

Questions & Answers – Ithildin IARPA-BAA-17-04

Responses to Questions #12 to #37 (Final Round)

Q12: p7-8: There is mention of ‘specified time’ several times in the sorbent taxonomy section. Will the ‘specified time’ be determined later by IARPA or is it a self-determined metric?

A12: In the sorbent taxonomy section the phrase “specified time” refers to a generalized time interval and is used as part of the definition of the capture and retention parameters. The only Ithildin thrust area which has program-level metrics associated with a Government-specified time interval is the Temporal Fidelity thrust area, which requires >90% of sorbent active within 2 minutes after trigger and <5% of sorbent still active 12 minutes after trigger for the Fast Temporal Characteristics sub-thrust, or >90% of sorbent active within 1 hour after trigger and <5% of sorbent still active 6 hours after trigger for the Slow Temporal Characteristics sub-thrust (p. 17).

Q13: p10: Is an electrical current / stimulus allowed to trigger the Temporal Fidelity so long as it is not required to perform the adsorption / retention?

A13: Yes, electrical current / stimulus is an allowed physical mechanism to trigger the start of the Temporal Fidelity event, as long as no form of electrical current or stimulus is required to adsorb or retain chemicals. See Ithildin BAA section 1.A.3: “However, approaches which require power input of any sort (direct, inductive, or scavenged) to the sorbent or its mesoscale packaging in order to execute the sorption and retention process are non-responsive.” And also see Ithildin BAA subsection 1.A.4.3: “Responsive solutions to this [Temporal Fidelity] thrust area will address innovative ways to trigger the start of sorption, including, but not limited to, mechanical action or friction; exposure to target or non-target chemicals; ultraviolet, visible, or infrared light exposure; magnetic or electric field exposure; or elapsed time from a given trigger event such as water, light, or trigger reagent exposure.”

Q14: p17: There is mention of C4-C14 capture, but rejection of C2-C8. Is there an overlap to be clarified or is the emphasis on the ‘aliphatic’ aspect of the C2-C8 hydrocarbons?

A14: C4-C14 capture indicates a broad desire for responsive sorbents to collect chemicals with 4-14 carbon atoms in their backbone, but also with a broad range of structures (linear, ring, aromatic, saturated, unsaturated) and a variety of ancillary functional groups (alcohols, amines, ketones, etc.). Rejection of C2-C8 hydrocarbons is specific to hydrocarbons (saturated, unsaturated, or aromatic). Where there is overlap between the sorption and rejection classes, sorption of C4-C8 hydrocarbons would not be counted “against” the broad spectrum capability of a material proposed to both the Selective Sorption and Clutter Rejection thrust areas.

Q15: p18: in table 4, the participants need to be ready for Gov't benchmark test at month 15. On page 19, paragraphs 1.B.4 and 1.B.5, the testing is mentioned at M14. Which month will it be?

A15: Government benchmark testing will occur at month 14. The month 15 reference in Table 4 is a typographical error, and will be corrected in an amendment to the Ithildin BAA.

Q16: p18: What is envisioned for the Gov't Interaction Day during which Ithildin will be showcased? Will the demonstration be performed in a lab or in a hotel / conference center? Will it be a live demo or a video demo? More specifically, how will the safety considerations be addressed?

A16: The Ithildin Government Interaction Day will take place in a hotel/conference center setting. The overall purpose of the Government Interaction Day is to showcase technical capabilities developed in the Ithildin program to a variety of potentially interested Government transition partners. The precise agenda for the Government Interaction Day is still under development, but it is anticipated that there will be a combination of short, "lightening round" style non-proprietary talks to introduce concepts, "deep-dive" proprietary talks to present technical details, and a poster/demonstration session. Demonstrations will focus on the form factor and appearance of the sorbent, with performance data presented in poster or video format. No live chemical releases will take place at the Government Interaction Day.

Q17: Page 19 of BAA, Section 1.B.5, states "In month 17 performers ...will provide 5 grams of one sample type, and 1 gram of the remaining sample types". Is this for the government independent testing only?

A17: The material provided in the Month 17 deliverable will be used both for Government independent testing, and for additional testing that may be requested by interested mission partners.

Q18: How much material is required for testing on Month 14? Month 17? And how much for Month 15, Government Interaction day?

