HR001126S0013 Multi Modal Materials Analysis (MMoMA)
Frequently Asked Questions (FAQs)
as of July 1, 2026

53Q: What is the definition of a "single source" within the context of this program?

53A: Single source is defined on P. 4: "**Excitation source**: A configurable and continuously tunable source of photons (lasers), electrons, ions (particle accelerators) for generation of signatures in materials analysis. Currently available excitation sources can be adapted but the development of novel, unproven classes of excitation sources (TRL<4) is out of scope.

52Q: What level of experimental validation is expected during Phase 1?

52A: See the BAA, P. 7 for Phase 1 goals.

51Q: What are the expected requirements for multimodal data acquisition and processing time? Is the target timescale on the order of minutes or hours?

51A: See table 1 of the BAA (<5 h demonstration goal in Phase 2).

50Q: Since each sensing modality typically requires a dedicated detector, would it be acceptable to integrate multiple detector modules into a single detector assembly or instrument package?

50A: Yes.

49Q: Is the use of an industry partner as a subcontractor permitted under this effort?

49A: Yes.

48Q: Are solutions that include both an optical and high-energy sources in scope?

48A: Yes.

47Q: Do solutions need to provide characterization of novel material families or types? Or are there particular material families or types (e.g., raw vs manufactured) of interest?

47A: A broad range of materials are of interest, ideally all kinds, universal (solids and liquids; gases not mandatory)

46Q: Are destructive sampling techniques within scope?

46A: No.

----------⬆⬆⬆New Q/A⬆⬆⬆----------

45Q: Can FFRDCs, UARCs, and/or Government Entities/National Labs propose to this effort?

45A: These entities can propose to the BAA and must follow the guidelines provided in Section IV: Special Considerations.

44Q: Does the Fundamental Defense Research Talent Award (FDRTA) Option listed in the BAA available only to University Primes only or both University Primes and Subs?

44A: FDRTA is limited to one award per University Prime proposer.

43Q: Is the intent that proposers use a single primary particle/radiation source, such as an accelerator-based neutron or photon source, for both surface and bulk signature generation? We would also appreciate clarification on whether the bulk-analysis requirement is intended to require direct determination of elemental composition, trace element content, and isotope ratios throughout the 10 cm steel-equivalent depth, or whether radiography is intended to satisfy the deep-penetration requirement while elemental, trace-element, and isotope measurements may be obtained through complementary surface/near-surface or selected bulk-sensitive modalities.

43A: Bulk analysis for elemental composition, trace elements and isotope information is required. Please see BAA P. 7.

42Q: Would a laser-driven or accelerator-driven converter target that produces X-rays, gamma rays, or neutrons still be considered consistent with the single-source architecture?

42A: Yes.

41Q: I am writing to request clarification regarding the interpretation of the “single configurable excitation source” requirement in the MMoMA solicitation. The solicitation states that the program seeks analytical capabilities that use a single configurable excitation source to generate and detect multiple surface and bulk material signatures in parallel under ambient conditions. It also identifies photons/lasers, electrons, and ions/particle accelerators as possible excitation sources. At the same time, the solicitation requires bulk analysis for elemental composition, trace element content, and isotope ratios in cm-scale and larger specimens to a depth roughly equivalent to 10 cm of steel, including a radiography option with energetic X-rays and/or neutrons. Our question concerns how these requirements should be interpreted for proposed laser-based approaches. Optical laser radiation can support several surface and near-surface modalities, including molecular spectroscopy, LIBS, laser ablation, and mass spectrometry. However, direct optical interrogation is not physically capable of probing cm-scale dense specimens to a 10 cm steel-equivalent depth for bulk elemental, trace-element, and isotope analysis. Such bulk interrogation would generally require penetrating radiation, such as neutrons, energetic X-rays, or gamma rays. Could you please clarify whether the “single configurable excitation source” requirement allows the primary source to generate secondary penetrating radiation for bulk interrogation?

41A: Yes, the “single configurable excitation source” requirement allows the primary source to generate secondary penetrating radiation for bulk interrogation.

