

HR001125S0004
Quantum Sensing of Neutrinos (QuSeN)
Frequently Asked Questions (FAQs)
As of 12/20/24

Q20: Should FFRDCs and UARCs prepare proposals for the January 23, 2025, deadline?

A20: FFRDCs and UARCs should not prepare proposals for the January 23, 2025, deadline. Proposers from universities and companies will submit proposals by January 23, 2025. In their proposals, proposers can request specific capabilities needed from FFRDCs and UARCs to ensure the success of their proposed effort (not including detailed cost for FFRDC capabilities). DARPA will review the proposals and evaluate how the requested support can be best met by the government team comprised of FFRDCs and UARCs. DARPA will then reach out to FFRDCs and UARCs to request SOWs/Budgets for selected support that has been requested by proposers in proposals that are under consideration for funding.

-----↑↑↑New Q/A↑↑↑-----

Q19: Should proposers include costs for FFRDC support in their proposals if FFRDC support is needed?

A19: Proposers should not include cost proposals for FFRDCs in their proposals. However, if the success of their proposal depends on FFRDC participation this should be indicated along with a rough order of magnitude cost estimate and the specific support needed in the proposer's technical proposal.

Q18: Are National Labs/FFRDCs/UARCs eligible as performers?

A18: National Labs/FFRDCs/UARCs can be part of the government team. National Labs/FFRDCs/UARCs should not be part of proposals as primes or subs. National Labs/FFRDCs/UARCs can propose to provide unique capabilities that they can make available to the QuSeN performers. This can be proposed in a white paper submitted to the QuSeN Program Manager (PM) by Nov. 25 and following the format of the abstracts under this BAA.

In their abstracts, proposers (not National Labs/FFRDCs/UARCs) can request DARPA separately procure program support resources from National Labs/FFRDCs/UARCs, including, but not limited to, access to neutrino sources, low background laboratories, background and noise mitigation technologies, cryo-technology, readout electronics, and data processing capabilities (see Amendment 1 of the BAA).

Q17: How should national labs (e.g., DOE, NIST) interact with the QuSeN program? Can they be part of a QuSeN proposal? Should they write separate complementary write papers that will be funded separately? If the latter, how closely should these white papers be integrated into a specific QuSeN proposal?

A17: See A18.

Q16: What is the application procedure if an FFRDC is the lead institution for a proposal? What is the application procedure if an FFRDC is not the lead institution but is a proposed subrecipient for a proposal?

A16: See A18.

Q15: Are there any general funding guidelines for a proposal call such as this one? Is there an expectation for the range of funds to be made available?

A15: See BAA, P. 2. (“Anticipated individual awards - Multiple awards are anticipated, ranging from \$1M to \$5M per award when justified by the proposed resources needed to meet the program goals and metrics. The period of performance is anticipated to be 30 months”).

Q14: What is the expected size of the QuSeN Program (in \$\$\$) per year? What are the rough expectations about award size and the total number of expected awards?

A14: See A15.

Q13: On the technical matrix, is “Mass (with neutron number, $N > 40$)” a hard requirement?

A13: Yes. Due to the cross section scaling in CENNS as N^2 . If a lower neutron number absorber is proposed, then it has to be shown how equivalent neutrino detector performance efficiency can be reached with a lower neutron number absorber.

Q12: The BAA states specific goals/metrics (e.g. < 0.5 eV threshold). Are these to be reached in the “phase 1 / 30 month” funding period, or is the goal for this period to show progress towards achieving these goals?

A12: Yes, these are to be reached within the 30-month initial period of performance. Metrics reached and progress towards metrics will be reviewed towards the end of the 30-month period of performance for consideration of a potential follow-up program.

Q11: The target metrics presented include a mix of CEvNS-specific goals (absorber mass, CEvNS signal-to-noise) and sensor-development goals (0.5 eV threshold, use of quantum sensors). What is the relative weight of these goals when evaluating proposals?

A11: Proposals will be evaluated towards their ability to reach all metrics, based on the criteria specified in the BAA.

Q10: Could the proposal team be more specific about what aspects of detector design/modeling will be encompassed in Preliminary and Critical Design Reviews, especially as the initial phase of the program does not necessarily target neutrino sensing?

A10: The preliminary and critical design reviews have the purpose of evaluating progress towards meeting QuSeN metrics for the initial 30-month period of performance.

Q9: Signal to noise (SNR) is usually determined assuming some source strength, distance to the reactor, and some reasonable overburden. What are you assuming that led to the $SNR \sim 1$ criteria?

A9: An $SNR > 1$ is a metric that supports the QuSeN program goal of developing sensitive and efficient detectors for neutrinos from nuclear activities that extend capabilities well beyond currently available capabilities.

Q8: The “heat only” background appears to plague all current recoil experiments to date, and its source is not known (though theories abound). To what degree do these proposals need to address this background?

A8: Proposals should address the background and noise sources and approaches to mitigate these as they pertain to the specific neutrino sensing approach in the proposal.

Q7: For the proposals, do you want groups to propose, “I plan to solve problem X, which in combination with other components, will meet all the criteria” Or do you want groups to propose, “I will propose to build Z, which meets all criteria (and is in effect a functional experiment)”?

A7: Proposals will be evaluated with respect to their ability to meet the QuSeN metrics in Table 1 of the BAA.

Q6: Will the technology developed need to be “deployable” at the end of the 30-month cycle?

A6: From the BAA: “Demonstrating neutrino detection is highly desirable but is not a mandatory performance goal within the initial 30-month period of performance.”

Deployment for neutrino detection outside of laboratory environments is not required in the 30-month period of performance.

Q5: Can a principal investigator (PI) be paid to work abroad for a period of time during the Program?

A5: Proposers will specify a work plan to reach the program metrics, and this can, in principle, include work abroad.

Q4: Are multi-PI proposals (from the same institution or different institutions) allowed/encouraged?

A4: Yes, they are allowed and optional. Proposals must address how the proposers’ and team’s capabilities enable the proposer(s) to reach the QuSeN metrics. From the BAA: “Given the challenges of the notional approach, integrated teams will be required from the outset of the program.”

Q3: Can a PI on a prime proposal also be a collaborator or sub-awardee on another proposal for the QuSeN Program?

A3: Yes.

Q2: Is collaboration with foreign participants/partners allowed?

A2: Yes, in principle. Approval of participation of foreign participants/partners will be required. This is an option that can be evaluated and there is no guarantee that it will be funded through the QuSeN program.

Q1: Should individual projects propose to develop low energy nuclear recoil calibration as part of their work program? If yes, is it okay if multiple proposals collaborate with the same group whose deliverable is low energy nuclear recoil calibration?

A1: Low energy nuclear recoil calibration is an important capability. This could be addressed in a collaboration of multiple proposers, and with the Government Team that

can include National Labs/FFRDCs/UARCs. This is an option that can be evaluated and there is no guarantee that it will be funded through the QuSeN program.