A18: For Month 17 Final Exam testing, the material needed will be taken from the Month 17 deliverable of 5 g for a single mature prototype, and 1 g for any additional mature prototypes. For Month 14 Benchmark testing a smaller amount of material will be needed. This amount will be determined by the Test and Evaluation team as they finalize the testing protocol after contract award, in coordination with the Ithildin performers. No material is needed for the Month 15 Government Interaction Day.

Q19: Page 15 of BAA: Could you clarify the "Metrics and Milestones for All Thrust Areas" such as 1 L/min N2 flow... how long would material be exposed to this requirement?

A19: Each of the "Metrics and Milestones for All Thrust Areas" are independent parameters, and will be tested accordingly. Specific test protocol to measure Ithildin sorbents against these metrics will be developed by the Ithildin Test & Evaluation team after contract award, and in consultation with

awarded performers, in order to develop a test suite that fairly assesses the diverse approaches funded by the program. Where possible and available, standard test procedures from commercial industry and/or peer reviewed literature will be used. For purposes of proposing to the Ithildin BAA, assume exposure to 1 L/min N2 flow for 20 minutes or less. The precise exposure time for Ithildin system testing of this requirement will be determined when the Test & Evaluation team develops detailed test protocol for the Benchmark and Final Exam testing.

Q20: Page 10 of BAA, Paragraph 2, states “three mature prototypes.” Please clarify how IARPA is counting these materials as three mature prototypes. If one material meets multiple thrust areas, does it still count as one mature prototype?

A20: A mature prototype is counted as one sorbent material type (which may be a heterogeneous structure) capable of carrying out the functions that pertain to one or more Ithildin Thrust areas. A single mature prototype could be responsive to one, two, three, or four thrust areas. In order to count as additional mature prototypes, alternative sorbent systems must employ different mechanisms of action in one or more thrust area categories. So, for example, a sorbent which triggered for both fast temporal fidelity and remote indication in response to absorption of a particular target would be a single mature prototype. However, a sorbent that triggered for fast temporal fidelity in response to light, and remote indication in response to absorption of the same target as the previous example would be a separate mature prototype.

Q21: Has a contractor performed similar work to this for the government in the past? If available, please provide the incumbent contract number. If you are unable to provide a contract number, is it safe to assume this is a new requirement for the government?

A21: The Ithildin program is a new effort at IARPA, not a follow-on to any previous IARPA program or effort.

Q22: The BAA mentions (pg 16-17) that the Broad Sorption Capability should have a metric of "Capture efficiency from C4-C14 within 25% of average broad-spectrum capture rate".

- Can you help us by providing the value of the average broad-spectrum capture rate? Do you have a reference document that you used for this purpose?
- Alternatively, if we have misunderstood the statement, are you talking about the allowable variation (divergence) in the capture rate for a given broad-spectrum sorbent for a given species, not to exceed more than 25% from the measured average capture rate for the newly developed sorbent (under this project)?

A22: The metric of “capture efficiency from C4-C14 within 25% of the average broad-spectrum capture rate” refers to the allowable variation in the capture rate for a given broad-spectrum sorbent for a given species, which is not to exceed more than 25% from the measured average capture rate for the newly developed sorbent. This metric is intrinsically self-referenced to the newly developed material, and therefore is not dependent on, or derived from, any reference documents.

Q23: Is the sorbent expected to operate only in standard atmosphere, or could it be designed to work in aqueous environments?

A23: All proposed sorbents must be able to operate in standard atmosphere. The additional capability to work in aqueous environments would be desirable, but must not come at the expense of the capability to work in standard atmosphere.

Q24: A metric of minimum adsorption capacity of 10% w/w of sorbent is given. Is it responsive to propose materials with high densities but propose an alternative specification (e.g., normalize to a density of 1 g/cm³ or use 10% w/v)?

A24: For high density materials an alternative specification for the minimum adsorption capability of 10% w/v is acceptable.

Q25: BAA Section: Temporal Fidelity Thrust Area (BAA Reference: 1.A.4.3). Can the trigger activate/deactivate certain collection capabilities of the sorbent material, or must it (or is it desired to) activate/deactivate all collection capabilities?

A25: Approaches to the Temporal Fidelity Thrust Area where the trigger activates/deactivates all collection capabilities, or where the trigger activates/deactivates only certain collection capabilities are both desirable.

