

**National Geospatial-Intelligence Agency (NGA)
23.3 Small Business Innovation Research (SBIR)
Proposal Submission Instructions**

INTRODUCTION

NGA is a Department of Defense (DoD) combat support agency and a member of the U.S. Intelligence Community (IC). NGA develops imagery and map-based intelligence solutions for U.S. national defense, homeland security, and safety of navigation. NGA's mission is to "provide timely, relevant, and accurate geospatial-intelligence in support of national security." Today, NGA manages the National System for Geospatial-Intelligence (NSG), which provides the foundation for correlating U.S. intelligence activities to the location of the Earth.

Geospatial intelligence, or GEOINT, is the exploitation and analysis of imagery and geospatial information to describe, assess and visually depict physical features and geographically referenced activities on the Earth. GEOINT consists of imagery, imagery intelligence and geospatial information. Additional information pertaining to the NGA mission and high-level course can be obtained by viewing the agency's website at <https://www.nga.mil> and NGA's strategy documents at <https://www.nga.mil/about/strategy.html>.

NGA Research supports the NSG and National Security Strategy by solving hard defense and intelligence problems for the IC and DoD in three broad areas: Foundational GEOINT; Advanced Phenomenologies; and Analytic Technologies. NGA Research works with customers on early concepts through to advanced developments in operating systems and environments.

Offerors responding to a topic in this BAA must follow all general instructions provided in the DoD SBIR Program BAA, as applicable. NGA requirements in addition to or deviating from the DoD Program BAA are provided in the instructions below.

Specific questions pertaining to the administration of the NGA SBIR Program and these proposal preparation instructions should be directed to:

National Geospatial-Intelligence Agency
Attn: SBIR Program Manager, RA, MS: S75-RA
7500 GEOINT Dr., Springfield, VA 22150-7500
Email: SBIR@nga.mil

Proposers responding to a topic in this BAA must follow all general instructions provided in the DoD SBIR Program BAA. NGA requirements in addition to or deviating from the DoD Program BAA are provided in the instructions below.

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

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

Specific questions pertaining to the administration of the NGA Program and these proposal preparation instructions should be directed to: sbir@nga.mil.

PHASE I PROPOSAL GUIDELINES

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

Technical Volume (Volume 2)

The technical volume is not to exceed 20 pages and must follow the formatting requirements provided in the DoD SBIR Program BAA. The Government will not consider pages in excess of the page count limitation. Number all pages of your proposal consecutively.

Content of the Technical Volume

The offeror shall not propose option period(s).

Commercialization Strategy. In addition, the Commercialization Strategy shall also address Section 508 compliance as noted below:

Section 508 Compliance

The contractor shall ensure that all systems, hardware, software, software engineering, and information technology associated with this effort is made in a manner that is accessible for people with the standards for people with disabilities as directed in the NGA Instruction 8400.4 and Section 508 of the Rehabilitation Act of 1973 as amended in 1998 (Section 508). Specifically, all Information and Communications Technology (ICT) associated with this contract, may use the Web Content Accessibility Guidelines (WCAG) 2.1 to comply with the Section 508 or use alternative designs or technologies which result in substantially equivalent or greater access to and use of the product for people with disabilities. Furthermore, the contractor shall pursue human centered design and usability guidelines to ensure that all services associated with this Topic Area are accessible by as many users as possible and to drive modernization, innovation, and enhance mission support.

As part of the offeror's proposal, the offeror should include an outline of specifically how Section 508 compliance will be achieved in the design of the ICT product. The proposal for Phase II should provide an explicit, detailed description of the approach, indicate what is planned, how and where the work will be carried out, a schedule of major events, how the solution will be Section 508 Compliant, and the final product to be delivered. The methods planned to achieve each objective or task should be discussed explicitly and in detail. If a determination is made that a Section 508 exception request is justified, the rationale for the exception request must be made and submitted as a part of the proposal.

Cost Volume (Volume 3)

The Phase I amount must not exceed \$100,000 for up to a nine (9)-month period of performance. Costs must be separated and clearly identified on the Proposal Cover Sheet (Volume 1) and in Volume 3.

Please review the updated Percentage of Work (POW) calculation details included in the DoD Program BAA. NGA will not accept any deviation to the POW requirements.

Company Commercialization Report (CCR) (Volume 4)

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

Supporting Documents (Volume 5)

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

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

Please refer to the DoD Program BAA for more information.

Additionally, submission of Standard Form 328, "Certificate Pertaining to Foreign Interests," is required in order to be considered for award. The form can be found at <https://www.gsa.gov/forms-library/certificate-pertaining-foreigninterests>.

PHASE II PROPOSAL GUIDELINES

Phase II proposals may only be submitted by Phase I awardees. Small business concerns shall provide a proposal no later than 30 calendar days prior to the expiration of their NGA Phase I contract period of performance to be considered for a Phase II award. For improved continuity, NGA encourages Phase I awardees to submit their Phase II proposals 60 days prior to the expiration of their NGA Phase I contract period of performance.

Sequential Phase II proposals (for related work after completion of the initial NGA Phase II or Direct to Phase II contract) will normally be required within 30 calendar days of: 1) NGA's review of the provider's prototype and final report, 2) NGA's determination that additional work is desired and funding is available; and 3) NGA's determination that the required work is not suitable for a Phase III contract. NGA expects to complete these actions within 30 calendar days of final report receipt. The precise proposal due date will be annotated in Section F of the original Phase II or Direct to Phase II contract.

NGA may entertain Phase II proposals to continue related work on non-NGA Phase I contracts of interest, subject to the original government contracting entity's approval. There are no pre-established due dates for these proposals.

Phase II proposal format, content, and submission instructions are identical to those described in the "DIRECT TO PHASE II PROPOSAL INSTRUCTIONS" above, except that the Technical Volume will only contain a Technical Proposal of up to 40 pages. Do not submit Part A – Feasibility Documentation.

DISCRETIONARY TECHNICAL AND BUSINESS ASSISTANCE (TAB A)

NGA does not provide TAB A.

EVALUATION AND SELECTION

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

The individual named as the Corporate Official on the Proposal Cover Sheet will receive an email for each proposal submitted from the NGA Contracting Officer/Specialist with their official notification of

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proposal selection or non-selection within 90 days of the closing date of the BAA or the timely submission date of their Phase II proposal. The notices will be binned into 3 categories: (1) proposals selected for award, (2) proposals selected for award if additional funding becomes available, and (3) proposals not selected for award.

