

**DARPA-BAA-16-58 EXTREME**  
**Frequently Asked Questions (FAQs)**  
**as of 9/2/16**

39Q: What are the proper protocols for classified work?

39A: This is a basic research program and it is not anticipated that classified work will be performed. If a proposal contains classified information, please follow the instructions in the BAA on page 34 Section IV B 3 b "Security Information."

38Q: The challenge problem examples listed in the BAA are diverse. My project ideas (capabilities and potential applications of my EnMat materials system) have an overlapping interest with more than a couple of different/heterogeneous applications. Should I focus on more cohesive subjects or be more comprehensive in my abstract?

38A: While it is important to establish context for your capabilities, abstracts and proposals should address a specific challenge problem.

37Q: Must the entire team be in place by the time the abstracts are due on September 9?

37A: Teaming does not need to be finalized in order to submit an abstract; however, proposers should make their best efforts to have their teams in place by the abstract phase.

36Q: Could team composition be somewhat different in Phase I and II?

36A: A proposal must include a description of Phase I and Phase II work. It is the Prime's decision to determine team composition throughout the program.

▲▲▲New Q/A▲▲▲

35Q: Are there ITAR restrictions?

35A: It is not anticipated that there will be ITAR restrictions; however, if information is ITAR-protected it is the duty of the proposer to regulate this information and appropriate protocols would be put in place.

34Q: Several faculty in our department have different concepts that might be a good fit to this BAA. Would it be OK if we submit separate smaller abstracts and proposals, or would it be preferred to have one proposal from a department?

34A: If these concepts can be combined into a *unified, coherent* proposal that addresses all critical requirements of the BAA, then one proposal would be preferred. If not, separate submissions are acceptable.

33Q: How much focus will be on novel manufacturing technology designed to make metamaterials using new and existing materials at a very low cost?

33A: The primary concern of EXTREME with respect to fabrication technology is manufacturing of EnMats on large spatial scales, as defined in Table 1 of the BAA. Low cost fabrication is of interest to EXTREME as a secondary concern. Please see question 23 for additional details.

32Q: Are proposers allowed to join multiple teams?

32A: Yes, proposers are allowed to be included on multiple different proposals; however, if selected for negotiation of a potential award, proposers (prime or sub) will not be funded for duplicative work.

31Q: Can you fund new tool development?

31A: All tools development (both in fabrication and modeling/design) should be in support of the overarching goal of new EnMat-based optical system architectures.

30Q: Does the opportunity only want engineered optical materials, or will it consider novel architectures that can deliver new functionality, and vastly improved SWaP using conventional materials?

30A: EXTREME is specifically focused on EnMats. Please see Section I on page 5 of the BAA for further details on technologies and EnMats of interest.

29Q: What technical challenges does the PM believe are most significant?

29A: Some significant challenges include (in arbitrary order): Active devices, fabrication of volumetric elements, overcoming loss, increasing the bandwidth of operation, scaling up the size of devices, modeling across spatial scales, and development of new optical architectures.

28Q: Is there an intent to establish one or more designated foundries for fabrication and team access to rapidly mature processes and technologies with commercial viability?

28A: At this stage there are no plans to designate a specific foundry or fabrication process. All proposals for development of new EnMats should provide a detailed plan for either in-house or sub-contracted fabrication. As the program matures, technology transition options will be explored.

27Q: Can the idea for a project be proof-of-concept stage?

27A: As EXTREME is a fundamental research program, concepts at any stage of development can be proposed. However, sufficient initial results and/or simulations should be provided to justify the feasibility of the proposed work, to the extent possible. Please see Section IV.B.2 for additional information on initial results and risk mitigation that should be included within the technical volume of a proposal.

26Q: What are the contract vehicles for providing services? What is the scope of a seedling grant?

26A: All awards under the EXTREME program will be procurement contracts, cooperative agreements, or other transactions. Seedling grants are not part of the funding structure for EXTREME. Please see “Part 1: Overview Information” and Section II “Award Information” of the BAA.

25Q: How is EXTREME different from previous programs on meta-materials, meta-surfaces, and binary optics?

25A: Previous programs have focused on the development of specific properties (e.g., negative index materials) or applications (e.g., cloaking), whereas EXTREME focuses on systems level development and the application of EnMats towards new architectures. Additionally, EXTREME seeks to push the use of EnMats out of the lab and develop capabilities that will enable EnMat use in practical optical systems. Please see Section I of the BAA for additional details.

24Q: What defines a “volumetric EnMat” versus a “surface-based EnMat”?

24A: While there is no hard requirement on the aspect ratio, an EnMat is generally considered volumetric if its building blocks (e.g., resonators, scattering structures, etc.) extend along all directions, including the direction of propagation, over many wavelengths. As an opposite example, an EnMat with a large transverse extent, but with a thickness on the order of a wavelength would be considered a surface. An EnMat consisting of many such surfaces stacked together would be considered a volume. However, DARPA can’t define a point at which a (large) number of stacked surfaces becomes a volume – this is material and application dependent. Our “sugar cube” example from the BAA in which cube sides are on the order of millimeters or even tens of millimeters would be considered a volumetric EnMat structure.

23Q: Will the scalability of the technology be part of the evaluation? What part of this effort will be dedicated to manufacturing development and scale up?

