



Special Notice N00014-20-S-SN14
Special Announcement for
2020 Office of Naval Research (ONR) Global Research Opportunity:
Global-X Challenge

I. INTRODUCTION

This notice announces the ONR Global-X Challenge and describes new funding to be awarded under the authority of N00014-20-S-B001, Long Range Broad Agency Announcement for Navy and Marine Corps Science and Technology which can be found at the following link:
<https://www.onr.navy.mil/work-with-us/funding-opportunities/announcements>.

The submission of white papers, proposals, their evaluation and the placement of research grants will be carried out as described in the above Long Range Broad Agency Announcement (BAA) and this special notice. The Office of Naval Research Global (ONR Global) expects to issue only research grants from this special notice.

ONR Global expects to have up to \$750,000 available for a nine-month initial period of performance for each grant awarded under the Global-X Challenge, with additional ONR Global funding possible for an additional nine month optional research effort, following successful concept demonstration. 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 each of the three challenge areas described in this special notice below. The number of grants and amounts of funding for each grant will depend on proposals submitted. ONR Global expects successfully demonstrated concepts 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; (2) a Global-X Challenge Kick-off Webinar on 23 April 2020 at 0700 hours EDT; and (3) the planned timetable for the submission of white papers and full proposals.

Recordings of the Kick-off Webinar, helpful links and supplementary information such as Global-X Challenge Guidelines and any Frequently Asked Questions (FAQs) will be available on <https://onr.navy.mil/global-X> following the webinar.

II. CHALLENGE DESCRIPTIONS

Background:

The purpose of this Global-X Challenge is to discover, disrupt, and ultimately provide a catalyst for later development and delivery of revolutionary capabilities to the U.S. Navy and Marine Corps, the commercial marketplace, and the public. The expected outcomes of this Global-X Challenge are promising revolutionary concepts whose technology maturity may be accelerated under separate agile 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 approaches that primarily result in evolutionary improvements to the existing state of practice, or are already funded by existing research programs.

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 demonstrate 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. ONR Global will use existing online collaboration tools to help researchers to connect, collaborate and form teams. ONR Global will provide more information about collaboration forums during the Kick-off Webinar. Individual researchers may participate on more than one team. Teams are responsible for establishing non-disclosure agreements among team members, if necessary. All ONR Global and U.S. Federal employees are already covered by Federal laws requiring the protection of trade secrets and proprietary information.

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 broad 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 that will distribute funding to co-PIs and other subrecipients. 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.

Teams must submit white papers describing their concept and approach **by 23:59 EDT on 25 May 2020**. ONR Global will evaluate submitted white papers and will invite teams with the most promising and revolutionary concepts, on or before 5 June 2020, to submit a grant proposal. Full proposals are due **by 23:59 EDT on 13 July 2020**. ONR Global will notify teams selected

for award on or before 31 July 2020, and intends to award grants by 7 September 2020. Within eight months of grant award, ONR Global expects teams to demonstrate their concept will likely meet proposed objectives. The initial grant period of performance is expected to be nine months. Following a successful proof-of-concept demonstration, ONR Global may exercise the 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. Financial and patent reports will also be required.

Challenge Problem Statements:

1. Tailored Material and Manufacturing

Descriptive Attributes:

- Material properties and manufacturing processes are custom designed and optimized on demand for a specific application, rather than a conventional material and manufacturing technique needing to meet a wide range of possible applications and conditions.
- Novel microstructures or material architectures are achieved, which are not realizable via traditional processing.
- Representative examples of tailored material and manufacturing may include stronger, lightweight structural materials for a vehicle; active control of material properties like strength and hardness; material interfaces with no thermal expansion coefficient; energetics; energy storage; material with novel functionality, such as self-healing, responsive, reactive with a multitude of features that are organic and self-replenishing; material with the hardness and high temperature of a ceramic, but with the ductility of a metal.
- Accurate and validated models that enable the development and implementation of design parameters used to quickly optimize material systems.
- Conduct performance, structural and material properties assessment without needing extensive, time consuming and expensive iterative testing at multiple scales. With tailored manufacturing of the custom-designed components, testing quickly validates models for accelerated certification and qualification at a fraction of the cost of conventionally designed and manufactured components.

Potential Enabling Technical Disciplines:

- Multiscale modeling
- Artificial intelligence / Machine learning
- Synthetic biology
- Advanced digital manufacturing
- Materials
- Structural mechanics
- Tribology
- Chemistry
- Physics

2. Multifunctional Maritime Films for Persistent and Survivable Platforms and Warfighters

Descriptive Attributes:

- Film prevents corrosion on conventional marine surfaces, resists extreme environmental conditions, may be shape-shifting, and may be configured for a specific form factor at the nano, micro and macro scale to affect surface properties, including reducing skin friction drag and preventing unwanted bio-fouling.
- Film is easily applied, does not adversely impact naval operations and eliminates or greatly reduces the need for repainting/recoating maritime surfaces; film may be removed in a controlled manner.
- Film may sense surface state for health monitoring, absorb energy and provide a source for alternative energy production.
- Film is non-toxic to humans and marine life, with no adverse impact on the environment.

Potential Enabling Technical Disciplines:

- Synthetic biology
- Marine biology
- Microbiology
- Virology
- Chemistry
- Corrosion
- Materials
- Fluid Physics
- Logistics
- Oceanography

3. Object Detection and Identification in any Medium (Air, Water, Sand/Earth)

Descriptive Attributes:

- Detect objects of any material (ferrous, non-ferrous, polymeric, organic, biological, etc.) and scale (10^3m to 10^2m); objects may be moving or stationary, wholly immersed within any medium or at the interface between two media (e.g. on a surface).
- Detection resolution and signal to noise ratio is sufficient to classify and identify the object; identification will occur at near real-time.
- Power demand and size of detection and identification components meet mobile host platform constraints and availability.
- Detection and identification components may be active and/or passive and incorporate multimodal, distributed and cross-domain approaches.
- Detection and identification components are low cost.

