

REQUEST FOR INFORMATION (RFI) ONR
RFI Announcement # N00014-16-RFI-0002 Title:
Hemispherical Imaging for Situational Awareness

I. DISCLAIMER:

This announcement constitutes a Request for Information (RFI) for the purpose of determining market capability of sources or obtaining information. It does not constitute a Request for Proposals (RFP), a Request for Quote (RFQ) or an indication that the Government will contract for any of the items and/or services discussed in this notice. Any formal solicitation that may subsequently be issued will be announced separately through Federal Business Opportunities (FedBizOpps). Information on the specific topics of interest is provided in the following sections of this announcement. Neither ONR nor any other part of the federal government will be responsible for any cost incurred by responders in furnishing this information.

II. BACKGROUND:

The Office of Naval Research (ONR) C4ISR Department (Code 31), Image Sensing and Processing (ImSP) Program objective is to detect, classify/identify, and localize/geolocate air, sea-surface, and ground targets. The primary interest is for systems working in visible and infrared (near, short wave, mid wave and long wave) regions of the electromagnetic spectrum. However, passive millimeter wave region is also of interest due to its superior atmospheric transmission properties in degraded visual environment (clouds, dust, fog, rain). Long range imaging through such environments is a thrust within this program. Both active (where source of illumination is under user control) and passive (using ambient illumination) ImSP systems operating in visible and infrared spectral bands are of interest. Exploiting multiple modalities associated with electromagnetic waves (spectral, polarimetric, temporal and quantum signatures) in addition to conventional spatial imaging is expected to provide additional information about the targets and hence improve performance under challenging environmental conditions. ONR ImSP program is also interested in exploring systems that do not form images in a traditional sense and yet are able to achieve the primary objectives through unconventional measurements augmented by sophisticated inverse processing operations. ONR ImSP is interested in supporting basic and applied research that advances state of the art in these broad areas.

III. SPECIFIC INFORMATION OF INTEREST:

The US Fleet Forces are often present in congested waterways throughout the world for a variety of humanitarian and military purposes. To maintain situational awareness (SA) and to support target detection, tracking, and identification, electro-optical (EO) and infrared (IR) sensors could be employed for their superior resolution and image-forming mode of operation, in contrast to radar. Surface ships require self-protection against a diversity of threats, surface and air borne. As such it is important to monitor the entire hemispherical dome (360 degrees azimuth X 90 degree vertical) for potential threats. The operational range and resolution requirements make it impractical to deploy a conventional imaging sensor since that would lead to single frames with hundreds of megapixels of data. In most operational scenarios a large fraction of these pixels (>90%) will not contain meaningful or relevant information and hence such an approach is deemed to be extremely inefficient. It should also be noted that as the vertical angle changes from near the horizon to directly overhead, the nature of the background and expected

threat signatures will also change in a dramatic manner. Therefore it would not be appropriate to employ an imaging sensor with operational characteristics that remain invariant over the range of vertical angles.

Researcher initiatives in Computational Imaging and Application Specific Imaging have suggested alternate measurements that produce far lower volume of data without losing underlying task-relevant information. They accomplish this by tailoring the measurements appropriately by incorporating prior information about the background and target statistics. Employing multi-modal sensing (spectral, polarization and temporal signatures) is another approach to reducing the data volume generated by conventional imaging sensors.

The ONR Code 312 EO-IR Technologies Focus Area seeks information on unconventional approaches to full hemispherical imaging for situational awareness. Designs concepts of interest will yield systems that are simpler, less expensive, and reduce the data load by at least two orders of magnitude, while maintaining performance as indicated by probability of detection for selected target sets, and low false alarm rates for given background conditions. High-performance designs and architectures may be of interest even if required underlying technologies are not available currently.

IV. SUBMISSION INSTRUCTIONS and FORMATTING REQUIREMENTS

a. Responses are requested no later than **19 February 2016 at 4:00PM Eastern Standard Time (EST)**. Any response received after this date will also be considered but may not be included in initial reporting or assessments.

b. All responses should be in PDF format and emailed to the technical point of contact: **Ravi Athale (ravindra.athale@navy.mil)**. The subject line of the email should read as follows “Hemispherical Imaging for Situational Awareness”.

c. All responses must be unclassified. No classified responses will be accepted under this RFI. All information received in response to this RFI that is marked proprietary will be handled accordingly. Responses to this notice will not be returned.

d. Required content and submission organization:

1. Cover Sheet – RFI number, company name and address, technical point of contact, printed name, title and email address and date.

2. Technical description of the proposed concept or capability, including a concise description of the underlying principles, a realistic assessment of limits of performance, and a comparison to existing capabilities. Technical challenges, risks, and risk mitigation strategies should be outlined. Experimental and/or theoretical evidence to validate/support the technical solution should be provided. This section should not exceed 5 pages, single-spaced, 12 point font, including charts, graphs, or other illustrations.

3. Relevant past experience. No more than one-page description of past relevant experience should be included. Response may include ROM cost estimates that will be considered only for planning purpose.

4. Small Business Concerns, Historically Underutilized Business Zone (HUBZone) Concerns, Service-Disabled Veteran-Owned Small Business (SDVOSB) Concerns, Small Disadvantaged Business (SDB) Concerns, Women-Owned Small Business (WOSB) Concerns and Veteran-Owned Small Business (VOSB) Concerns are all highly encouraged to respond to this RFI.

V. QUESTIONS AND POINT OF CONTACT

Questions of a technical nature regarding this RFI may be sent to the following Technical Point of Contact:

Name: Ravi Athale

Title: Program Officer

Office of Naval Research

Division Code: 31

Address: 875 N. Randolph St, Arlington, VA 22203

Email Address: ravindra.athale@navy.mil