

Special Notice N00014-15-R-SN16
Special Program Announcement for 2016 Office of Naval Research
Research Opportunity:
Stand-off and Remote Improvised Explosive Device Detection and Neutralization

I. INTRODUCTION

This announcement describes a research thrust, entitled “Stand-off and Remote Improvised Explosive Device (IED) Detection and Neutralization,” to be launched under the ONRBAA15-001, Long Range Broad Agency Announcement for Navy and Marine Corps Science and Technology which can be found at <http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx>. The research opportunity described in this announcement specifically falls under numbered paragraph (3) of the “Expeditionary Maneuver Warfare & Combating Terrorism Department (Code 30)” sub-section. The submission of proposals, their evaluation and the placement of research grants and contracts will be carried out as described in Broad Agency Announcement ONRBAA15-001.

This announcement is being initially released under the current Long Range BAA numbered ONRBAA15-001 in order to allow sufficient time for all interested parties to submit white papers prior to full proposals. It is expected that proposals will be received under the anticipated new Long Range BAA numbered N00014-16-R-BA01, which is expected to be released in late September 2015 since the requested submission date for proposals is after the expiration of the current Long Range BAA numbered ONRBAA15-001. The requirements of proposal submission, evaluation and award of any resulting contracts will ultimately be subject to N00014-16-R-BA01. Potential Offerors may review the current Long Range BAA numbered ONRBAA15-001 to get a general understanding of what the proposal requirements may be in the anticipated follow-on Long Range BAA numbered N00014-16-R-BA01.

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

II. TOPIC DESCRIPTION

Objective:

Office of Naval Research (ONR), Code 30, Expeditionary Maneuver Warfare and Combating Terrorism Department is soliciting FY16, 6.1 Basic Research topics to pursue fundamental science and innovation that provide promising new approaches and concepts to advance current state-of-art technologies and understanding of phenomenology that will ultimately lead to improving in standoff detection and neutralization of improvised explosive device (IED) and their related components from outside of explosive hazard range. The proposal must clearly state and emphasize the basic fundamental research aspect. Topics that do not fall under the definition of 6.1 Basic Research will not be considered.

DETECTION:

Office of Naval Research along with many government agencies have invested in research and development of various concepts of detecting explosive threats (mines, IEDs, and Home-Made Explosives) and their related components (metallic and non-metallic) at stand-off distances. While improvement in sensitivity and selectivity of explosive detection sensors have increased, challenges still remain to acquire relevant information rapidly enough to maintain an operational tempo while maintaining a safe stand-off distance in expeditionary operation (vehicle or other small platform operation). Most of the current optical and Radio Frequency (RF) solutions suffer poor collection efficiency due to severe scattering from the targets, hence, not capable of providing sufficient coverage. Ideal solutions should include determination of all types of explosives, provide sufficient coverage rate enabling detection, classification, and identification all the explosive threats from a moving platform. In order to address these challenges, this announcement is seeking innovative research topics that can address the following research areas.

1. **Stand-Off Spectroscopic Detection:** Research topics are sought to address one or more of the following challenges. The proposal should also discuss a path to a compact, low-power sensor.
 - a. **Rapid Wide Area Detection:** Research topics that have the potential to rapidly and accurately obtain signatures of military explosives, IED, and Home-Made Explosives (HME), pre-cursor materials and/or their related components on a moving platform from safe distances.
 - b. **Multi-Environment Detection:** Detection concepts that can be applied to other challenging environments such as highly vegetated region, surf/beach zone, and urban areas.
 - c. **Hidden or Obscured Item Detection:** Hidden and obscured Explosive Hazard (EH) component detection, classification, and/or identification outside of explosive hazard range.
2. **Remote Miniature Sensors:** Compact low power sensors that can be integrated into a small Unmanned Ariel Vehicle (UAV) or Unmanned Ground Vehicle (UGV) platform to detect the explosive threats discussed above. Distributed (and/or bi-static) concepts will be considered as well.
3. **Optimized Combination of Fused Orthogonal Measurements:** Detection of IEDs and/or their components utilizing multi-modal or multi-sensor techniques by exploiting detection capabilities of their orthogonal features to either significantly increase the stand-off distance or probability of detection with low false alarm rate. Proposed solution should address different geo-registration issues if each sensor covers different areas.
4. **Radio Frequency (RF) Explosive Target Detection and Exploitation Algorithm:** The RF research community has focused on developing appropriate standoff detection transceivers for standoff detection of Explosive Hazards (EH) and associated initiation devices. In developing these RF transceivers for both ground vehicles and airborne platforms, the focus

has been on developing Radio Frequency Interference (RFI), system noise cancellation and high fidelity 2 & 3-D images. However, the exploitation algorithms enabling automatic target recognition (ATR) have not been fully developed or exploited. This announcement is seeking algorithms and data processing approaches for the ATR of targets of interest including hidden and buried objects).