Proposals in response to this BAA with the award designation of “Award if Additional Funding Becomes Available” will receive consideration for award through October 17, 2024. Phase II proposals with this award designation will receive consideration for award for a period of one year following the timely submission date of the Phase II proposal.

An unsuccessful offeror has three (3) days after notification that its proposal was not selected to submit a written request for a debriefing to the Contracting Officer (CO).

Refer to the DoD SBIR Program BAA for procedures to protest the Announcement. As further prescribed in FAR 33.106(b), FAR 52.233-3, Protests after Award should be submitted to: Emely Winnert at Emely.E.Winnert@nga.mil.

AWARD AND CONTRACT INFORMATION

Phase I awards are capped at \$100,000 each over a maximum nine (9)-month period of performance.

Phase II awards are capped at \$1,000,000 each over a maximum 24-month period of performance.

NGA caps sequential Phase II contracts (those proposed near the completion of the initial Phase II or Direct to Phase II contract) at the then current Small Business Administration (SBA) “without seeking SBA approval” ceiling over a maximum 24-month period of performance. See <https://www.sbir.gov/about> for the most recent information.

NGA typically provides a firm fixed price contract for its awards within 180 days of the proposal due date. The type of contract is at the discretion of the Contracting Officer.

ADDITIONAL INFORMATION

CONTROLLED UNCLASSIFIED INFORMATION (CUI)

Controlled Unclassified Information (CUI) is information that requires safeguarding or dissemination controls pursuant to and consistent with applicable law, regulations, and government-wide policies but is not classified under Executive Order 13526 or the Atomic Energy Act, as amended.

Executive Order 13556 "Controlled Unclassified Information" (the Order), establishes a program for managing CUI across the Executive branch and designates the National Archives and Records Administration (NARA) as Executive Agent to implement the Order and oversee agency actions to ensure compliance. The Archivist of the United States delegated these responsibilities to the Information Security Oversight Office (ISOO).

32 CFR Part 2002 "Controlled Unclassified Information" was issued by ISOO to establish policy for agencies on designating, safeguarding, disseminating, marking, decontrolling, and disposing of CUI, self-inspection and oversight requirements, and other facets of the Program. The rule affects Federal executive branch agencies that handle CUI and all organizations (sources) that handle, possess, use, share, or receive CUI—or which operate, use, or have access to Federal information and information systems on behalf of an agency.

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During performance of this contract, if the government provides the offeror a dataset that is not publicly released, the offeror must be CUI Compliant to receive it. For more information on this compliance please see DFARS Clauses 252.204.7008 and 252.204-7012, NIST Special Publication SP 800-171 and the National Archives and Records Administration (NARA) website (<https://www.archives.gov/cui/about>).

See each individual topic for guidance.

NON-DISCLOSURE AGREEMENTS (NDA)

Subject to any vetting of uncleared individuals involved in the project per the DoD SBIR Program BAA, all eligible contractor and subcontractor personnel requiring access to Protected Information and Computer Software shall sign an NDA prior to accessing such information. See 5X52.209-9003, Protection of Information and Nondisclosure Agreements (JUN 2009) below for additional details.

INFORMATION HANDLING

Contractor personnel will comply with the NGA, DoD, and IC policies and regulations (to include, but not limited to, the CoNGA Security Classification Guide) to properly mark (to include portion marking) classified and unclassified documentation, media, etc.

Markings will be in accordance with the lowest security classification possible to ensure the confidentiality and integrity for the greatest release to partners in accordance with NGA and mission partner marking guides for classified information.

Information management will be in accordance with applicable security policy and regulations, and NGA compliance documents.

All Government-furnished information released to the Contractor or created in the performance of this contract will be destroyed or returned by the Contractor to NGA upon contract termination or when no longer required for contract performance. The determination to destroy or return will be at the direction of the NGA CO or COR.

CLASSIFIED WORK PERFORMANCE SECURITY REQUIREMENTS (Not applicable to UNCLASSIFIED ONLY contracts)

Contractor personnel performing Top Secret/Sensitive Compartmented Information (TS/SCI) work on the SBIR contract are required to have active TS/SCI clearances for access to NGA facilities, when performing duties within TS/SCI environments, and for access to TS/SCI NGA computer systems. Contractors are subject to a Counterintelligence Polygraph as requested by the Government. NGA will sponsor TS/SCI security clearances, NGA Badges, Common Access Cards (CAC) and other items (example: parking hangtag) for required contract personnel.

Contractors must abide by the DD Form 254 - Contract Security Classification Specification and applicable security policies and regulations.

Contractor personnel shall follow all applicable NGA, IC, and DoD information security and operational security policies and guidance when accessing and transmitting data over networks during performance of agreement requirements.

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The contractor shall inform the Government when its employees no longer support the contract (see DD254). The Government desires notification prior to the day the individual no longer supports the contract, but requires notification no later than the day support ends. If contractor personnel will no longer be supporting NGA via an NGA contract, any debriefing paperwork, notifications, and/or requests for further direction from the COR or Industrial Security shall be turned into the NGA Workforce Support Center, NGA Site Security Office, or the COR. If contract personnel are unable to turn these items into the NGA Workforce Support Center, NGA Site Security Office, or COR then it is the contractor's security office's responsibility to collect the items from the individual. If the contractor debriefs the employee, the contractor shall send a copy of the debriefing statement, plus any Government items (i.e. NGA Badge, CAC, Courier Card, parking hangtags, etc.) within four (4) business days (timeline may be extended with authorized documented exceptions by NGA Security) to an NGA Site Security Office or the NGA Workforce Support Center.

All classified work performed at a non-NGA facility must be approved by the COR.

Cleared contractor personnel may be authorized to hand-carry contract-related classified information as authorized by the COR. Contract personnel will obtain NGA courier authorization prior to hand-carry of contract-related classified data. Contract personnel will be limited to hand-carry classified information between the contractor facilities and NGA facilities only.

Any classified work performed at collaborator sites must be performed in either an NGA accredited SCIF or an Other Government Agency (OGA) SCIF that has either a Memorandum of Agreement (MOA), Memorandum of Understanding (MOU), Joint Use Agreement or Co-Use Agreement with NGA for this contract.