Potential Enabling Technical Disciplines:

- Physics
- Electromagnetic spectrum
- Acoustics
- Quantum sensing
- Signal processing

- Artificial intelligence / Machine learning
- Materials
- Oceanography
- Space science
- Earth science
- Synthetic biology
- Power and energy
- Microelectronics
- Neuromorphic imaging

III. GLOBAL-X CHALLENGE KICK-OFF WEBINAR

ONR Global will hold a Global-X Challenge Kick-off Webinar on 23 April 2020 at 0700 hours EDT. This webinar is open to any interested researchers, and it will be recorded and placed on the Global-X website (<https://onr.navy.mil/global-X>) for reference following the webinar. There is no fee for participating in the webinar; however, ADVANCE REGISTRATION IS REQUIRED.

Please navigate to the following website prior to the webinar to register:
https://goto.webcasts.com/starthere.jsp?ei=1304622&tp_key=05bcb53438.

Once registered, you will be able to view the webinar at the time of the event. You do not have to participate in, or register for the webinar to submit a white paper or proposal.

IV. WHITE PAPER SUBMISSION

White papers are highly encouraged for all applicants seeking funding from this Global-X Challenge. ONR Global will evaluate 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 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 Special Notice, whether or not a white paper was submitted or evaluated by ONR Global.

White papers shall follow the format provided in this Special Notice (see special notice attachments 1 and 2). White papers shall not exceed five single-sided pages. White papers must include an additional one-page quad chart, which is not part of the white paper page limitation. White papers should be submitted in Adobe PDF format (preferred) or in Microsoft Word and Microsoft PowerPoint format.

Submit white papers to ONRG.GrantProposals@mail.mil by **23:59 EDT on 25 May 2020**. White papers received after the deadline may not be considered. The subject line of the email shall read: "*N00014-20-S-B001 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. Please notify ONRG.GrantProposals@mail.mil at least 7 calendar days before the white paper deadline to make arrangements for submitting white papers with a total file size larger than 10MB. E-mails with sizes greater than 10MB might not be received by ONRG.GrantProposals@mail.mil, so special file transfer accommodations will be made to ensure receipt of the white paper.

On or before 5 June 2020, ONR Global will evaluate submitted white papers, and will invite teams with the most promising and revolutionary concepts to submit a full grant proposal.

V. FULL PROPOSAL SUBMISSION AND AWARD INFORMATION

Offerors notified that their white papers are deemed to be of particular value to the Department of the Navy should submit a full grant proposal at www.grants.gov under BAA number N00014-20-S-B001 by **23:59 EDT on 13 July 2020**. ONR Global will not consider Full Proposals received after this date.

See Appendix 1 of BAA N00014-20-S-B001 for instructions on submitting grant proposals via grants.gov. When completing the form titled SF-424 (R&R) in www.grants.gov, applicants must include the following information in Field 4b (Agency Routing Number) exactly as follows: 600 [Jefferies, Rhett]

Applicants must include the “600 [Jefferies, Rhett]” identifier (without quotation marks) in Field 4b of the SF-424 (R&R) submission in www.grants.gov, or they may receive a notice that their proposal is rejected.

ONR Global will evaluate Full Proposals in accordance with Section II (E) of BAA N00014-20-S-B001. ONR Global will notify teams selected for award on or before 31 July 2020 and intends to award grants by 7 September 2020. Within eight months of grant award, ONR Global expects teams to demonstrate their concept will likely meet proposed objectives. The initial period of performance is nine months. Following a successful proof-of-concept demonstration, ONR Global may exercise the 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. 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 Special Notice does NOT imply any promise of award.

VI. SIGNIFICANT DATES AND TIMES

Event	Date	Time
White Paper Submission Date	25 May 2020	23:59 Eastern Daylight Time (EDT)
Notification of White Paper Valuation*	5 June 2020	17:00 EDT
Full Proposal Submission	13 July 2020	23:59 EDT
Notification of Selection: Full Proposals *	31 July 2020	17:00 EDT
Grant Awards *	7 September 2020	17:00 EDT

Note: * These are approximate dates.

VII. POINTS OF CONTACT

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

Technical Points of Contact:

- Challenge Statement 1: Tailored Material and Manufacturing
Dr. Bill Nickerson, ONR Global Science Director, william.c.nickerson2.civ@mail.mil
Dr. Chris Heagney, ONR Global Science Advisor, christopher.heagney@navy.mil
- Challenge Statement 2: Multifunctional Maritime Films for Persistent and Survivable Platforms and Warfighters
Dr. Stephen O'Regan, ONR Global Science Director, stephen.d.oregan.civ@mail.mil
Mr. Chris Zito, ONR Global Science Advisor, chris.zito@navy.mil
- Challenge Statement 3: Object Detection and Identification in any Medium
Dr. Elena McCarthy, ONR Global Science Director, elena.m.mccarthy.civ@mail.mil
Mr. John Phillips, ONR Global Science Advisor, John.T.Phillips2@usmc.mil

Business Point of Contact:

- ONR Global Grants Team, ONRG.GrantProposals@mail.mil

VIII. 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 Special Notice will be addressed in a Frequently Asked Questions (FAQ) document posted on <https://onr.navy.mil/global-X>.

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