NEUTRALIZATION:

High Power Microwave (HPM) and High Power Radio Frequency (HPRF) techniques have been under investigation as potential directed energy modalities that can provide operational effects against various weapons, IEDs and sensor systems. While the effectiveness of HPM/HPRF systems has been demonstrated, lack of efficient compact systems limits development and delivery of practical systems to warfighters.

This announcement aims to identify and develop novel RF and microwave sources and their related key components that significantly improve upon existing state-of-the-art performance, size, weight and power. Office of Naval Research (ONR), Code 30, Expeditionary Maneuver Warfare and Combating Terrorism Department is soliciting FY13 6.1 Basic Research topics to pursue and exploit fundamental science and innovation that provide promising new approaches and concepts to advance current state-of-art technologies to improve in the following research topics.

1. High Power Radio Frequency (HPRF) Compact Source Technology:

HPRF sources that can produce high output peak and/or average powers, concomitant with high DC-RF efficiencies and bandwidth are sought. Innovative concepts for electron beam modulation (gated emission/density modulation, velocity modulation, and the like) are preferred. Such devices must be able to handle electrical and thermal environments owing to high powers. Research that can lead to a compact system size/complexity/stability/efficiency, including energy density, will also be an important consideration.

2. High Voltage Solid-State Fast Rise-time Switches and Drivers:

Novel switch materials and designs are sought for use in HPRF/HPM applications. For many of the novel switches, efficient high voltage gate drivers are not yet available to fully explore the limitations and efficiency of the switches. Potential research topics are sought to significantly improve peak power output, maximum voltage handling, rise-time, and energy density and efficiency.

3. Cathode and Window Technologies:

Advanced cathode technology is sought for both high peak power and high average power electron beams. Innovative materials that exhibit a combined thermionic and field-effect emission yielding current densities beyond state-of-the-art are solicited. Focus of material research should also include projections for cathode lifetime estimates. Other areas of electron beam production include, but are not limited to, multi-pactor based emission, ferroelectric emitters (PLZT and PZT) and other innovative materials/concepts. Advanced materials are sought for innovative window technologies that can handle high peak and average RF fields.

RF DETECTION AND NEUTRALIZATION

In an expeditionary operation, it is desirable to have a single system performing multi-tasks. This announcement is seeking any potential research topics toward a single modality that can operate in both a detection and neutralization mode.

OTHERS: Offerors possessing any additional innovative ideas, concepts, or recommendations that can significantly improve detection and neutralization capabilities beyond the topics listed above are also encouraged to submit proposals to this Special Notice.

III. No events are planned

IV. 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 science & technology advancement proposed appears to be of particular value to the Department of the Navy. Initial Government evaluations and feedback will be issued via e-mail notification from the Technical Point of Contact.

Detailed Full Proposal (Technical and Cost volumes) will be subsequently encouraged from those Offerors whose proposed technologies have been identified through the above referenced e-mail 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 scope to fit within expected available budgets.

White papers should not exceed four (4) single-sided pages, exclusive of cover page 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 MS Office 2007.

The cover page should be labeled “White Paper for ONR 2016 Research Opportunity: Stand-off and Remote Improvised Explosive Device (IED) Detection and Neutralization” and include the following information: title of the proposed effort, technical point of contact, telephone number, fax numbers, and e-mail address.

The 4-page body of the white paper should include the following information:

- (1) Principal Investigator;
- (2) Relevance of the proposed effort to the research areas described in Section II;
- (3) Technical objective and unique part of the proposed effort;

- (4) Technical approach that will be pursued to meet the research objective;
- (5) A summary of recent relevant technical accomplishments; and
- (6) A funding plan showing requested funding per fiscal year.

A resume of the principal investigator, not to exceed one (1) page, should also be included after the 4-page body of the white paper.

To ensure full, timely consideration for funding, white papers should be submitted **no later than October 14, 2015**. White papers received after that date will be considered as time and availability of funding permit.

