

ONR BAA 07-010

**Affordable Electronically Scanned Array Technology
for Next Generation Naval Platforms**

Questions & Answers 3/21/07

NOTE: Questions and Answers in this document are considered DRAFT. Final Versions will be posted on ONR BAA Website. Participants are strongly urged to refer to <http://www.onr.navy.mil/02/baa/> for any updates and amendments to this BAA.

QUESTION: Regarding the objective of 40% reduction of the life cycle cost, please clarify what is included. Is it restricted to acquisition and whole life support costs? Is (apportioned) development cost reduction for future systems also included? Also, are there examples of existing radar and EW systems that can be used as a cost basis?

ANSWER: In accordance with DoD Directive 5000.1 Series, DEFENSE ACQUISITION GUIDEBOOK states, "Defense system LCC is the total cost to the Government of acquisition and ownership of a system over its useful life. It includes the cost of development, acquisition, support, and disposal." Offerors should use best judgment to estimate existing Radar and EW systems costs and provide potential cost reductions and life cycle cost improvements based on their specific technology.

QUESTION: How will cost realism of the proposed research be analyzed?

ANSWER: In accordance with the DFAS, as stated in the BAA.

QUESTION: Are photonics, InP, SiGe, GaAs, GaN, HYBRID Approaches....., etc... specific technologies, architectures, etc... of any interest?

ANSWER: ONR is not specifying types of materials, components, architecture, etc. that must be used. However, proposals must address the overall objectives of the BAA.

QUESTION: How are Open Architecture (OA) and Modular Open Systems Approach (MOSA) considered in this BAA?

ANSWER: See OA and MOSA in section 6 of the BAA.

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QUESTION: Does ONR recommend teaming in this BAA?

ANSWER: Offerors may consider teaming, for example between system integrators and component manufacturers, where appropriate in response to this BAA.

QUESTION: Is there a possibility to hold classified meetings in order to discuss classified requirements and/or specifications for specific RADAR and EW systems?

ANSWER: No proprietary or classified meetings are expected at the Industry Day. ONR will determine if classified discussions will be appropriate during Oral Presentations for this BAA.

QUESTION: Is there a baseline for the number of simultaneous independent beams that the aperture must support or is that a variable the offerors must determine?

ANSWER: The BAA does not specify the number of beams. Offerors may consider actual number of transmit and receive beams per element or module in estimation of life cycle cost improvement calculations.

QUESTION: Can the Government provide a crude pie chart of costs so one can judge where the effort should be focused?

ANSWER: Estimated life cycle costs will likely depend on the architectural, component approach, and other factors. Offerors should use best judgment.

QUESTION: What are the production volumes needed for RADAR and EW systems?

ANSWER: Production volumes are not specified by ONR. ONR is not an acquisition command. Offerors may wish to consult with the acquisition community.

QUESTION: Will the integration cost be considered part of the interface definitions cost?

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ANSWER: Offerors should state any assumptions used in arriving at the cost reduction/life cycle improvement argument. It is the offeror's responsibility to clarify any assumptions in their proposed submissions.

QUESTION: Can the Government put a Concept of Operations onto the ONR website?

ANSWER: There are no plans to post the RADAR and EW CONOPS on the website.

QUESTION: How many awards does ONR plan for this BAA?

ANSWER: See Introduction and Section II of the BAA.

QUESTION: What type of signals need to be transmitted in each beam (single-tone, multi-tone, arbitrary band-limited)? What is the typical bandwidth and frequency range of the signal to be transmitted in each beam?

ANSWER: Signals (e.g., waveforms) to be transmitted (or received) include either radar or electronic warfare. Specific details of these waveforms are not included in this announcement. Offerors should use best judgment in assuming specifics of waveforms and state any fundamental limitations of their technical approach.

QUESTION: What is the output power required for each beam? What is the output power for all beams combined?

ANSWER: The power level of each beam and the combined power of all beams is not specified in this BAA. Offerors should use best judgment when considering radar and Electronic Warfare applications.

QUESTION: What is the typical number of elements in the output antenna array? Is there a preferred pattern in which the antenna elements are arranged (linear, 2D or 3D array)? Is there any constrain on the distance between adjacent antenna elements?

ANSWER: The typical (e.g. in many but not all cases) Naval DoD electronically scanned array (ESA) can range from 100's to 10K's of elements, and implemented in 2D architectures. All approaches must demonstrate that components fit within an array lattice over the intended frequency of operation.

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QUESTION: What are the typical spatial specifications of one beam, the angle range (in degrees) in which the desired beam needs to be steered, angular width of the desired beam and attenuation required at undesired angle values?

ANSWER: The typical spatial specifications, angle range (in degrees) in which the desired beam needs to be steered, angular width of the desired beam/attenuation required at undesired angle values are entirely up to the offeror. ONR does not intend to specify potentially limiting characteristics.

QUESTION: Will the Government entertain multiple proposals from a single contractor?

ANSWER: Yes.

QUESTION: What is the required speed for updating the beam angles?

QUESTION: What types of input signals will be used to the transmit system? Analog or Digital? Baseband digital or up-converted digital?

QUESTION: Does the system need to have an internal waveform generation capability (such as DDS) or an up-conversion capability (such as mixers)?

QUESTION: Is there a PAE or total power specification for the entire system? Is there a size limitation?

QUESTION: What frequency band(s) should be chosen for prototype demonstration? What should be the complexity of a breadboard prototype?

ANSWER: This answer applies to the above five questions. The Government does not intend to specify potentially limiting characteristics of Affordable Array Technology.

QUESTION: To support the Next Generation Navy applications, when do the proposed technologies need to be “production ready”?

ANSWER: ONR is specifying the TRL which would be achieved at the end of a successful program.