Contract personnel are forbidden from bringing in prohibited, unauthorized, and/or Portable Electronic Devices (PEDs) items into any NGA installation or any office/working location covered under this agreement. A list of PEDs includes but is not limited to cell phones, cameras, two-way pagers, laptops, recorders (digital, tape, etc.), flash drives, or any other kind of removable media, without prior approval and approval paperwork from NGA. See NGA instructions/regulations/policy for a full list of prohibited and unauthorized items. Security violation repercussions will be determined on the severity of the violation.

DISCLOSURE OF INFORMATION

(1) The Contractor shall not release to anyone outside the Contractor's organization any unclassified information, regardless of medium (e.g., film, tape, document), pertaining to any part of this contract or any program related to this contract, unless-

- (a) The Contracting Officer has given prior written approval;
- (b) The information is otherwise in the public domain before the date of release; or
- (c) The information results from or arises during the performance of a project that involves no covered defense information (as defined in the clause at DFARS 252.204-7012, Safeguarding Covered Defense Information and Cyber Incident Reporting) and **has been scoped and negotiated by the contracting activity with the contractor and research performer and determined in writing by the contracting officer to be fundamental research* (which by definition cannot involve any covered defense information)**, in accordance with National Security Decision Directive 189, National Policy on the Transfer of Scientific, Technical and Engineering Information, in effect on the date of

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contract award and the Under Secretary of Defense (Acquisition, Technology, and Logistics) memoranda on Fundamental Research, dated May 24, 2010, and on Contracted Fundamental Research, dated June 26, 2008 (available at DFARS PGI 204.4).

(2) Requests for approval under paragraph (a)(1) shall identify the specific information to be released, the medium to be used, and the purpose for the release. The Contractor shall submit its request to the Contracting Officer at least 10 business days before the proposed date for release.

(3) The Contractor agrees to include a similar requirement, including this paragraph (c), in each subcontract under this contract. Subcontractors shall submit requests for authorization to release through the prime contractor to the Contracting Officer.

***Note: This has to be negotiated prior to award of the contract. A request for determination after award will not be entertained and will result in the clause being pushed down to all subcontracts. Non-performance could result in cancelation of contract.**

Clauses

52.204-7 System for Award Management.

As prescribed in 4.1105(a)(1), use the following provision:

SYSTEM FOR AWARD MANAGEMENT (OCT 2018)

(a) Definitions. As used in this provision—

"Electronic Funds Transfer (EFT) indicator means a four-character suffix to the unique entity identifier. The suffix is assigned at the discretion of the commercial, nonprofit, or Government entity to establish additional System for Award Management records for identifying alternative EFT accounts (see subpart 32.11) for the same entity.

Registered in the System for Award Management (SAM) means that—

(1) The Offeror has entered all mandatory information, including the unique entity identifier and the EFT indicator, if applicable, the Commercial and Government Entity (CAGE) code, as well as data required by the Federal Funding Accountability and Transparency Act of 2006 (see subpart 4.14) into SAM

(2) The offeror has completed the Core, Assertions, and Representations and Certifications, and Points of Contact sections of the registration in SAM;

(3) The Government has validated all mandatory data fields, to include validation of the Taxpayer Identification Number (TIN) with the Internal Revenue Service (IRS). The offeror will be required to provide consent for TIN validation to the Government as a part of the SAM registration process; and

(4) The Government has marked the record "Active".

Unique entity identifier means a number or other identifier used to identify a specific commercial, nonprofit, or Government entity. See www.sam.gov for the designated entity for establishing unique entity identifiers.

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(b)

(1) An Offeror is required to be registered in SAM when submitting an offer or quotation, and shall continue to be registered until time of award, during performance, and through final payment of any contract, basic agreement, basic ordering agreement, or blanket purchasing agreement resulting from this solicitation.

(2) The Offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation "Unique Entity Identifier" followed by the unique entity identifier that identifies the Offeror's name and address exactly as stated in the offer. The Offeror also shall enter its EFT indicator, if applicable. The unique entity identifier will be used by the Contracting Officer to verify that the Offeror is registered in the SAM.

(c) If the Offeror does not have a unique entity identifier, it should contact the entity designated at www.sam.gov for establishment of the unique entity identifier directly to obtain one. The Offeror should be prepared to provide the following information:

- (1) Company legal business name.
- (2) Tradestyle, doing business, or other name by which your entity is commonly recognized.
- (3) Company physical street address, city, state, and Zip Code.
- (4) Company mailing address, city, state and Zip Code (if separate from physical).
- (5) Company telephone number.
- (6) Date the company was started.
- (7) Number of employees at your location.
- (8) Chief executive officer/key manager.
- (9) Line of business (industry).
- (10) Company headquarters name and address (reporting relationship within your entity).

(d) Processing time should be taken into consideration when registering. Offerors who are not registered in SAM should consider applying for registration immediately upon receipt of this solicitation. See <https://www.sam.gov> for information on registration.

(End of Provision)

52.204-27 Prohibition on a ByteDance Covered Application.

As prescribed in 4.2203, insert the following clause:

PROHIBITION ON A BYTEDANCE COVERED APPLICATION (JUN 2023)

(a) *Definitions.* As used in this clause—

Covered application means the social networking service TikTok or any successor application or service developed or provided by ByteDance Limited or an entity owned by ByteDance Limited.

Information technology, as defined in 40 U.S.C. 11101(6)—

(1) Means any equipment or interconnected system or subsystem of equipment, used in the automatic acquisition, storage, analysis, evaluation, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the executive agency, if the equipment is used by the executive agency directly or is used by a contractor under a contract with the executive agency that requires the use—

(i) Of that equipment; or

(ii) Of that equipment to a significant extent in the performance of a service or the furnishing of a product;

(2) Includes computers, ancillary equipment (including imaging peripherals, input, output, and storage devices necessary for security and surveillance), peripheral equipment designed to be controlled by the central processing unit of a computer, software, firmware and similar procedures, services (including support services), and related resources; but

(3) Does not include any equipment acquired by a Federal contractor incidental to a Federal contract.