Q26: BAA Section: Waypoints (BAA Reference: 1.B.3. Paragraph 2/1.D.1). The BAA states, "Offerors shall plan to send no more than 2-3 key personnel to the WMA review meetings." However, Section 1.D.1 (last sentence) states, "Program participants should expect to send no more than 3-4 key technical personnel to the WMA meetings." Please clarify the number of personnel expected to attend the WMA meetings.

A26: Offerors should plan to send no more than 3-4 key technical personnel to the WMA meetings. The inconsistency will be corrected in a BAA amendment.

Q27: BAA Section: Meeting and Travel Requirements (BAA Reference: 1.D Bullets 3 and 4). Are we to assume that the test facilities (Naval Research Laboratory and Edgewood Chemical Biological Center) will have the necessary sensors or instrumentation for remote sensor indication? Or will the contractor have to provide sensors for the Benchmark and Final Milestone Testing events?

A27: Due to the expected diversity of approaches for the Remote Indicators thrust area, the test facilities cannot commit to providing all needed sensors or instrumentation for remote sensor indication. Offerors should plan to provide sensors for both the Benchmark and Final Milestone testing events consistent with a field implementation of their proposed approach. The government team will utilize additional ground truth sensors as appropriate to augment the testing. Specific test

protocol will be developed by the Ithildin Test & Evaluation team after contract award, and in consultation with awarded performers, in order to develop a test suite that fairly assesses the diverse approaches funded by the program.

Q28: BAA Section: Ithildin Programmatic Milestones and Metrics (BAA Reference: Table 3/1.B.5). Per Table 3 Metrics and Milestones for All Thrust Areas, the form factor of the sorbent must be powder and an additional form factor of the offeror's choosing. In the deliverables for the final test and evaluation in month 17, the performer is to provide a 5 g sample of the sorbent material (Section 1.B.5). How many grams of the sorbent in powder and the other form factor is to be delivered?

A28: The bulk of the material performance testing will be carried out on powder form samples. For performers proposing a single mature prototype the 5 g deliverable should be split into 4 g of powder format sample, and 1 g of the additional form factor. For performers proposing multiple mature prototypes, there should be one material with a 5 g deliverable, split into 4 g of powder format and 1 g of the additional form factor, as well as 1 g deliverables in powder format only of the other mature prototypes. These additional specifications will be addressed in a BAA Amendment.

Q29: BAA Section: Ithildin Programmatic Milestones and Metrics (BAA Reference: Table 3).

Per Table 3 Metrics and Milestones for All Thrust Areas, the sorbate retention requirement is:

<10% mass loss under exposure to:

- 1 liter per minute N2 flow
- 90% relative humidity
- 72 h ambient exposure
- 100 Torr vacuum

(A) Are we to assume that these exposures are independent to each other? (B) As the total mass lost under exposure to 1 L/min N2 flow is likely to be a function of exposure time, what exposure time are we to assume?

A29: A) The exposure requirements for sorbent retention are independent parameters, and will be tested accordingly. Specific test protocol to measure Ithildin sorbents against these metrics will be developed by the Ithildin Test & Evaluation team after contract award, and in consultation with awarded performers, in order to develop a test suite that fairly assesses the diverse approaches funded by the program. Where possible and available, standard test procedures from commercial industry and/or peer reviewed literature will be used. B) For purposes of proposing to the Ithildin BAA, assume exposure to 1 L/min N2 flow of 20 minutes or less. The precise exposure time for Ithildin system testing will be determined when the Test & Evaluation team develops detailed test protocol for the Benchmark and Final Exam testing.

Q30: Paragraph Reference 1.B: This section states: "The following are examples of topics that are considered to be out of scope for this program:

- Commercial off-the-shelf technology or other off-the-shelf tools that require a proprietary system architecture.
- Commercialization and/or commercialization plan development technology.
- Dual Use Research of Concern (DURC)”.

Would the Government consider a total system that is not a COTS product, but that contains a COTS software module component, to be out of scope?

