



**Funding Opportunity Announcement (FOA) N00014-23-S-BC12  
For Office of Naval Research (ONR) Global Research Opportunity:  
Global-X Challenge 2023**

This FOA announces the ONR Global-X Challenge 2023 and describes new funding to be awarded under authority of N00014-23-S-B001, Long Range Broad Agency Announcement (BAA) for Navy and Marine Corps Science and Technology. This BAA may be found at the following link: <https://www.nre.navy.mil/work-with-us/funding-opportunities>.

The Assistance Listing Number for this announcement is 12.300.

**I. SIGNIFICANT DATES AND TIMES**

| Event   | Date             | Time                              |
|---|------------------|-----------------------------------|
| Kick-off Webinar                                | 18 April 2023    | 07:00 Eastern Daylight Time (EDT) |
| Upload Technical Area Video Recordings to Slack | 30 April 2023    | 23:59 EDT                         |
| White Paper Submission Date                     | 21 May 2023      | 23:59 EDT                         |
| Notification of White Paper Valuation*          | 2 June 2023      | 17:00 EDT                         |
| Full Proposal Submission                        | 30 June 2023     | 23:59 EDT                         |
| Notification of Selection: Full Proposals *     | 21 July 2023     | 17:00 EDT                         |
| Grant Awards *                                  | 8 September 2023 | 17:00 EDT                         |

Note: \* These are approximate dates.

**II. INTRODUCTION**

The submission of white papers, proposals, their evaluation and the placement of research grants will be carried out as described in this FOA and the Long Range BAA. ONR Global expects to issue only research grants from this FOA.

ONR Global expects to award up to a total of \$750,000 for an initial nine-month period of performance for proposals selected under the Global-X Challenge 2023. Additional funding may be possible for an additional nine-month optional research effort, following successful proof of concept. Total grant award values, including the initial and additional optional research period, will not exceed \$1,000,000. ONR Global may award one grant or multiple grants, addressing a single challenge area or multiple grants addressing two or three challenge areas described below. The number of grants and amounts of funding for each grant will depend on proposals submitted. ONR Global expects a successful proof of concept will attract additional funding from other

sources for potential follow-on accelerated research efforts under a separate agile acquisition mechanism; however, this does not imply the promise of additional funding.

The purpose of this announcement is to focus the attention of the international scientific community on (1) the challenge areas of interest; and (2) the schedule of key events and deadlines, including the Global-X Challenge Kick-off Webinar, technical area pitch submissions, and the submission of white papers and full proposals.

Recordings of the Kick-off Webinar, technical area pitches, and supplementary information such as Global-X Challenge Guidelines, templates and Frequently Asked Questions (FAQs) will be available on <https://www.nre.navy.mil/organization/onr-global>.

### **III. CHALLENGE DESCRIPTIONS**

#### **Background:**

The purpose of this Global-X Challenge is to discover, and ultimately provide a catalyst through a research grant, for subsequent development and delivery of revolutionary capability to the U.S. Navy and Marine Corps, the commercial marketplace, and the public. The expected outcomes of this Global-X Challenge are promising, potentially game-changing, concepts whose technology maturity may be accelerated under separate follow-on technology development efforts.

#### **Objective:**

ONR Global is interested in promising concepts to achieve revolutionary capability advances with both military and commercial value in the multidisciplinary technology challenge areas described below. Specifically excluded are existing commercial systems or products, technical approaches already funded by existing research programs, or research that provides evolutionary improvements to existing technology.

ONR Global recognizes that international scientists and engineers conduct creative and novel research. This Global-X Challenge provides an opportunity for these international researchers to collaborate, generate revolutionary ideas and show proof of concept these ideas will succeed. ONR Global invites outstanding international researchers to form multi-national, multidisciplinary teams to address one or more of these capability challenges. Individual researchers may participate on more than one research team. Teams are responsible for establishing non-disclosure agreements among team members, if necessary.

Non-federal entity researchers from academia and industry may participate. ONR Global expects, but does not require, that multi-national teams will consist of at least two research entities outside of the U.S., whether from academia, industry and/or the broader research community. Researchers from U.S. research entities may also participate but are not required. As stated above, this Global-X Challenge is an opportunity specifically directed toward international researchers; therefore, ONR Global expects the majority of team members will be outside of the U.S. Each team shall designate a lead Principal Investigator (PI) whose research organization outside of the U.S. will submit the white paper or proposal and will distribute

funding to co-PIs and other sub-recipients. For a given project team, one award is made to the PI's institution. Only the PI's institution will be the prime awardee, and that institution is responsible for all aspects of the grant, including conditions on the use of funds and other terms and conditions of the grant.

Research organizations and individuals that are not subject to U.S. sanctions or are not otherwise excluded from doing business with the U.S. Government, may participate. Please note the grant applicant is responsible for complying with any applicable sanctions, export controls, and similar limitations.