40Q: The BAA states that "A sample (specimen) may be any material (organic, inorganic, special nuclear materials) in a solid or liquid state. Gaseous samples are optional." What does "optional" mean in this case?

40A: Optional means that the capability to analyze gaseous samples is not required but may be included as an additional capability within the proposed scope.

39Q: The Abstract Instructions permit us to link to up to three Technical Papers. Do these papers need to be peer-reviewed or published?

39A: No, they do not have to be peer-reviewed, but the pertinent information should be accessible.

38Q: Do viable proposals need to be materials-agnostic or is it ok to focus on one class of materials (e.g., metals, polymers, ceramics)?

38A: Approaches should be materials agnostic.

37Q: If bulk analysis is based on destructive techniques, how much volume needs to be sampled for 10cm depth?

37A: Destructive techniques for bulk analysis are not desirable. Non-destructive techniques are preferred.

36Q: How many proposals are expected to be awarded for Phase I? Phase II?

36A: Multiple awards are anticipated. Awards will be made to proposers whose proposals are determined to be the most advantageous to the Government, all evaluation factors considered.

35Q: Are there constraints on the number and size of the excitation sources?

35A: Yes. The vision of MMoMA is to work with one (tunable) excitation source (including potential secondary radiation derived from the primary, tunable excitation source).

34Q: To what extent is the material analysis intended to be completely automated vs. a user-in-the-loop process?

34A: Automated workflows are highly desired, and “a user-in-the-loop process” is fine, especially early during development.

33Q: What data resources does DARPA anticipate the government providing to enable AI/ML approaches to data fusion?

33A: Data including from published reports and databases, data from materials analysis with COTS techniques and simulated data, details TBD.

32Q: Are multi-institution proposal preferred? Are proposals that include commercial entities preferred?

32A: Proposers are encouraged to form teams that they think can best meet the requirements in the BAA.

31Q: Why is it required to measure samples in ambient conditions vs. in vacuum?

31A: The MMoMA vision is to conduct sample analysis under ambient conditions, not in vacuum. Materials analysis with samples in a vacuum chamber is out of scope.

30Q: Can you please tell us if you anticipate the information shared by DARPA to be subject to CUI restrictions?

30A: MMoMA is a fundamental research program, no CUI is expected.

29Q: Page7 of the BAA states that "Data shall include data from a series of detection modules, from signature analysis, and can include additional information from external data sources". Can you please provide examples of what constitutes "external data sources"? Can we assume that we

a priori information about the sample's weight or geometric dimensions is available, for example?

29A: “External data sources” can include sources of data that provide information on the sample prior to MMoMA analysis and information that is complementary to the required information on molecular structure, elemental composition, trace elements and isotopes.

28Q: If a potential proposer has strong capabilities in integrated architecture, synchronized molecular/elemental/isotopic measurements, interface/routing technologies, and multimodal data fusion, but does not currently have in-house expertise in FA3 bulk radiography or penetrating x-ray/neutron analysis, would DARPA recommend that the proposer identify a teaming partner with that expertise? If such a teaming partner is not identified by the abstract deadline, would the abstract be considered non-responsive, or may the abstract describe a credible teaming strategy to address FA3 during full proposal development?

28A: Yes, please consider teaming. Teaming arrangements can be fine-tuned by proposers after abstract feedback. But the prime performer of the proposed work cannot change after abstract submission. Having teaming in place that addresses all focus areas in the abstract is strongly encouraged.

27Q: If MMoMA’s goal is to maximize information extraction from a single sample and approach a “true digital copy” of the sample across molecular, elemental, trace-element, isotopic, surface, and bulk signatures, would architectures that couple the sample/excitation region to multiple state-of-the-art analyzers through integrated routing/interface technologies, synchronized acquisition to extend dynamic range and capture complementary chemical signatures, and data fusion be considered within scope, even if the analyzers themselves are existing instruments?

27A: Yes, and please see the BAA.