QUESTION: As to transmitters and the heat dissipation, what is the average cost (\$/watt) to remove dissipated heat?

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ANSWER: The ONR does not specify numbers relative to \$/watt.

QUESTION: To address the cost reduction associated with improved power efficiency of a technology, what is the average cost (\$/watt) of supplying electrical power (cabling, power sources, and associated environmental control) to a typical antenna array?

ANSWER: The ONR does not specify numbers relative to \$/watt.

QUESTION: To support consistent life cycle cost comparisons between offerors, will a hypothetical antenna array be specified along with:

- a. A baseline cost per transmit channel, especially the amplifier components;
- b. Number of transmit channels;
- c. Radiated power and efficiency per channel;
- d. Projected annual array purchase quantities in full rate production; and
- e. Expected operational life?

ANSWER: The Government plans to evaluate proposals in accordance with the evaluation criteria in the BAA as described in Section V- EVALUATION INFORMATION.

QUESTION: Is ONR looking for technology (S&T) at each “box” (area) for the S-band radar and X- band? Can we prepare subsystems especially in Phase 2 to prove our architectures?

ANSWER: Yes, provided that the technologies proposed address the requirements stated in the BAA. For example, offerors can demonstrate feasibility of component technologies in the Phase 1, and then demonstrate said can be integrated into the “chain” of the proposed relevant architecture in Phase 2. Proposals must clearly show how the component fits into the architecture.

QUESTION: Will classified requirements be available to potential offerors prior to the white paper submissions?

ANSWER: ONR does not plan to provide classified information under this BAA.

QUESTION: Will provisions be made for offerors to provide or present classified numbers?

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ANSWER: Offerors are urged to work at the unclassified level when possible. However, if details of requirements necessitate, classified addendums to white papers and proposals can be considered on a case-by-case basis. ONR will also consider holding Oral presentations at the classified level on a case-by-case basis. If offerors must submit a classified addendum for a white paper or proposal, they must first contact Mr. John McConnell (telephone: 202-404-1941, email: john.mcconnell@nrl.navy.mil). Instructions will be given for sending classified information to the following address:

Outer Envelope:
Commanding Officer
Naval Research Laboratory
Attn: Registered Mail Section
4555 Overlook Ave. S.W.
Washington DC 20375

Inner Envelope:
Commanding Officer
Naval Research Laboratory
Attn: J. McConnell (Code 5327)
Bldg. 42, Rm 111
4555 Overlook Ave. S.W.
Washington DC 20375-5336

QUESTION: Must the Phase 1 (Base portion of a potential contract addressing component technologies) be restricted to one year?

ANSWER: No. Offerors may use best judgment in formulating a research plan and corresponding timeline that achieves both the Base (Phase 1) and the Options (Phase 2) objectives over the length of the proposed contract. The contract cannot exceed 5 years. The preferred period of performance is between 3 and 5 years. Normally, ONR funds contracts in 1 year increments constant with the Government's fiscal cycle.

QUESTION: How many simultaneous beams are required?

ANSWER: This BAA will not explicitly specify the number of beams needed for a given aperture, however the following guidance is provided. Multiple simultaneous beams are of interested where it makes best sense to combine functions into a common aperture. Offerors addressing multiple simultaneous beams may consider two factors which are of interest to the Government:

1) Offerors must show how the proposed research provides an advancement in the state of art; and,

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2) offerors should consider where the best business case can be made by combining multiple functions into a shared aperture.

QUESTION: [given that life cycle costs (LCC) include the cost of development, acquisition, support, and disposal] How should offerors prioritize savings in LCC?

ANSWER: Offerors are urged to address overall LCC. In the case where an offeror can identify a near term planned acquisition system that could benefit from the proposed technology and the benefit clearly addresses acquisition cost reduction, then it may be considered and proposed as such. In such cases technical approaches must not result in impediments to achieving overall life LCC (for example by reduced reliability and increased support costs).

QUESTION: Can offerors consider “common” components and technologies that are intended for both shipboard and airborne applications? Would this also be considered for electronic warfare (EW) and radar?

ANSWER: Yes. A component or technology that can be used in both shipboard and airborne applications may be considered where it makes best sense. For example, a common use component that can be used in both applications may offer “economy of scale” life cycle cost reductions. A word of caution in making such claims is that offerors must also be aware of any performance drivers unique to each requirement that would invalidate said claims. A similar argument can be applied to common radar and EW applications, however it is also noted that overall system performance requirements may be very different.

QUESTION: May offerors discuss system requirements with other Government agencies outside of ONR (for example, the “Navy Acquisition community”)?

ANSWER: Yes. Offerors are encouraged to discuss future Navy system needs and requirements with the “Navy Acquisition Community” where it makes best technical and business sense. All specific questions pertaining to this BAA must be directed to the technical (Dr. Dan Purdy, Program Manager) or business (Ms. Carol Brown, Contracting Officer) point of contact as stated in the announcement.

QUESTION: What level of risk is appropriate? Will ONR consider only low risk approaches?

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ANSWER: The overall planned program is not intended to be entirely “low risk”, but is rather geared toward mitigating risk in future electronics technologies. ONR will seriously consider levels of risk that exceed “low risk” provided that the risks are clearly identified, the technical approach provides a clear path to mitigating said risks, and the payoff from a successful research program is appropriately high for the given level of risk. In this sense offerors need not be restricted solely to “lowest risk” approaches but should also consider innovation and potential for high payoff.

QUESTION: Will all presentations and material from the Industry day be made available?

ANSWER: Several of the Industry Day presentations contain material which are not yet approved for public release and therefore can not be openly published. ONR is currently assessing if any these can be released and will be posted accordingly.