(b) *Prohibition.* Section 102 of Division R of the Consolidated Appropriations Act, 2023 (Pub. L. 117-328), the No TikTok on Government Devices Act, and its implementing guidance under Office of Management and Budget (OMB) Memorandum M-23-13, dated February 27, 2023, “No TikTok on Government Devices” Implementation Guidance, collectively prohibit the presence or use of a covered application on executive agency information technology, including certain equipment used by Federal contractors. The Contractor is prohibited from having or using a covered application on any information technology owned or managed by the Government, or on any information technology used or provided by the Contractor under this contract, including equipment provided by the Contractor’s employees; however, this prohibition does not apply if the Contracting Officer provides written notification to the Contractor that an exception has been granted in accordance with OMB Memorandum M-23-13.

(c) *Subcontracts.* The Contractor shall insert the substance of this clause, including this paragraph (c), in all subcontracts, including subcontracts for the acquisition of commercial products or commercial services.

(End of clause)

5X252.204-7000-90 PUBLIC RELEASE OF INFORMATION (MAR 2023)

(a) Except as provided in paragraph (b) of this clause, information pertaining to this contract shall not be released to the public unless authorized by the Contracting Officer in accordance with DFARS 252.204-7000, Disclosure of Information. Requests for approval to release information pertaining to this contract shall be submitted to the Contracting Officer by means of NGA Form 5230-1, National Geospatial-Intelligence Agency Request for Clearance for Public Release.

(b) The contractor may provide past performance information regarding this contract, without completing an NGA Form 5230-1 and without Contracting Officer approval, when submission of such information is to the Office of the Director of National Intelligence (ODNI), the Central Intelligence Agency (CIA), the National Reconnaissance Office (NRO), the National Security Agency (NSA), the Defense Intelligence Agency (DIA), and NGA to support source selections at those agencies. The contractor is responsible for the proper classification and handling of such information, and shall provide a copy of the information provided to the Contracting Officer.

(End of Clause)

5X52.209-9003: PROTECTION OF INFORMATION AND NONDISCLOSURE AGREEMENTS (JUN 2009)

(a) Definitions. As used in this clause only:

(1) Protected Information and Computer Software means, unless specifically excluded by paragraph below, all information and computer software, in any form or media, that in the course of performing work under this contract are disclosed to the Contractor, its subcontractors, or their employees, or to which those persons otherwise are given access to, by:

(i) NGA,

(ii) Other government agencies,

(iii) Foreign governments, or

(iv) Other contractors while directly supporting NGA, which is accompanied by written legends identifying use or disclosure restrictions or disclosed under circumstances that the Contractor knows are subject to use or disclosure restrictions established in writing by the Government.

(2) Protected Information and Computer Software does not include information that:

(i) Has been released to the general public through no action of the undersigned in breach of this agreement or through no action of any other party in breach of any other obligation of confidentiality owing to the Government or the owner of the protected information or computer software;

(ii) Has been lawfully obtained by the recipient outside the course of the performance of this contract;

(iii) Has been properly licensed or provided directly by the owner (or other authorized source) of the information or computer software to the recipient to the extent so licensed or provided;

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(iv) Is owned by the recipient or was developed independently of the disclosure hereunder;
or

(v) Has been disclosed to the recipient by the Government with explicit authorization to use or disclose the information for another purpose, to the extent so authorized.

(b) Use and disclosure restrictions. The Contractor shall use and disclose Protected Information and Computer Software only as necessary for the performance of the requirements of this contract. Protected Information and Computer Software may not be used or disclosed for any other purpose, including bid or proposal preparation or business marketing, without the written approval of the Contracting Officer. Furthermore, unless otherwise directed by the Contracting Officer, the Contractor shall comply with all restrictions set forth in any legends, licenses or instructions provided to the Contractor or accompanying Protected Information and Computer Software or other written directives of the Government known to the Contractor. The use and disclosure obligations imposed by this paragraph shall expire as follows:

- (1) There shall be no expiration date for the following Protected Information and Computer Software:
 - (i) Technical data or computer software containing Limited Rights, Restricted Rights, Government Purpose Rights, Special License Rights, or Unlimited Rights legends;
 - (ii) information or software marked Limited Distribution (LIMDIS);
 - (iii) information or software marked Source Selection Information;
 - (iv) contract proposal information marked pursuant to FAR 52.215-1(e) limiting its use for proposal evaluation purposes only;
 - (v) information and computer software marked Contractor Proprietary or a similar legend;
 - (vi) data known by the Contractor to be protected by the Privacy Act; and
 - (vii) information and software marked Controlled Unclassified Information (CUI) or For Official Use Only (FOUO).
- (2) For other information or software accompanied at time of disclosure by a written legend identifying use or disclosure restriction time periods, the expiration date shall be as stated in or derived from the legend.
- (3) For all other Protected Information and Computer Software, the expiration date shall be 3 years from the date the information or software is first disclosed to the Contractor.

Notwithstanding the above obligations, the Contractor is not in breach of this agreement if the Contractor uses or discloses Protected Information and Computer Software in response to an order of a court or administrative body of competent jurisdiction, but only to the extent permitted by that authority and only if the Contractor gives the Contracting Officer, to the extent practical, notice of the tribunal's order before the use or disclosure is made that allows NGA a reasonable time to object to the order.

(c) Unauthorized Use or Disclosure. The Contractor shall immediately notify the Contracting Officer of any unauthorized use or disclosure known by the Contractor of Protected Information and Computer Software in violation of the obligations contained in this clause.

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(d) Disposition. At the conclusion of performance of work under this contract, the Contractor shall immediately return to the Government all Protected Information and Computer Software in its possession. Furthermore, if an employee of the Contractor who has had access to Protected Information and Computer Software is terminated or reassigned and thus is no longer performing work under this contract, the Contractor shall immediately return all Protected Information and Computer Software in the employee's possession. Moreover, if a Contractor's employee is dedicated to support a specific NGA Office or Directorate or NGA program under this contract, but is subsequently reassigned to support another NGA Office or Directorate or NGA program under this contract, the Contractor shall immediately return all Protected Information or Computer Software in the employee's possession previously furnished by the prior NGA Office or Directorate or NGA program. In lieu of returning Protected Information and Computer Software, the Contracting Officer or Contracting Officer's representative may authorize the destruction of the information or the transfer of the information to another employee of the Contractor working under the contract. Finally, this clause shall not be interpreted as preventing the Contractor from retaining records required by statutes or other clauses of this contract, such as FAR 52.215-2 Audit and Records--Negotiations.