26Q: If a proposer has a related concept previously reviewed through a DARPA market-research or capability-assessment mechanism, such as ERIS, is there a preferred way to reference that prior submission in the abstract without including proprietary details?

26A: Please include information you deem relevant in your abstract.

25Q: Does DARPA expect one physical source to generate all required surface, bulk, molecular, elemental, trace-element, isotope, and radiographic signatures, or would a coordinated source/instrument architecture that produces synchronized multimodal data streams satisfy the single-source intent?

25A: Yes, one physical excitation source for excitation of surface and bulk signatures. A series of excitation conditions that generate a series of signatures can be derived from one tunable excitation source (e.g. secondary radiation is an option that is in scope).

24Q: The BAA identifies lasers as an example excitation source, while also requiring bulk characterization to a depth roughly equivalent to 10 cm in steel and a radiography option using penetrating radiation. For excitation sources that are primarily suited to surface analysis, should proposers interpret the bulk/radiography requirement as requiring secondary penetrating radiation generated from the same excitation architecture, or may it be satisfied through an integrated and synchronized complementary capability?

24A: The MMoMA vision is to use one tunable excitation source for surface and bulk analysis. In one example, yes, deriving secondary radiation from a primary source is in scope.

23Q: Will the slides from Proposers Day be posted online?

23A: Yes, https://www.darpa.mil/research/programs/multi-modal-materials-analysis .

22Q: Does the MMoMA BAA include the development of sources to activate a sample? And my understanding is that the whole system should be field-deployable, hopefully portable, including the sources. Am I right?

22A: Yes.

21Q: We focus on the multimodal data fusion area. What is the best way to find partners for the other 3 focus areas and be part of the prime proposal? Any suggestions would be appreciated. We planned to reach out through attendee and lightning talks.

21A: Submitted teaming profiles will also be shared with registrants to the proposers' day.

20Q: The solicitation emphasizes that analyses must "be conducted under ambient conditions of pressure and temperature." Could an instrument responding to the call apply a field-deployable, open-ended enclosure (e.g., laser ablation cell) that would enable manipulation of the local pressure/gas flow surrounding the sample but without processing the sample itself?

20A: Yes.

19Q: For teams with prior DARPA-reviewed or ERIS-listed technologies relevant to multimodal analysis is there a preferred mechanism for bringing those capabilities to the attention of the PM or potential prime performers?

19A: No. Please submit an abstract following the guidelines in the BAA (Section II).

18Q: Tuning a single source to transition from surface analyses to bulk analysis will require independent calibration for quantitative analysis. A potential disconnect in the data product types provided by each analytical mode may result. For example, evaluating the isotopic composition of a larger aliquot of sample (cm-scale, like the steel example mentioned in the solicitation) may be inhibited a block of steel were simply "zapped" by a low- and high-energy particle beam in sequence. Would you consider techniques that could evaluate multiple dimensions of the physical sample, for example a nominal "surface" as well as a longitudinal orientation, to effectively construct a 3D profile of sample composition down to a depth equivalent to 10 cm in steel? This would allow all data product types (major, minor, trace elements, isotopic ratios, and molecular abundances) and performance metrics (ppmw detection limits, mass resolving power m/dm >1000, isotopic precision at the permil level) to be shared between surface and bulk analyses.

18A: Yes.

17Q: The program requires that instruments operate at ambient pressure on Earth, but space applications will likely require operation in vacuum. Is your vision to isolate the sample in space in a vacuum chamber and then fill the chamber with atmosphere to apply the same technology,

or are you looking for the development of a vacuum-compatible equivalent to the Earth-based instrument solution solicited here?

17A: MMoMA requires sample analysis under ambient conditions, i.e. in air and not in a vacuum chamber on Earth.

16Q: The solicitation requires that the instrument solution leverage "a single, configurable excitation source to generate multiple signatures." Is that same source meant to support the "approach for radiography with penetrating radiation" requirement?

16A: Yes.

15Q: Is it possible to be funded under a MIPR or G-Invoicing for FFRDCs?

15A: Yes, please see the BAA (Section IV).