23A: Proposed EnMats should be scalable in terms of their spatial dimensions, but do not necessarily need to be scalable in terms of quantity of production. Please see the Program Structure and Transition to Phase II descriptions in Section I for additional details.

22Q: Do teams have to address all three TAs or it enough to focus on one or two of them?

22A: Per the BAA, teams may propose to any or all TAs. Please see the “Program Structure” and “Integration of Efforts” descriptions in Section I of the BAA on pages 7-10 for additional details.

21Q: Is EXTREME interested in having fundamental questions answered? Is the work fundamental or device focused?

21A: Phase I of EXTREME will be focused on fundamental insights, theoretical developments and initial demonstrations of devices. Phase II will be focused on extending device fabrication and systems development. Please see Program Structure in Section I of the BAA beginning on page 7 for additional details.

20Q: What are the required deliverables?

20A: Please see the Deliverables description in Section I on Page 15 of the BAA.

19Q: What are the programmatic end goals?

19A: Please see the Program Description on pages 5-7, the example challenge problems on page 11, Table 1 on page 12, and Table 2 on Pages 13-14 in Section I of the BAA for details on programmatic end goals.

18Q: What are the metrics of interest?

18A: Please see Table 1 on page 12 of the BAA for metrics of interest.

17Q: What systems/capabilities/applications are of interest?

17A: Please see the example challenge problems on page 11 in Section I of the BAA for details on systems, capabilities, and applications of interest. However, please note that this is not an exhaustive list, it is not in any order of preference, and that proposers can propose their own challenge problems.

16Q: What details must a proposal incorporate in order to be compliant?

16A: Section IV of the BAA outlines the details of writing, formatting, and submitting a compliant Abstract or Full Proposal.

15Q: What constitutes an EnMat "building block"?

15A: A building block is considered the fundamental element of a given EnMat. For a meta-material the building block could be a sub-wavelength resonator. For a scattering material, the building block could be a specified voxel of a given dielectric constant. It is ultimately up to the performer to define the building block for any EnMats proposed.

14Q: When is the full proposal deadline and what is the proposed project performance period?

14A: Please see Section I on page 6 of the BAA for information on the length of the program, and Section IV.C on page 35 of the BAA for submission deadline information.

13Q: Are both active and passive systems of interest to EXTREME?

13A: EXTREME is interested in both passive and active concepts. Active include, but are not limited to dynamic, reconfigurable and tunable EnMats and systems. Please see Table 1 on page 12 of the BAA, and the list of challenge problem examples on page 11. In addition, slides from the Webinar will be posted and available for review on the DSO Opportunities page, <http://www.darpa.mil/work-with-us/opportunities>.

12Q: How much money can be allocated to purchasing equipment?

12A: Proposers are expected to request the level of funding for equipment (including capital expenditures) necessary to complete the proposed work. Proposers should have fundamental capabilities and facilities already established (i.e., EXTREME is not intended to fund the start-up or development of a materials fabrication laboratory.)

11Q: What is the amount of funding available and the number of awards?

11A: Multiple awards are anticipated. The level of funding for individual awards made has not been predetermined and will depend on the quality of the proposals received and the availability of funds. Proposers are expected to request the level of funding commensurate with the proposed work.

10Q: Is my technology within scope of the EXTREME program?

10A: Please see Section I on page 5 of the BAA for further details on technologies and EnMats of interest.

9Q: What is the expected Technology Readiness Level (TRL) of incoming concepts and what TRL does this program plan to achieve?

9A: EXTREME is a basic research (6.1) program, but is focused on advancing the state-of-the-art towards practical systems.

8Q: What are the frequency bands of interest?

8A: Please see Table 1 on page 12 of the BAA.

7Q: Can Federally Funded Research and Development Centers (FFRDCs) and Government Entities (such as National labs) participate in the program?

7A: Yes, as long as the eligibility requirements outlined in Section III.A of the BAA are met. FFRDCs and Government entities (including National laboratories) are subject to applicable direct competition limitations. Please see Section III.A.1 for more information.

6Q: Can non-US citizens participate in the program? Can European universities participate as collaborators?

6A: Please review Section III.A.2 of the BAA. EXTREME is a basic research program (6.1) and non-U.S. organizations and/or individuals may participate to the extent that such participants comply with any necessary nondisclosure agreements, security

regulations, export control laws, and other governing statutes applicable under the circumstances.

5Q: What is the minimum/maximum size of the team?

5A: There is no minimum or maximum team size. All teams should be of a size such that they can be effectively managed by the PI and capable of accomplishing the proposed effort. Please see the Program Structure and Integration of Efforts/Data Sharing and Collaboration sections on pages 7-10 of the BAA for additional details.

4Q: Can a company rather than a university serve as the Prime? Is participation of a small business mandatory for this program?

4A: Both companies and universities are welcome to apply as prime or as sub-contractors. Participation of small businesses is not mandatory.

3Q: Are non-tenured track faculty eligible to be Principal Investigators (PIs) and Co-PIs?

3A: Yes, non-tenured track faculty are eligible to be PIs and Co-PIs.

2Q: Does DARPA prefer a method of teaming?

2A: Please see the Program Structure and Integration of Efforts/Data Sharing and Collaboration sections on pages 7-10 of the BAA.

1Q: What mechanism does DARPA provide for proposers to team/collaborate with others?

1A: Please see Section VIII.B on page 49 of the BAA.