(e) Third party beneficiaries. This clause is executed for the benefit of the Government and the owners of Protected Information and Computer Software. The Government and the owners of Protected Information and Computer Software (and their delegates, successors and assignees) are third party beneficiaries of the obligations contained in this clause who, in addition to any other legal rights they may have, are intended to have the rights of direct action against the Contractor or any person to whom the Contractor has disclosed or released Protected Information and Computer Software, to seek damages from any breach of this clause, or to otherwise enforce this clause.

(f) Duration. The above obligations imposed by this clause shall survive the termination or completion of this contract.

(g) Classified Information. This clause is in addition to and in no manner abrogates requirements, obligations or remedies regarding the protection of classified information and does not supersede the requirements of any laws, regulations, other directives or nondisclosure agreements regarding classified information.

(h) Other Restrictions. This agreement does not abrogate any other obligations currently placed upon the Contractor or which may be imposed upon the Contractor in the future by the Government or other persons; or remedies afforded those persons regarding those obligations.

(i) Nondisclosure agreements. The Contractor shall require and ensure that each of its employees who may receive or be given access to Protected Information and Computer Software signs the nondisclosure agreement provided by attachment to this contract prior to the employee performing work under this contract covered by the nondisclosure agreement. The Contractor shall maintain copies of signed nondisclosure agreements for a period of at least three years after final payment under this contract. At the direction of the Contracting Officer, the Contractor shall make those agreements available for inspection by the Contracting Officer and will furnish the Contracting Officer copies of those agreements at no additional cost to the Government if requested by the Contracting Officer.

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(j) The Contractor shall include the substance of this clause in all subcontracts under this contract in which subcontractors may be disclosed or granted access to Protected Information and Computer Software.

(End of Clause)

5X52.227-9000 UNAUTHORIZED USE OF NGA NAME, SEAL AND INITIALS (JUN 2006)

(a) As provided in 10 U.S.C. Section 425, no person may, except with the written permission of the Director, National Geospatial-Intelligence Agency, knowingly use the words “National Geospatial-Intelligence Agency”, “National Imagery and Mapping Agency” or “Defense Mapping Agency”, the initials “NGA”, “NIMA” or “DMA”, the seal of the National Geospatial-Intelligence Agency, National Imagery and Mapping Agency, or the Defense Mapping Agency, or any colorable imitation of such words, initials, or seal in connection with any merchandise, retail product, impersonation, solicitation, or commercial activity in a manner reasonably calculated to convey the impression that such is approved, endorsed, or authorized by the Director, NGA.

(b) Whenever it appears to the U.S. Attorney General that any person is engaged or about to engage in an act or practice which constitutes or will constitute conduct prohibited by paragraph (a), the Attorney General may initiate a civil proceeding in a district court of the United States to enjoin such act or practice. Such court shall proceed as soon as practicable to hearing and determination of such action and may, at any time before such final determination, enter such restraining orders or prohibition, or take such other action as is warranted, to prevent injury to the United States, or to any person or class of persons whose protection the action is brought.

(End of Clause)

**5X52.232-9000: Submission of Invoice-Federal Payment Center (FPC) (OCT 2017)
– For use in contracts paid by the FPC vendor pay office.**

(a) The contractor shall prepare each invoice in accordance with the Prompt Payment Act and email one copy of the invoice to the DOD/FPC Scott AFB, IL at FMFOINSP@nga.mil. The DOD/FPC at Scott AFB, IL requires an email copy, but will accept a hard copy that is mailed to Federal Payment Center, P.O. Box 25767, Scott AFB, IL 62225.

(b) At the same time of submission of the invoice to the FPC vendor pay office, the contractor shall fax or email one copy to [**Contracting Officer**], and one copy to [**Contracting Officer Representative**]. The contractor shall ensure that the invoice submitted to the payment office is the same invoice that is submitted to the CO and the COR without alteration.

(c) Upon receipt of the invoice, the COR will complete the receiving report and submit via the RRPT database tool. A copy of the completed receiving report shall also be provided to the Contracting Officer shown on the face of this contract/order.

(d) Contractors wishing to check the payment status of their vouchers may do so by calling FPC Vendor Support at 636-321-5251. In addition, questions may be directed to the Contracting Officer’s Representative (COR). In the absence of a COR, contact the Procurement Contracting Officer (PCO), whose name and contact information appear

on the face page of this contract/order.

(End of Clause)

5X52.237-9001 CONTRACTOR IDENTIFICATION (JAN 2012)

The contractor shall ensure that contractor personnel, including their sub-contractor personnel, identify themselves as contractor personnel, by introducing themselves or being introduced as contractor personnel when:

- (1) attending meetings with Government personnel or contractors performing under a contract awarded to support NGA requirements,
- (2) answering government telephones,
- (3) providing any type of written or electronic mail correspondence, and
- (4) working in any other situation where their actions could be construed as an official Government act or representation of the Government.

The contractor shall ensure that contractor personnel possess and properly display Government-issued identification badges when on NGA property or when attending NGA meetings not located on NGA property.

The contractor will ensure that contractor personnel, when performing in a contractor capacity, refrain from using their retired or reserve component military rank or title in all written and verbal communications.

The Government may include the results of the contractor's ability to adhere to this clause in quality assurance surveillance plans and award fee plans as part of the overall administration of this contract.

(End of Clause)

5X52.37-9000 Contractor Employee Data for Access to NGA Facilities or Sensitive Systems (OCT 2005)

1. This clause defines the contractor's responsibilities for providing accurate contractor data, and providing updates to that data, for NGA's Human Capital Management System (HCMS). NGA requires that all contractors provide initial and timely updates to HCMS data for all personnel performing under this contract who have access to NGA facilities or sensitive systems, as determined by the contracting officer.

2. The Contractor shall:

a. Provide the Contracting Officers Representative (COR) a Point of Contact (POC) for providing and maintaining contractor personnel data for the HCMS database. The POC shall be provided to the COR, in writing, within 10 days of contract award (or modification inserting this clause). For contracts with an on-site Project Lead or Program Manager, this person shall serve as the POC.

b. Provide the COR initial HCMS data for their personnel within 10 days of contract award or modification. The information that is to be provided for HCMS shall include: persons full legal

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name, social security number, citizenship status, NGA contract number, prime contractor name, NGA location and organization where the person will be working, and a 24/7 emergency contact point for the contractor.

c. Notify the COR of all contractor data changes within 10 days of the change. Changes include new or departing contractor personnel and any change to information provided in paragraph b above. If the contract number under which a contractor or its personnel work changes, the POC for the contract receiving the personnel shall notify the COR within 10 days of the change.

d. Provide response to all inquiries made by NGA as to the validity and completeness of contractor data records in the HCMS database within two weeks of date of request.

e. Ensure all employees attend in-processing and out-processing briefings.