14Q: Are the only possible Award types procurement contracts, cooperative agreements, or Other Transaction Agreements for Prototype?

14A: Yes, please see the BAA (Section II).

13Q: If I understand correctly FFRDC cannot be a prime on a proposal to MMoMA? Can an FFRDC be a subcontractor?

13A: Yes, FFRDCs can be subs. FFRDCs can also be primes. They need to clearly follow the instructions in the BAA (Section IV) and show they have unique capabilities not available elsewhere.

12Q: What is an OT and the rules?

12A: Please see the BAA for info on OTs and other contracting options (Section IV).

11Q: What are the important use cases?

11A: Use case examples include fraud detection and provenance (BAA P. 6, 7) and the Proposers Day slides (posted on the MMoMA website, https://www.darpa.mil/research/programs/multi-modal-materials-analysis).

10Q: The CMO presentation mentioned “prototype”, are we developing a prototype in MMoMA? A prototype is an operational instrument. Please define prototype.

10A: Under 10 U.S.C. § 4022(e)(5), the term “prototype project” is defined to include a project that addresses any of the following:
(A) A proof of concept, model, or process, including a business process.
(B) Reverse engineering to address obsolescence.
(C) A pilot or novel application of commercial technologies for defense purposes.
(D) Agile development activity.
(E) The creation, design, development, or demonstration of operational utility.
(F) Any combination of subparagraphs (A) through (E)

9Q: Can the DARPA program team provide any guidance as to a ceiling value for awards under the MMoMA program?

9A: The level of funding for individual awards made under this BAA will depend on the

quality of the proposals received and the availability of funds. Proposed costs should reflect the resources necessary to accomplish your proposed work.

8Q: Can the "single excitation" source use multiple probes of the sample (for example, neutrons and photons), or are teams restricted to use a single probe modality?

8A: Yes, the "single excitation" source can use “multiple probe modalities of the sample.”

7Q: Are you expecting us to develop an integrated feature-detection platform that can generate multimodal datasets, or to leverage existing individual instruments to collect the data as a proof-of-concept demonstration for the proposed analysis?

7A: The former, develop an “integrated feature-detection platform that can generate multimodal datasets.” Performers can work with data from existing libraries during data fusion e.g. development and testing. Performers and the Gov. Team will compare results from SOA sequential analysis to results from emerging MMoMA platforms.

6Q: While MMoMA asks that there be one diagnostic source (e.g. laser, e-beam etc.) are we allowed to have another source on the sensor side

6A: The MMoMA vision is to work with one source that can be tuned in intensity. Use of multiple excitation sources has to be very clearly motivated. See also the BAA, bottom of P. 9.

5Q: Clarification on Bulk Analysis. MMoMA requires elemental composition to a depth of 10 cm of steel, and this must be by nondestructive means, we presume?

5A: Yes, non-destructive, or minimally destructive. E.g. minimal surface damage is ok, but breaking a sample into many pieces is not desired.

4Q: Are we to estimate the cost of the project for all phases, given that phase 2 may actually be an integrated tool development.

4A: Yes, please follow the instructions outlined in Attachment B. Cost details will be required for full proposals after the abstract phase. Phase 2 is expected to be proof-of-concept of an integrated capability (tool) in a lab setting, plus design studies for a fieldable instrument.

3Q: Given the Abstracts are due on July 8, what is your estimate of when the full proposals will be due for those who past the first gate?

3A: The full proposal due date will be provided in the Invitation to Submit a full Proposal Package, and anticipated to be at least 30 days after that notification.

2Q: Will the MMoMA office facilitate teaming arrangements?

2A: Team formation is the sole responsibility of the proposers. Teaming is encouraged but optional. Proposers are highly encouraged to create integrated teams across technical areas.

1Q: We assume that multi model analysis to extract new information has been demonstrated using current instruments done in serial fashion, so is the goal of the MMoMA to integrate the diagnostics tools?

1A: Please see the BAA, e.g. P. 5, on the four focus areas of MMoMA.