deliverable technical data and each such item, component, or process. For computer software or computer software documentation identify the software or documentation.

**Generally, development at private expense, either exclusively or partially, is the only basis for asserting restrictions. For technical data, other than computer software documentation, development refers to development of the item, component, or process to which the data pertain. The Government's rights in computer software documentation generally may not be restricted. For computer software, development refers to the software. Indicate whether development was accomplished exclusively or partially at private expense. If development was not accomplished at private expense, or for computer software documentation, enter the specific basis for asserting restrictions.

***Enter asserted rights category (e.g., government purpose license rights from a prior contract, rights in SBIR data generated under another contract, limited, restricted, or government purpose rights under this or a prior contract, or specially negotiated licenses).

****Corporation, individual, or other person, as appropriate.

*****Enter "none" when all data or software will be submitted without restrictions.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS--PRIMARY COVERED TRANSACTIONS

(1) 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 governmental 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.

(2) 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 REGARDING LOBBYING ACTIVITIES

The following certification applies only to actions exceeding \$100,000:

Section 1352, Title 31, U.S.C. (PL 101-121, Section 319) entitled "Limitation on use of appropriated funds to influence certain Federal contracting and financial transactions".

(1) 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.

(2) 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 the 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.

(3) 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.C. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

CERTIFICATION REGARDING DRUG-FREE WORKPLACE REQUIREMENTS

Alternate I. (Grantees Other Than Individuals)

(1) 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 grant 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).

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

Place of Performance (Street address, city, county, state, ZIP code)

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

Alternate II. (Grantees Who Are Individuals)

(1) The grantee certifies that:

(a) 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 grant office 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.

As the duly authorized representative of the applicant, I hereby make the above certifications on behalf of the applicant.

Applicant Institution:

Taxpayer Identification Number (TIN):

Printed Name, Title and Signature of Authorized Representative:

Date:

**REPRESENTATION REGARDING AN UNPAID DELINQUENT TAX LIABILITY OR A FELONY
CONVICTION UNDER ANY FEDERAL LAW – DOD APPROPRIATIONS**

(1) The applicant represents that it is ___ is not___ a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

(2) The applicant represents that it is___ is not __a corporation that was convicted of a felony criminal violation under any Federal law within the preceding 24 months.

NOTE: If an applicant responds in the affirmative to either of the above representations, the applicant is ineligible to receive an award unless a Federal agency suspension and debarment official (SDO) has considered suspension or debarment and determined that further action is not required to protect the Government's interests. The applicant therefore should provide information about its tax liability or conviction to the agency's SDO as soon as it can do so, to facilitate completion of the required consideration before award decisions are made.