(End of Clause)

5X52.246-9000 - Contractor Compliance with all applicable National Geospatial-Intelligence Agency (NGA) and U.S. Government installation regulations, directives, instructions, rules, policies and procedures. (MAR 2023)

A. The Contractor shall comply with, and shall ensure that its personnel, to include subcontractors, comply with all applicable NGA regulations, directives, instructions, rules, policies and procedures. The Contractor may request copies from the Contracting Officer's Representative (COR), the Contracting Officer or their designated representative(s).

B. The Contractor shall comply with, and shall ensure that its personnel, to include subcontractors, comply with regulations, directives, instructions, rules, policies, procedures and other applicable requirements issued by the U.S. Government Installation Commander where NGA is a tenant activity, including, but not limited to, those relating to force protection, security, health and safety. The Contractor may request copies from the Contracting Officer's Representative (COR), the Contracting Officer or their designated representative(s).

C. The Contractor shall institute and implement an effective program to ensure their employees and subcontractors, comply with all applicable requirements in accordance with paragraphs A and B above as well as paragraphs E and H below.

D. The specific requirements covered in paragraphs A, B, E, and H may be specified in the Performance Work Statement, elsewhere in the contract, or in NGA and/or Government installation regulations, directives, instructions, rules, policies and procedures. Specific requirements may include, but are not limited to categories such as:

- Security in/out processing
- Personnel in/out processing
- Facility access, parking, and in/out processing
- Information technology access and in/out processing
- PeopleSoft access, updates and in/out processing
- Periodic and special training requirements

E. Facility Access and Badging. The following criteria must be met in order to be issued an NGA IC badge and to gain access to an NGA-controlled facility:

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(1) NGA IC badges will only be issued to those contractors who provide direct charge support on an active TS/SCI NGA contract, even when seated at corporate locations outside of NGA Government facilities. Green badges must be used at least once during a one-month period at an NGA Government facility. Failure to use an NGA IC badge may result in suspension or termination of the badge for lack of activity. The badges will expire at the end of the supported contract. Note: NGA IC badges will not be issued to any contractor who does not need access to an NGA facility, i.e., Corporate VIPs, etc. Infrequent visitors must report to the Visitor's Center.

(2) Notwithstanding the above, NGA badges will be issued to contractors, who are required by contract, to gain access to an NGA facility in the event of an emergency or when after-hours access is required. The Government POC or Contracting Officer's Representative (COR) coordinates the submission of an application for an NGA badge; establishment of a PeopleSoft record of SCI accesses; completion of NGA Form 5212- 7A, "Request for Identification/Building Access Picture Badge"; and submission of the application to the appropriate Site Security Office for approval. (Reference NGA Instruction 5210.8, Physical Security Program)

F. The Contracting Officer may direct the Contractor, at its own expense, to remove and replace any Contractor personnel who fail to comply with or violate applicable requirements of this clause. Such action may be taken at the Government's discretion without prejudice to its rights under any other provision of this contract, including the Termination for Default clause.

G. The Contracting Officer may include the results of the Contractor's ability to adhere to this clause in past performance reports, quality assurance surveillance plans and award fee plans as part of the overall administration of this contract.

H. NGA Inspector General.

(1) The contractor must report to the NGA Inspector General (IG), DoDIG, or Intelligence Community IG any and all possible violations of federal law or illegal intelligence activities related to this contract by individuals charging directly or indirectly to this contract.

(2) The IG shall have access to any individual charging directly or indirectly to this contract whose testimony is needed for the performance of the IG's duties. In addition, the IG shall have direct access to all records, reports, audits, reviews, recommendations, documents, e-mails, papers, or other material that relate to this contract with respect to which the IG has responsibilities. Failure on the part of any contractor to cooperate with the IG shall be grounds for administrative action by the Director, Office of Contract Services, including contractual remedies.

(3) NGA contractors and contractor personnel may report suspected instances of improper conduct through the NGA IG Hotline. Contractors shall make their employees aware of this Hotline: 571-557-4849, secure 578-4849, or toll free 1-800-380-7729 or by contacting the OIG at IG@nga.mil or secure at IG@nga.ic.gov.

(4) The contractor agrees to include the substance of this clause in all subcontracts exceeding the simplified acquisition threshold except those for commercial products or commercial services and those where the NGA association must be protected.

(5) This requirement is supported in the Federal Acquisition Regulation (FAR) clause 52.203-13, which requires timely disclosure to the Government of credible evidence of violation of law, and timely and complete response to OIG requests for documents and access to employees and information.

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(6) This requirement is supported in NGA policy. NGAI 7410.1 requires all personnel, to include contractors, to cooperate fully with NGA OIG audits, inspections, and investigations.

(End of Clause)

END

OSD-NGA SBIR 23.3 Phase I Topic Index

OSD233-001	Deep Rational 3D Geospatial Analytics for Generative AI
OSD233-002	Solar Blind UV Detector for Space Object Detection
OSD233-003	Specialized Crystal Growth and Material Characterization
OSD233-004	Advanced Single-Photon Avalanche Diode for 1030 nm (SPAD-1030)

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OSD233-001 TITLE: Deep Rational 3D Geospatial Analytics for Generative AI

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Trusted AI and Autonomy

OBJECTIVE: Develop advanced AI/ML algorithms that combine generative AI with discriminative AI to enhance 3D geospatial analytics.

DESCRIPTION: DESCRIPTION: Current artificial intelligence and machine learning (AI/ML) techniques for geospatial analysis use pixel or voxel information for semantic segmentation, detection, and classification tasks, but do not exploit the rich contextual relational information in the scene (e.g., cars drive on roads, ships/boats sail on water, etc.). Scenes are fundamentally compositional, adhering to relational rules, which can be exploited to improve geospatial analytics. We seek approaches that combine generative AI, which can describe relations between objects, with discriminative AI to improve multi-task geospatial analysis. Specifically, this topic seeks approaches that leverage generative AI in the form of large language models capable of generating relationships between objects while capturing the relational diversity present in the real world (e.g., cars drive on roads, cars park in drive ways, drive ways connect houses to roads). The proposed approaches must combine generative AI with discriminative AI such as deep convolutional neural network models for segmentation and classification in an end-to-end system. The relations from the generative AI can be considered as constraints and regularization that aid the discriminative AI in solving highly under-constrained problems in 3D geospatial analysis. NGA anticipates that Phase II work will involve input data that may be Controlled Unclassified Information (CUI) or classified.