### **Challenge Problem Statements:**

#### **1. Long Range, High Bandwidth Underwater Communications**

##### Descriptive Attributes:

- Enables voice and data communications underwater
- Communication range > 100 km with data rates > 5 MBPS
- Cooperative communications to enable networked heterogeneous communication between platforms for collaborative mission management
- Operates in all salinity (e.g. fresh and salt water) and in minimum visibility conditions (high turbidity) with no degradation in performance
- Assured, secure; adaptable; low cost; unmanned
- May incorporate networked, multimodal, distributed and cross-domain approaches
- Low SWaP (size, weight and power)

##### Potential Enabling Technical Disciplines:

- Artificial Intelligence / Machine Learning
- Chemistry
- Physics
- Electromagnetic spectrum
- Next generation networking
- Quantum science
- Signal processing
- Space science
- Earth science
- Power and energy
- Nano or Micro-electronics
- Neuromorphic sensors
- Materials
- Logistics
- Oceanography
- Cybersecurity
- Microbiology / Synthetic biology

## **2. Multifunctional Fabric (2-D woven fibers) for Survivable platforms**

### Descriptive Attributes:

- Resists extreme environmental conditions (cold and hot, dry and fully submerged underwater)
- May be actuated to produce 3D shapes
- May be configured for a specific form factor at the nano, micro and macro scale to affect surface properties, including inducing hydrophobicity, reducing skin friction drag, reflectance (color), and refractance;
- Fabric may be easily applied to a surface and removed
- Fabric may sense surface state for health monitoring, absorb energy and provide a source for alternative energy production.
- Lightweight, adaptive, low cost;

### Potential Enabling Technical Disciplines:

- Artificial Intelligence / Machine Learning
- Chemistry
- Physics
- Electromagnetic spectrum
- Quantum science
- Power and energy
- Nano or Micro-electronics
- Materials
- Logistics
- Electrical engineering
- Biology
- Advanced Manufacturing,

## **3. Personal Expeditionary Power**

### Descriptive Attributes:

- Power density  $>1000$  W/kg and Energy density  $\geq 5000$  Wh/kg
- Scavenge materials/resources to provide fuel sources that are indigenous to any location, including underwater, on land and in air; Generate at point of use to eliminate logistics tail;
- May be weight bearing and incorporated into structures
- Long-life; reusable

### Potential Enabling Technical Disciplines:

- Artificial Intelligence / Machine Learning
- Chemistry
- Physics / nuclear physics
- Electromagnetic spectrum
- Quantum science
- Power and energy

- Materials Science,
- Microbiology / Synthetic biology

#### **IV. GLOBAL-X CHALLENGE KICK-OFF WEBINAR**

ONR Global will hold a Global-X Challenge Kick-off Webinar on 18 April 2023 at 0700 EDT. This webinar is open to any interested researchers. There is no fee for participating in the webinar, however, advance registration is required to view it live and participate in the live Q&A session. Subsequent to the live webinar broadcast, a recording of the webinar will be available for viewing, upon registration. The link to register for the live or recorded webinar will be posted on <https://www.nre.navy.mil/organization/onr-global>, as well as on grants.gov. You do not need to participate in or register for the webinar to submit a white paper or proposal.

#### **V. TECHNICAL AREA PITCHES**

Revolutionary technology development typically results from multidisciplinary teams working in an environment that fosters and leverages serendipitous discovery. ONR Global acknowledges that researchers may already have colleagues with whom they wish to collaborate on research teams. However, to help expand a researcher's network of colleagues, ONR Global invites all to prepare technical area video recordings to help create new connections and potentially new teams. These recordings should be three minutes or less and include a PowerPoint chart describing their research expertise and interests, along with contact information.

ONR Global invites you register for the Global-X Challenge workspace in Slack ([https://join.slack.com/t/2023global-xchallenge/shared\\_invite/zt-1smzhna1v-dtGLb9ezNpTEkyjTdk6Pag](https://join.slack.com/t/2023global-xchallenge/shared_invite/zt-1smzhna1v-dtGLb9ezNpTEkyjTdk6Pag)) and post a link to your video pitch by 30 April within the most appropriate discipline area. These videos will be available to all who register for the workspace. ONR Global encourages researchers to participate in multiple research teams to develop a wide range of approaches to address one or more of the Global-X Challenge topics. Furthermore, ONR Global may recommend specific researchers connect, form a team and submit a white paper.

#### **VI. WHITE PAPER SUBMISSION**

White papers are highly encouraged for all applicants seeking funding from this Global-X Challenge. The Global-X Challenge evaluation panel will assess how well each white paper submitted achieves the revolutionary capability described in the technology challenge areas above. ONR Global will invite those teams submitting white papers with the most promising concepts to submit a full proposal. Invitations to propose and feedback will be issued via e-mail notification to the team PI from the Technical Point(s) of Contact or their designee(s). However, any such invitation does not assure a subsequent award. Full proposals may be submitted by any applicant in response to this FOA, whether or not a white paper was submitted or evaluated by ONR Global.

