

**BAA Call N0001424SBC01**  
**Special Programs Announcement for Office of Naval Research**  
**Research Opportunity:**  
**Basic Research for Electro-Optic/Infrared (EO/IR) Sensors and Sensor Processing**

**I. INTRODUCTION**

This announcement describes the technology areas, entitled “EO/IR Sensors and Sensor Processing” under N0001424SB001, Long Range Broad Agency Announcement for Navy and Marine Corps Science and Technology, which can be found at <https://www.nre.navy.mil/work-with-us/funding-opportunities/announcements>. The submission of proposals, their evaluation and the placement of research grants and contracts will be carried out as described in the above Long Range Broad Agency Announcement.

The purpose of this announcement is to focus attention of the scientific community on (1) the area to be studied and (2) the planned timetable for the submission of white papers and full proposals.

**II. TOPIC DESCRIPTIONS**

The ONR Code 312 EO/IR portfolio seeks discovery and invention proposals to develop and demonstrate technologies for the next generation of systems in electro-optic and infrared (EO/IR) sensors. White papers and subsequent proposals should address technology developments in the one technical area listed below.

**Novel, fast-response, infrared (IR) detector concepts enabling higher temperature operation**

**Background:** Infrared (IR) imagers operating in the mid-wave infrared (MWIR) (3-5  $\mu\text{m}$ ) and long-wave infrared (LWIR) (8 – 12  $\mu\text{m}$ ) enable the Navy and Marine Corps to see long distances in all lighting conditions (day and night) as well as through challenging atmospheric conditions. Typically, these high performance imagers have detectors that must be cooled between 45 K and 120 K, depending on wave band. This is to enable them to operate at the background limited infrared photon (BLIP) condition. Progress has been made in recent years within semiconductor materials and designs to increase this operating temperature. The second class of detectors most commonly used in the LWIR band for uncooled infrared imaging is the microbolometers. While this design does enable room temperature operation, it’s fundamentally limited by the material properties for electrical and thermal conductivity. In the case of the uncooled microbolometers, they are further limiting in the response time and typically must dwell longer per imaging frame compared to a cooled imager. In either case, both of these devices are ultimately limited by photon shot noise from the background leading to an inevitable cooling limit based the desired SNR.

**Objective:** Proposed research topics are sought to explore the space of the fundamental limit of infrared detection using completely novel architectures, materials, light-matter interactions, or some other novel means. This is a request for basic research topics to better understand the physics and quantum limitations of infrared detection beyond our current understanding, even

fundamentally exploring how to overcome the shot noise and BLIP limits without sacrificing response speed or sensitivity. Example areas of research include (but not limited to) high-gain processes such as avalanche, phonon assisted gain, and stochastic photon methods. All topics should be passive based, that is, they should improve the understanding in imaging and detection without the use of active IR illumination.

Concepts are sought that explore ways in which uncooled infrared detectors and no cold shield, can achieve greater than >25 mK sensitivity and >100 kHz imaging bandwidth across most, if not all, of either the MWIR or LWIR imaging bands.

Since this is a call for basic research topics, there is no requirement to demonstrate imaging or build an imaging array. However concepts, should discuss how the proposed method could one day be scaled up and be manufactured into a focal plane array (FPA) of comparable resolution and pixel size to those available on the market today. If this isn't known now, then discuss how the research plan will answer make progress to answering this question.

Topics should specifically avoid proposals that are duplicative of those being sought in the DAPRA OPTIM program. While the end goal for this program is similar, the proposed methods for studying the problem should fundamentally not be duplicated.

### III. WHITE PAPER SUBMISSION

Although not required, white papers are strongly encouraged for all offerors seeking funding. Each white paper will be evaluated by the Government to determine whether the technology advancement proposed appears to be of particular value to the Department of the Navy. Initial Government evaluations and feedback will be issued via email notification from the Technical Point of Contact. The initial white paper appraisal is intended to give entities a sense of whether their concepts are likely to be funded.

Detailed full proposal (Technical and Cost volumes) will be subsequently encouraged from those offerors whose proposed technologies have been identified through the above referenced email as being of "particular value" to the government. However, any such encouragement does not assure a subsequent award. Full proposals may also be submitted by any offeror whose white paper was not identified as being of particular value to the government or any offeror who did not submit a white paper.

For white papers that propose efforts that are considered of particular value to the Navy but either exceed available budgets or contain certain tasks or applications that are not desired by the Navy, ONR may suggest a full proposal with reduced effort to fit within expected available budgets or an effort that refocuses the tasks or application of the technology to maximize the benefit of the Navy.

White papers should ***not exceed*** 5 single-sided pages, exclusive of cover page, references, and resume of principal investigator, and should be in 12-point Times New Roman font with margins not less than one inch. White papers shall be in Adobe PDF format (preferred) or in Microsoft Word format, compatible with at least Microsoft Word 2016

The Cover Page can be found at <https://www.nre.navy.mil/work-with-us/how-to-apply/submit-grant-application>

The ***no more than*** 5-page body of white paper should include the principal investigator's plan to address a specific problem set(s) associated with a topic(s) described in Section II, Topic Description by providing the following information:

- **Future Naval Relevance (where applicable)** – A description of potential Naval relevance and contributions of the effort to the agency's specific mission.
- **Technical Concept (majority of white paper is this section)** – A description of the technology innovation and technical risk areas.
- **Future Manufacturability plan (1 to 0.5 page)** – A short discussion on the how concept could be scaled up for use in an infrared focal plane array. If this isn't known now, then discuss how the research plan will answer questions to addressing this topic.
- **Rough Order of Magnitude (ROM)** cost estimate.