A30: The topics mentioned above as Paragraph Reference 1:B from the Ithildin BAA do not actually appear in that paragraph, or in any other location in the Ithildin BAA. Section 1.A.6 does list a number of research areas that are out of scope for the Ithildin BAA, but these out of scope topics do not address proprietary system architecture, commercialization plan development technology, or dual use research of concern items. Overall, the goal of the Ithildin program is to develop passive sorbent technology with enhanced capabilities at the molecular, nanoscale, and mesoscale level, independent of the sampler design. As such, the Ithildin materials should not contain software module components, COTS or otherwise. It is expected that responses to the Remote Indicators and Temporal Fidelity thrust areas may involve powered sensors and other powered or mechanical analysis equipment are allowed to both detect the Remote Indicators signature(s), and to perform sample preparation and analysis of the sorbed compounds. It is expected that these ancillary systems would be COTS, or near COTS, and there are no restrictions for this ancillary equipment on the proprietary or non-proprietary nature of their software.

Q31: Paragraph Reference 1.C: In Thrust 1, Ease of Implementation discusses restrictions on working space for computing infrastructure. Is it the intention of the Government to allow offerors to have 1TB of space for delivered databases and code, but take up to 10TB of space with intermediate/temporary files during the actual run time?

A31: Paragraph 1.C of the Ithildin BAA discusses the program timeline and deliverables, and does not place any restrictions on computing infrastructure. Overall, the goal of the Ithildin program is to develop passive sorbent technology with enhanced capabilities at the molecular, nanoscale, and mesoscale level, independent of the sampler design. No computer architecture, databases, or code should be part of the Ithildin sorbent materials. It is expected that responses to the Remote Indicators and Temporal Fidelity thrust areas may involve powered sensors and other powered or mechanical analysis equipment are allowed to both detect the Remote Indicators signature(s), and to perform sample preparation and analysis of the sorbed compounds. This ancillary detection and analysis equipment may have processing architecture and/or database functionality, but no specific restrictions are placed on storage space. It is expected that these ancillary systems would be COTS, or near COTS.

Q32: Paragraph Reference 4.B.1.c.A: The requirement to present the Statement of Work (SOW) and a Gantt chart for all activities proposed in a multi-phase program may require a significant number of pages. Would the Government consider allowing offerors to present only the first phase of the program in detail in the SOW/Gantt chart?

A32: Ithildin is a single-phase program, so presenting a detailed Gantt chart for the effort in the pages allotted for the SOW should not be a problem.

Q33: Paragraph Reference 4.B.2.c: This paragraph states: "If subcontractors have concerns about proprietary cost information, subcontractors can submit their detailed cost proposals directly to the Contracting Officer." What e-mail address should subcontractors use to submit proprietary cost details?

A33: Contractors selected for negotiations/award will be contacted by the Contracting Officer and their subcontractors will be contacted separately for any proprietary cost information necessary for government audit.

Q34: Technical Question: Does the government have the following GFE equipment that can be accessed? 1) Access to a PXRD (Powder X-ray Diffraction) machine; 2) Access to a NanoSight NS500 machine.

A34: IARPA will not provide Ithildin performers with access to a Powder X-ray diffraction machine or NanoSight NS500 machine. Access to such equipment, if needed, should be included in the offerors proposal through commercial access channels.

Q35: Cloud Compatibility Question: If an offeror has a public cloud that the government can access. Would this be sufficient for the Cloud Compatibility requirement? It is a commercial off the shelf environment.

A35: The Cloud Compatibility Requirement in section 6.B.13 of the Ithildin BAA does not require the offeror to provide Government access to cloud resources, but rather specifies that any software deliverables in the program must be capable of being deployed in a cloud environment for testing and production use. This is a general requirement of all IARPA efforts. Since the Ithildin program is primarily a hardware development effort, most potential approaches will not have software deliverables, and therefore the requirement for cloud compatibility would not apply. If an offeror's specific proposed approach would result in a software deliverable, then this deliverable must be compatible with deployment in a cloud platform.

Q36: Evaluation Question: Please elaborate more on adjectival and numerical rating methodology?

A36: In accordance with the evaluation criteria; proposals will be evaluated and assigned an adjectival rating (ex. Good), and an overall numerical score associated with the rating will be calculated.

Q37: Cost Question: Use of Government furnished Property. Will the government provide any "Other Price Assumptions" if we can use the GFE Equipment?

A37: There are no plans to provide GFE or other price assumptions under this program.