White papers shall follow the format provided in this FOA (see FOA attachments 1-3); this format will meet mandatory ONRG Cover Page requirements. White papers shall be 12 point

Times New Roman font and not exceed five single-sided pages. Figures, charts and tables should be legible, but may use a smaller font size. White papers must include an additional one-page quad chart and a spreadsheet, which are not part of the white paper page limitation. The five-page white papers should be submitted in Adobe PDF format (preferred) or in Microsoft Word. The quad chart may be submitted in Adobe PDF (preferred) or in Microsoft PowerPoint format. The spreadsheet should be submitted in Microsoft Excel (or compatible) format and should indicate the principal Challenge Statement the white paper addresses. The format of the spreadsheet should remain unchanged; please do not alter the order or add additional columns.

The PI for each team shall be the primary point of contact throughout the application process; they are responsible for submitting white papers describing their concept and approach to [ONRG.GrantProposals@mail.mil](mailto:ONRG.GrantProposals@mail.mil) by **23:59 EDT on 21 May 2023**. White papers received after the deadline may not be considered. The subject line of the email shall read: “*N00014-23-S-BC12 Global-X Challenge White Paper Submission*”. Do not send ZIP files or provide links to “Dropbox” type applications as they will not be reviewed. Password protected files are discouraged.

The Global-X Challenge evaluation panel will review submitted white papers and will invite teams with the most promising and revolutionary concepts, on or before 2 June 2023, to submit a grant proposal. All teams submitting a full proposal must follow steps listed in section VI below.

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

Full grant proposals must be submitted to the Department of the Navy at [www.grants.gov](http://www.grants.gov) under BAA number N00014-23-S-BC12 by **23:59 EDT on 30 June 2023**. ONR Global will not consider full proposals received after this date. See Appendix 1 of BAA N00014-23-S-B001 for instructions on submitting grant proposals via grants.gov. Please note SAM registration is required to submit proposals on grants.gov and may require significant time to complete for new SAM registrants. The Global-X Challenge evaluation panel will evaluate Full Proposals in accordance with Section E. 2. Review and Selection Process within BAA N00014-23-S-B001.

ONR Global will notify teams selected for award on or before 21 July 2023 and intends to award grants by 8 September 2023. The initial period of performance is nine months. Within nine months of grant award, ONR Global expects teams to show proof their concept will likely meet proposed objectives. Following a successful proof-of-concept demonstration, ONR Global may exercise an optional research effort for up to an additional nine months to continue concept development and testing. A final research progress report is required in accordance with the terms and conditions of the grant. The terms and conditions applicable to assistance instruments as referenced in BAA N00014-23-S-B001 will apply to grants awarded under this FOA. Financial and patent reports will also be required.

Although ONR Global expects the above plan to be executed, ONR Global reserves the exclusive right to make changes or cancel this Global-X Challenge, as necessary. This FOA does NOT imply any promise of award.

## VIII. POINTS OF CONTACT

The specific points of contact for this announcement are listed below:

### Technical Points of Contact:

- Challenge Statement 1: Long Range, High Bandwidth Underwater Communications  
Dr. Richard Meyer, ONR Global Science Director, [richard.s.meyer23.civ@us.navy.mil](mailto:richard.s.meyer23.civ@us.navy.mil)  
Mr. Tony Bausas, ONR Global Science Advisor, [anthony.v.bausas.civ@us.navy.mil](mailto:anthony.v.bausas.civ@us.navy.mil)
- Challenge Statement 2: Multifunctional Fabric for Survivable platforms  
Dr. Scott Walper, ONR Global Science Director, [scott.a.walper.civ@mail.mil](mailto:scott.a.walper.civ@mail.mil)  
Dr. Chris Heagney, ONR Global Science Advisor,  
[christopher.p.heagney.civ@us.navy.mil](mailto:christopher.p.heagney.civ@us.navy.mil)
- Challenge Statement 3: Personal Expeditionary Power  
Dr. Chip Eddy ONR Global Science Director, [charles.r.eddy12.civ@mail.mil](mailto:charles.r.eddy12.civ@mail.mil)  
Mr. Justin Helton, ONR Global Science Advisor, [justin.helton@usmc.mil](mailto:justin.helton@usmc.mil)

### Business Point of Contact:

- ONR Global Grants Team, [ONRG.GrantProposals@mail.mil](mailto:ONRG.GrantProposals@mail.mil)

## IX. SUBMISSION OF QUESTIONS

Any questions regarding this announcement must be provided to the Business Point of Contact listed above. Please submit all questions in writing by electronic mail.

Answers to questions submitted in response to this FOA will be addressed in a Frequently Asked Questions (FAQ) document posted on <https://www.nre.navy.mil/organization/onr-global> and [grants.gov](https://www.grants.gov).

Questions regarding **White Papers or Full Proposals** should be submitted no later than five working days before the dates recommended for receipt of White Papers and/or Full Proposals. Questions received after this date may not be answered.