DARPA-PS-25-27 Rads to Watts
Frequently Asked Questions (FAQs)
as of 6/25/25

16Q: Where do the abstracts get sent to?

16A: Please review Attachments A and B for abstract formatting and submission instructions. Abstracts must be submitted per the instructions outlined therein and received by DARPA no later than the due date and time listed in the Overview Information section in the Program Solicitation (PS). Abstracts received after this time and date may not be reviewed. Please visit Proposer Instructions and General Terms and Conditions for instructions on how to submit your abstract through DARPA's Broad Agency Announcement Tool (BAAT).

15Q: Does the proposer need to have found a Transition Partner for this effort?

15A: DARPA will pursue a transition partner for the effort. However, the proposal must include a recommendation for a domain, power level, and operational duration that the radiovoltaic is expected to operate in as described in the PS.

14Q: What if we don't have a radiation source? Can we substitute dose on the radiovoltaic with a high-energy, high-flux particle device such as another linac to measure W/cm^2?

14A: This is not allowed per the structure of the program, because performers will not be able to perform time capsule experiments, and using an idealized radiation source would not meet the intent of the program to develop power sources for operational use. In particular, a performer will not be able to put their unit cell into a "time capsule" at month 15 for the capstone test, which is expected to be encapsulated along with their respective source. If they rely on a device (e.g., a linac) as a substitute for a radiation source, then the linac would have to be running continuously for 9 months at low flux to get the real time degradation effect data. This is not realistic nor is it representative of an operational unit cell.

13Q: Is the development of scintillators in scope?

13A: No. Rads to Watts will only invest in experimentation and development of radiovoltaic hardware.

12Q: How should shielding be considered, in particular when considering mass for the W/kg estimate?

12A: The W/kg estimate should only include the mass of the full-scale, operational system radiovoltaic. You may assume the device is stand-alone in space, not around humans.

11Q: What is the expected level of funding? What size of teams should we aim for?

11A: The level of funding for individual awards will depend on the quality of the proposals received and the availability of funds. Proposers are encouraged to assemble teams that can address the full scope of the challenges presented in the program solicitation and meet and exceed the metrics therein.

10Q: For (1) PIs, (2) Co-PIs and (3) Institutions, how many proposals may each respectively be on?

10A: There is no limit on the number of proposals that a given prime or subcontractor may submit, however, the unique aspects of each approach should be clear, and should explain how performance would be managed to ensure success and potential conflicts of interest would be handled should multiple proposals be selected for award.

9Q: How should proposers reconcile the linac fluence metric, if the proposer plans to use a different source other than a beta (eg, an alpha, gamma, etc.) with respect to a different source's fluence level? Should the proposer also test their own unit cell with alphas at 1E+17/cm^2 of alphas, for example?

9A: The linac test will be an unbiased way to damage and dose all of the materials with a common energy level and fluence of high energy electrons. This is a way to compare radiation degradation for all performers. Then, the performance of the unit cell subject to its own native particles (e.g., an alpha, gamma, etc.) will be captured in a separate metric via the Figure of Merit (FOM). The FOM will capture the performer's own unique, proposed way to reach (i.e., different radiation source types) their chosen power density and time data points within the range specified by DARPA. DARPA recognizes that the "fluence corridor" which has been illustrated in the Proposers Day slides is illustrated for betas, but a similar corridor could be drawn for the same power density and time values for all unit cells, using correlations for different particles. For example, the 1E+17/cm^2 ceiling is likely to correlate to a 1E+13/cm^2 ceiling for alphas for two given unit cells (one using betas at x W/cm^2 and another using alphas that could equal that same x W/cm^2 value).

8Q: What is the procedure for FFRDCs, UARCs, and National Labs to be involved?

8A: Federally Funded Research and Development Centers (FFRDC), University Affiliated Research Centers (UARCs), and Government Entities to include National Laboratories are not eligible to propose to this solicitation as prime contractors. Should prime proposers require national laboratory support for their efforts, to include the provision of radioisotopes, they must clearly define the proposed supporting role of the national lab(s) in their technical proposal and ensure that proposed costs are segregable in the cost proposal, as DARPA will fund those activities separately through those entities' existing agreements should the proposer be selected for funding.

7Q: What data does DARPA require with regards to waste heat during the unit cell tests?

7A: DARPA is interested primarily in radiation degradation and does not expect performers to iterate on improvements to the device to minimize thermal degradation. The "time capsule" at month 15 will be an opportunity to document the effects of heat on the unit cell performance at month 24; but radiation degradation will be the principal metric from this test that will be used to score performers.

6Q: How are performers expected to quantify the W/cm^2 metric using data from the unit cell experiments, taking into consideration that source radiation may be lost with a single layer?

6A: As stated in the PS, assume source collection efficiency is 100% for singular unit cell experiments in order to validate W/cm^2.

5Q: How much flexibility do performers have when proposing the radiation source for the vision system? What is the level of interest in a nuclear reactor as a source versus isotopes?

5A: Proposers have total flexibility when proposing a radiation source in their proposal as long as they are addressing the requirements of the PS. A reactor is an example of a radiation source which could be possible in the vision system. However, performers need to be mindful of the schedule and application constraints of the program. Neutrons and gamma emissions from a reactor will likely be more difficult to capture, convert, and then drive the resultant energy into current in Rads to Watts via a unit cell in the timeframes needed to meet the competitive metrics.

4Q: What quantity of isotope in relation to licensing limits is expected?

4A: DARPA expects that Rads to Watts performers will not be working with or handling an abundance of isotopes whose radioactivity levels will go beyond the licensing limits of the proposers. Unit cells are expected to be small, using small quantities of radioisotopes within licensing limits.

3Q: What are the expectations for performers to acquire radioisotopes?

3A: DARPA expects that performer teams have experience acquiring the radioisotope that they propose to incorporate into their radiovoltaic and/or that performers are able to reach out to radioisotope providers directly to do the procurement directly. Proposers should refer to the PS, for exact language to address this question.

2Q: What is within bounds with regards to solutions to heat for estimating the W/kg metric?

2A: DARPA is allowing performers to creatively suggest ways to manage waste heat for the full-scale operational system and in order to estimate the W/kg specific power metric. For example, efficiency “topping cycles” that allow added ways to generate energy (besides radiovoltiacs) are allowed. However, performers will be competitively down-selected based on the performance of their radiovoltaic as it pertains to the radiovoltaic’s Figure of Merit (FOM) described in the PS at each down-select point, which is a value that is measured by the unit cell in experiments. In other words, even if a performer has met the 10 W/kg with creative assumptions on top of their radiovoltaic, if their radiovoltaic’s FOM is lower than another performers’, then they will not “win” the competition to move onto the next phase.

1Q: Can you elaborate on why the example list of candidate advanced materials was presented; does it refer to a broad class in a more general sense or specific way to harnessing energy?

1A: The examples which listed out candidate advanced materials depict possible, encouraging ideas for charge-carrying, radiation-tolerant solutions that haven’t necessarily been applied in radiovoltaics before. The example list of materials is not meant to be exclusive or comprehensive but provide some suggestions to give a sense of the breadth of possible materials of interest to direct energy conversion.