

## IARPA-BAA-15-12

RAVEN BAA Questions 1 through 8:

**Q1:** Does the Combined Synopsis/Solicitation under solicitation number IARPABAA1512 contain requirements similar to a current contract? If possible, please provide the current contract number. Or, is this a new requirement for the government?

**A1:** This is a new requirement. See BAA Section 1: Funding Opportunity Description for more details.

**Q2:** The BAA in Section 1.C, page 8, talks about proving the imaging techniques for integrated circuits (ICs) on sample ICs provided by IARPA for all program phases. Will it be possible to clarify further what these IARPA-provided sample ICs will contain? Possibilities range from providing the physical IC samples in dies only, and/or providing additional information such as the fabrication foundry of origin with the technology node used in the fabrication (which determines the PDKs used), providing the EDA/CAD files, providing the functionality and type of these ICs (e.g., digital, analog/mixed-signals, microprocessors, controllers, DSPs, etc.), etc. Could you please provide us with some appropriate clarification?

**A2:** BAA Table 1: RAVEN Technical Objectives and Metrics on page 8 specifies that the Test Articles are bare die  $\geq 14$  nm feature size for Phase 1, bare die, 10nm feature size for Phase 2 and bare die, 10nm feature size for Phase 3. The feature size of the Phase 1 Test Article will be identified when the articles are delivered.

**Q3:** The BAA instructions indicate that the “three chart summary of the proposal” should appear both in the Summary of the Proposal section (Volume 1, Section 2G) and as an attachment (Volume 1, Section 4, Attachment 8). Do you want the “three chart summary” to appear in both places, and does it count as 3 out of the 10 pages allocated to Section 2?

**A3:** Yes, it should appear in both places per the instructions in Section 4.B Proposal Content Specifics on page 17, Section 4.B.1.2 Section 2: Summary of Proposal, Item G on page 19, and Section 4.B.1.4 Section 4: Attachments on page 24. Item G also states that the three chart summary “does not count against the page limit.”

**Q4:** The BAA instructions state that if we propose to use a Government X-Ray Beam Facility, that we should estimate the costs associated with using this Capability. Should we also include that cost in our budget, or will it be furnished by a separate mechanism?

**A4:** As discussed in Section 1.E. Assistance from other Government Agencies (OGAs), Federally Funded Research and Development Centers (FFRDCs), and University

Affiliated Research Centers (UARCs) on page 12, Offerors should include in their proposals “the estimated costs associated with the use of the Capability.” Those Capabilities IARPA deems necessary to meet RAVEN program goals will be provided as Government Furnished Equipment / Property / Information. Section 4.B.2 Volume 2: Cost Proposal notes that Section 2: Estimated Cost Breakdown must include “(8) Identification of pricing assumptions which may require incorporation into the resulting award instrument (e.g., use of Government Furnished Property/Facilities/Information, access to Government Subject Matter Experts, etc.)” on page 25. This is where the estimated costs for the use of the Capability should be addressed. They should not be included in your Appendix E & F Cost Element Sheet breakdowns and Total Price/Cost since the intent would be to provide these Capabilities as Government Furnished Equipment / Property / Information, if appropriate and available and deemed necessary for RAVEN program goals.

**Q5:** The BAA states that “Features to be imaged include metal, polysilicon, vias, contacts, STI regions, and dielectrics.” The Proposers’ Day Briefing, Slide #22, suggests that earlier x-ray systems were considered to have successfully imaged non-metallic features by inferring their presence from the absence of metal (in the context of known circuit design rules). In the RAVEN program, can a proposal be competitive if it similarly images only the metal features directly, and infers the other features from the absence of metal, or are competitive solutions expected to image all of the features directly?

**A5:** As noted in the BAA in section 1.A.2 RAVEN Research Challenges, there are four major areas for the tool development: rapid acquisition of images from a bare die, real-time image analysis with in-situ feedback, innovative algorithms for reconstructing the images for each layer and the overall device, and computational resources necessary for the petabyte size data files. A successful tool will provide a finished, compiled layer and device images showing the metal, polysilicon, vias, contacts, STI regions, dielectrics and, ideally, the n- and p-wells. How that is accomplished and the division of work between the hardware and software is determined by the offeror. The offeror must provide a credible description of the approach and the rationale for why it can be successful in the technical volume of the proposal.

**Q6:** The BAA strongly implies, but nowhere explicitly states, that the primary goal of the tools developed in each Phase should be to demonstrate the ability to fully reconstruct a circuit, either by successfully doing so on a full 1 cm X 1 cm test article, or perhaps more reasonably by doing so on a portion of a test article and extrapolating the time required to complete the full area. On the other hand, the BAA does explicitly state (page 7): “The goals of this phase [Phase 2] are to optimize the performance of the proposed tool and demonstrate the tool in an analysis of a 10 nm test chip, **for either circuit design debug or failure analysis.** [emphasis added] This may involve the application/integration of multiple circuit analysis techniques.” This statement appears to suggest that performers need to propose, develop and demonstrate an application of their choosing other than reconstruction of an unknown circuit or verification of a circuit. Please clarify if reconstruction/verification of a circuit is a suitable application to

demonstrate the tool. Please also clarify if a partial analysis is an acceptable demonstration of success, if the time required is extrapolated to the full circuit.

**A6:** As stated in the BAA, the RAVEN program is focused on developing a tool capable of imaging minimum size circuit features on a silicon integrated circuit chip and reconstructing the images for each layer and the overall device. The capability of the tool will be tested at the end of each phase using test articles provided by IARPA. The targeted feature size and the time metric for each phase is shown in Table 1: RAVEN Technical Objectives and Metrics on page 8.

**Q7:** For the laboratory platform to be developed in Phase 1, would it be acceptable to propose a tool that can image a single field of view, but does not have the capability to step across the entire sample? The rationale is that moving the sample with the required precision does not pose any fundamental challenges and is low risk, but expensive to implement. We would prefer to defer this activity to Phase 2 to focus on proving the innovative and higher risk technologies in Phase 1. Throughput performance can be readily extrapolated.

**A7:** The laboratory platform developed in Phase 1 must have the ability to step across the entire sample in a repeatable manner.

**Q8:** For the Phase 2/3 tools, we expect to use a synchrotron source to achieve the throughput goals. In Phase 1, would it be acceptable to propose to use a laboratory source, even if the laboratory source does not achieve the 80 hour time metric, provided that we could clearly show that if the Phase 1 laboratory platform had the benefit of the synchrotron source, it would meet the Phase 1 time metric? The rationale is that characteristics of the synchrotron are well known, and we can establish feasibility more easily and cost effectively with an off-the-shelf laboratory source.

**A8:** Please note that the time metric for Phase 1 is 80 days, not 80 hours. The laboratory source-based system still needs to meet the 80 day metric.