PHASE I: Demonstrate proof-of-concept approach capable of combining generative AI with discriminative AI using open source 3D datasets derived from commercial satellite (COMSAT) imagery and full motion video (FMV). For a given set of classes (buildings, houses, cars, roads, trees), demonstrate that approach is able to improve multi-task performance in semantic segmentation and object detection beyond baseline approaches that utilize only discriminative AI. Develop a Phase II plan that includes integration, test, and validation of the end-to-end system.

PHASE II: Realize the optimization and implementation of the selected generative AI and discriminative AI into an end-to-end model. Demonstrate the proposed model is trainable with an expanded class/target set, and is able to perform inference on 3D datasets derived from COMSAT and FMV. Develop a technology transition plan and business case assessment.

PHASE III DUAL USE APPLICATIONS: 3D geospatial analytics software leveraging generative AI capable of supporting DoD use cases including scene segmentation, classification, and target detection; civil engineering missions such as surveying, urban mapping and city planning; commercial robotics applications such as route planning.

REFERENCES:

1. Zhao, Wayne Xin, et al. "A survey of large language models." arXiv preprint arXiv:2303.18223 (2023);
2. Xiao, Aoran, et al. "Unsupervised Point Cloud Representation Learning with Deep Neural Networks: A Survey." IEEE Transactions on Pattern Analysis and Machine Intelligence (2023).

KEYWORDS: 3D geospatial analytics; generative AI; AI/ML

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OSD233-002 TITLE: Solar Blind UV Detector for Space Object Detection

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Trusted AI and Autonomy

OBJECTIVE: Develop novel systems to expedite detection of unknown objects.

DESCRIPTION: New methods are needed to exploit the increased availability of space imagery, to predict and to track questionable technology movement robustly over tactical time scales, and help to understand future direction for space-based technologies. To address the threat of questionable technologies, modern defense aircrafts or even satellites need to be equipped with a suite of self-protection sensor systems, which includes warning sensors operating in the ultraviolet (UV) part of the spectrum, especially the Ultraviolet-C (UVC) region spanning from 200 – 280 nm wavelength because the UVC is completely absorbed by the atmospheric ozone layer. A source of UVC in the atmosphere below the ozone layer is the plumes, which can be detected with solar blind UVC sensors. The detection range of these sensors is limited, on the order of several km, against comparable technologies, but their false-alarm rate is low. The use of infrared (IR) sensors, which can offer much longer detection range, is limited, and requires more complex image processing methodologies. The low false-alarm rate of the UV sensors is due to absence of background radiation and the absence of sources of UV radiation, especially in the UVC region.

For this topic, foreign nationals shall be restricted from participating in all phases. Phase I work shall be conducted on NIST SP 800-171 compliant information systems. Phase II work is expected to be classified.

PHASE I: Research, develop, and demonstrate concepts for high sensitivity (>100 mA/W) wide bandgap based solar blind detector with a UV/V rejection ratio of >105.

PHASE II: Build prototype systems with various form factors. Deliver a minimum of two of these prototypes to the sponsor for evaluation. Perform detailed analysis to ensure materials are rugged and appropriate for sponsor's application. Perform analysis to understand environmental, shock, and vibration effects on system. Evaluate prototype against provided performance goals.

PHASE III DUAL USE APPLICATIONS: Apply the knowledge gained in Phase II to build an advanced sensor, suitably configured for mission application, including flight spares and interface electronics, and characterize its performance in the UV & V range requirements. Market research and analysis shall identify the most promising technology areas and the company shall develop manufacturing plans to facilitate a smooth transition.

REFERENCES:

1. Monroy, E.; Omnes, F.; Calle, F. Wide-bandgap semiconductor ultraviolet photodetectors. *Semicond. Sci. Technol.* 2003, 18, R33;
2. Omnes, F.; Monroy, E.; Muñoz, E.; Reverchon, J. Wide bandgap UV photodetectors: A short review of devices and applications. *Proc. SPIE Gallium Nitride Mater. Devices II 2007*, 64730E, 111–125;
3. Shi, L.; Nihtianov, S. Comparative study of silicon-based ultraviolet photodetectors. *IEEE Sens. J.* 2012, 12, 2453–2459;
4. Narayanan, D. L.; Saladi, R. N.; Fox, J. L. Ultraviolet radiation and skin cancer. *Int. J. Dermatol.* 2010, 49, 978–986.

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KEYWORDS: Space-based sensing; Space object detection; Tracking

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OSD233-003 TITLE: Specialized Crystal Growth and Material Characterization

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Microelectronics; Advanced Materials

OBJECTIVE: Develop advanced Material and process for quality crystal growth to aid mission support effort.

DESCRIPTION: The objective of this topic is to develop innovative crystals that are transparent in the vacuum ultraviolet (VUV) region of the electromagnetic spectrum and host thorium dopants at a concentration of 10^{16} - 10^{17} thorium atoms per cubic centimeter. The thorium-doped crystals should be either thorium doped into CaF₂ and/or thorium doped into MgF₂. The ability to produce both CaF₂ and MgF₂ crystals is preferred. The crystals must transmit VUV light down (>99% bulk transmission to at least 140 nm which would require very low levels of impurities, such as oxygen). Also exploring other large bandgap crystals and showing their capability is highly encouraged with this request.

For this topic, foreign nationals shall be restricted from participating in all phases. Development and demonstration of crystal growth under Phase II will likely involve Controlled Unclassified Information (CUI), which requires application of technical and non-technical controls described in DoDI 5200.48 and NIST SP 800-171.

PHASE I: Demonstrate a proof-of-concept that one can grow/develop a crystal that is transparent in VUV region of the electromagnetic spectrum and able to host radioactive dopants. Also, a clear indication of growing low-impurity, VUV crystals i.e. MgF₂, CaF₂, purification of material as well as show property characterization of the crystal material. Develop a Phase II plan that includes the ability to handle radioactive material in the facility that foresee future crystal development with such dopants.