A resume of the principal investigator, not to exceed 1 page, should also be included after the body of the white paper.

To ensure full, timely consideration for funding, white papers should be submitted **no later than (NLT) 31 OCT 2023 1600 EST**. White papers received after that date will be considered as time and availability of funding permit.

White papers must be submitted through Fedconnect at <https://www.fedconnect.net> in accordance with Section D. Application and Submission Information, Section 2. Content and Form of Application Submission, paragraph d. White Paper Requirements, ii. White Paper Submission in N00014-24- S-B001.

The planned date for completing the review of white papers is **08 NOV 2023**.

#### **IV. ORAL PRESENTATIONS**

ONR may request that Project Managers (PMs)/Principal Investigators (PIs) provide an expanded oral presentation from those Offerors whose proposed technologies have been identified as being of "particular value" to ONR. The purpose of the oral presentation is to provide greater detail than can be contained in the White Paper and to permit the evaluation panel to ask questions to better understand particular aspects of the proposed effort. However, any such request does not assure a subsequent award. Any Offeror whose White Paper technology was not identified as being of "particular value" to ONR will not be invited to make an oral presentation. The requested oral presentations will occur on, or around, **16-17 NOV 2023**. The time, location, and briefing format of the oral presentations, if requested, will be provided at a later date via email notification.

ONR evaluations of the oral presentations will be issued via email notification on or about **21 NOV 2023**.

#### **V. FULL PROPOSAL SUBMISSION AND AWARD INFORMATION**

Full proposals should be submitted under N0001424SB001 by **18 DEC 2023**. Full Proposals received after that date will be considered as time and availability of funding permit.

ONR does not anticipate awarding contracts under this effort.

**Full proposals for grants should be submitted via Grants.gov in accordance with Appendix 1 of N0001424SB001.**

ONR plans to allocate approximately \$4.5M dollars over the total length of the program. The period of performance for projects will be one to four (1-4) years. It is anticipated that multiple awards will be made based on the quality of the proposed efforts. Due to limited funding in year 1 of this program, some proposed efforts may start with very limited funding in year 1 before ramping up in the subsequent years. Or some efforts may be not be awarded in year 1 and recommend to resubmit in year 2. White papers are strongly encouraged from all offerors seeking funding.

Although ONR expects the above described program plan to be executed, ONR reserves the right to make changes according to program priorities and funding availability.

Selected proposers will be notified on or about 22 DEC 2023. Selected projects will have an estimated award date of 1 MAR 2024.

## **VI. ESTIMATED DATES AND TIMES**

<b>Event</b>	<b>Date</b>	<b>Time</b>
Recommended White Paper Submission Date	31 OCT 2023	1600 EST
Notification of White Paper Evaluation	8 NOV 2023	1600 EST
Oral Presentations – Invitation only*	16-17 NOV 2023	TBD
Notification of oral presentation evaluation	21 NOV 2023	1600 EST
Full Proposal Submission	18 DEC 2023	1600 EST
Notification of Selection Full Proposals	22 DEC 2023	1600 EST
Awards	1 MAR 2024	1600 EST

Note: \* These are approximate dates.

## **VII. POINTS OF CONTACT**

In addition to the points of contact listed in N0001424SB001 the specific points of contact for this announcement are listed below:

### Technical Point of Contact:

Dr. Richard Espinola  
Program Officer for Electro-Optic and Infrared (EO/IR) Sensors  
richard.l.espinola.civ@us.navy.mil

Please also copy:

Dr. Andrew Pipino, Contractor Support to the EO/IR portfolio, andrew.c.pipino.ctr@us.navy.mil

Business Point of Contact:

Veronica Lacey  
Grants Officer  
veronica.y.lacey.civ@us.navy.mil

**VIII. ADDRESS FOR THE SUBMISSION OF WHITE PAPERS AND FULL PROPOSALS FOR FEDERAL LABS, UARCS, AND FFRDCS**

**White Papers/Full Proposal:**

Offerers from federal labs, FFRDCs, and UARCs are also encouraged to submit under this topic if allowed by its Sponsoring Agreement or contract. **See Section III**

If requested to submit a full proposal then federal labs, FFRDCs, and UARCs should follow **Section V**

**Classified White Papers:**

This topic is only seeking basic research concepts. As such all submissions shall be **unclassified**. Do not submit classified white papers or proposals under this topic.

**IX. SUBMISSION OF QUESTIONS**

Any questions regarding this announcement must be provided to the Technical Points of Contact and/or the Business Point of Contact listed above. All questions shall be submitted in writing by electronic mail.

Answers to questions submitted in response to this BAA Call will be addressed in the form of an Amendment and will be posted to the following web pages:

- FEDCONNECT.NET Webpage – (<https://www.fedconnect.net/FedConnect/Default.htm>)
- GRANT.GOV Webpage – <https://www.grants.gov/>
- ONR BAAs, FOAs and Special Program Announcement WebPage  
<https://www.nre.navy.mil/work-with-us/funding-opportunities/announcements>

Questions regarding **white papers or full proposals** should be submitted NLT two weeks before the dates as ascribed in Section VI. Questions after this date may not be answered.