The planned date for completing the review of white papers is **Oct 29, 2015**.

V. FULL PROPOSAL SUBMISSION AND AWARD INFORMATION

Full proposals should be submitted under **N00014-16-R-BA01** by **Dec 17, 2015**. Full Proposals received after that date will be considered as time and availability of funding permit.

ONR anticipates that both grants and contracts will be issued for this effort.

Full proposals for contracts should be submitted in accordance with the instructions at Section IV, Application and Submission Information, item 2.b, Full Proposals and item 6, Submission of Full Proposals for Contracts, Cooperative Agreements, and Other Transactions. The Technical Proposal/Content shall be single spaced and not exceed thirty (30) pages. The cover page, resumes, bibliographies, and table of contents are excluded in the page count. For contract proposal submission, one (1) hardcopy and one (1) electronic submission on CD-ROM are requested.

Full proposals for grants should be submitted in accordance with the instructions at Section IV, Application and Submission Information, item 5, Submission of Grant Proposals through Grants.gov. All full proposals for grants must be submitted through www.grants.gov. The following information must be completed as follows in the SF 424 to ensure that the application is directed to the correct individual for review: Block 4a, Federal Identifier: Enter N00014; Block 4b, Agency Routing Number, Enter the three (3) digit Program Office Code 30 and the Program Officer's name, last name first, in brackets ([Joong H. Kim]). All attachments to the application should also include this identifier to ensure the proposal and its attachments are received by the appropriate Program Office.

ONR plans to fund multiple awards up to \$250K per year under 6.1 Basic Research fund, however, proposals outside of this cost range will be considered. The period of performance for projects may be up to three (3) years.

Although ONR expects the above described program plan to be executed, ONR reserves the right to change the respective program.

VI. SIGNIFICANT DATES AND TIMES

Event	Date	Time
White Paper Submission Date	14 Oct 2015	1500 Eastern Time
Notification of White Paper Evaluation*	29 Oct 2015	
Recommended Full Proposal Submission	17 Dec 2015	1500 Eastern Time
Notification of Selection: Full Proposals *	14 Jan 2016	
Awards *	14 Jul 2016	

Note: *These dates are estimates as of the date of this announcement.

VII. POINTS OF CONTACT

In addition to the points of contact listed in ONRBAA15-001, the specific points of contact for this announcement are listed below:

Technical Points of Contact:

Dr. Joong H. Kim
Program Officer, Code 30
Joong.kim@navy.mil

Business Point of Contact:

Office of Naval Research
Attn: Justin Zerbato
ONR Code 251
875 North Randolph Street – Suite 1272F
Arlington, VA 22203-1995
Justin.zerbato@navy.mil

VIII. ADDRESS FOR THE SUBMISSION OF WHITE PAPERS AND FULL PROPOSALS FOR CONTRACTS

White papers should be submitted electronically to the program technical points of contact. Files exceeding 10MB in size should not be emailed, but instead transmitted via a file transfer service, for example AMRDEC Safesite, <https://safe.amrde.army.mil>, or mailed on DCROM or DVD.

The DVD or CD-ROM of the Full Proposal including all supporting documentation should be sent to the Office of Naval Research at the following address:

Primary Point of Contact	Secondary Point of Contact
Office of Naval Research Attn: Joong H. Kim, Ph.D ONR Code 30 875 North Randolph Street – Suite 1156 Arlington, VA 22203-1995 Email: Joong.Kim@navy.mil	Office of Naval Research Attn: Lee Mastroianni ONR Code 30 875 North Randolph Street – Suite 1169 Arlington, VA 22203-1995 Email: Lee.Mastroianni@navy.mil

IX. Submission of Questions

Any questions regarding this announcement must be provided to the Technical Point 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 Special Notice will be addressed in the form of an Amendment and will be posted to the following web pages:

- Federal Business Opportunities (FEDBIZOPPS) Webpage – <https://www.fbo.gov/>
- Grants.gov Webpage – <http://www.grants.gov/>
- ONR Special Notice Webpage - <http://www.onr.navy.mil/Contracts-Grants/Funding-Opportunities/Special-Notices.aspx>

Questions regarding **White Papers or Full Proposals** should be submitted no later than two (2) weeks before the dates recommended for receipt of White Papers and/or Full Proposals. Questions after this date may not be answered.