PHASE II: Demonstrate and develop a method to grow crystal from ~1mg of dopant as starting materials for the crystal and less quantity in some cases. Clearly present an example and prototype of crystal with exact amount of dopant in the first 6 months. As part of this phase a method for sectioning and polishing for example (two 3 mm x 3 mm faces of the crystal and one of the 3 mm x 10 mm) must be demonstrated and developed.

- Methods for ascertaining the amount of thorium dopant in the crystals must be verified
- The ability, now or planned, to handle thorium isotopes in the SBIR facility must be verified
- The capability to deliver thorium doped crystals as part of the phase II.
- Grow and provide prototype crystals with roughly 3 mm x 3 mm x 10 mm dimensions with surface polish of at least $\lambda/4$.

PHASE III DUAL USE APPLICATIONS: Apply the knowledge gained in Phase II to grow and distribute this specialized quality doped material for DOD and other commercially interested partners of this development. A manufacturing plan to facilitate a smooth transition would be ideal.

REFERENCES:

1. Peik, E. & Tamm, C. Nuclear laser spectroscopy of the 3.5 eV transition in ²²⁹Th. Euro. Phys. Lett. 61, 181 (2003);
2. Campbell, C. J., Radnaev, A. G. & Kuzmich, A. Wigner crystals of for optical excitation of the nuclear ²²⁹Th isomer. Phys. Rev. Lett. 106, 223001 (2011);
3. Rellergert, W. G. et al. Constraining the evolution of the fundamental constants with a solid-state optical frequency reference based on the ²²⁹Th nucleus. Phys. Rev. Lett. 104, 200802 (2010);
4. Kazakov, G. A. et al. Performance of a ²²⁹Thorium solid-state nuclear clock. New J. Phys. 14, 083019 (2012).

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KEYWORDS: Advanced Materials; Crystal Growth; Radioactive Dopant

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OSD233-004 TITLE: Advanced Single-Photon Avalanche Diode for 1030 nm (SPAD-1030)

OUSD (R&E) CRITICAL TECHNOLOGY AREA(S): Space Technology

OBJECTIVE: Develop a single-photon avalanche detector for mm-accurate multi-kHz satellite and lunar laser ranging at 1030 nm.

DESCRIPTION: High-accuracy satellite and lunar laser ranging (SLR/LLR) stations have heavily relied upon the availability of short pulse, frequency-doubled Nd:YAG and Yb:YAG lasers. This has driven SLR/LLR receive-detector development toward fairly wide-use of gated, large-area ($\square 100 \square m$) Si-based single-pixel sensors having peak photon sensitivity ($\square 30\%$) near 532 nm, with quenching circuits and time-walk compensation for <18 picosecond (ps) timing jitter at multi-kHz repetition rates. Operating at 1030/1064 nm, however, provides significant advantages over green systems, including improved eye safety (flash blindness and dazzling) and better atmospheric transmission that manifest in gains in link margin and ranging precision. The aim of this effort is to design and develop a single-photon detector (single pixel, or array) optimized for for 1030 nm SLR/LLR applications according to notional specifications outlined in Table 1.

Table 1. Performance Metrics

Parameter Description	Other Detail	Notional Specifications			Unit
		Min	Typical	Max	
Spectral response range		≤ 950 to ≥ 1150			nm
Peak sensitivity wavelength			1030		nm
Effective photosensitive diameter			100		$\square m$
Photon detection efficiency (PDE)	Single photon		≥ 30		%
Time walk		-10		+10	ps
Dark count			≤ 2500		Hz
Internal/external gating frequency		1		10^7	Hz
Gate duration range		0.5		1000	ns
Gate duration step			≤ 100		ps
Reference output	Required		TTL*		
Gate output	Required		TTL*		
Detection output	Required		TTL*		
External gate trigger input	Required		TTL*		
Operating temperature		-20		35	$^{\circ}C$
Detection head dimension	LxWxH 137x50x50				mm
Control unit dimension	LxWxH 225x170x50				mm
Cooling Time			5		min
Connector type	Preferred		SMA**		

*Transistor-Transistor Logic

**SubMiniature version A

PHASE I: Trade study and design of a gated, Geiger-mode single-photon avalanche diode detection head and signal conditioning electronics, including quenching circuit and time-walk compensation logic according to Table 1. Details of the temperature stability and cooling architecture (i.e. thermoelectric cooler stages) shall be articulated. Develop a Phase II plan to build and test the “SPAD-1030” prototype

that includes schedule, cost, milestones and a device characterization plan. Deliver detailed trade study, analysis and initial design documentation in a Phase I technical data package.

PHASE II: Design, fabricate, and integrate an engineering development unit of SPAD-1030, that is consistent with performance identified in notional parameters in Table 1, and with Phase I trade study results and design activities. Characterize the PDE over the spectral response range. Work with a Government Laboratory partner to conduct an evaluation of the engineering development unit SPAD-1030 on an active laser ranging system.

Upon successful developmental test and evaluation of the engineering unit, complete a final design incorporating lessons learned for optimized mission use and performance. Complete a comprehensive Phase III integrated schedule and unit cost estimate for the development, fabrication, and unit test of six (6) prototype SPAD-1030. Deliver engineering development unit, design documentation, and characterization plan, raw data, and analysis of results in a Phase 2 technical data package.

PHASE III DUAL USE APPLICATIONS: Complete final design documentation, performance characterization and factory acceptance test plan. Complete fabrication, integration, updated prototype packaging and comprehensive performance characterization of six (6) SPAD-1030 prototype units according to the plan developed in Phase II. Work with Government Laboratory partner to integrate prototype SPAD-1030 with existing laser ranging system to verify performance for target mission. Deliver all prototypes and Phase III technical data package.

REFERENCES:

1. Kirchner, G. & Koidl, F. Compensation of SPAD time-walk effects. *J. Opt. A: Pure Appl.* 1, 163 (1999);
2. Procházka, I., Kodet, J. & Blažej, J. Note: Solid state photon counters with sub-picosecond timing stability. *Rev. Sci. Instr.* 84, 046107 (2013);
3. Michálek, V., Procházka, I. & Blažej, J. Twenty years of Rad-Hard K14 SPAD in Space Projects. *Sensors* 15, 18178-18196; doi:10.3390/s150818178 (2015)

KEYWORDS: Time-Walk Compensation; SPAD; 1064 nm; 1030 nm; Satellite Laser Ranging

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