

DARPA-PS-26-13:

Photonic Integrated Circuit Architectures for Scalable System Objectives (PICASSO)

Question and Answer (Q&A) Document

Version 2: February 5, 2026

1. Do the PICASSO photonic circuits need to include both processing and signal regeneration?
 - Yes. The circuits are inclusive of both the application functionality (i.e., processing of signals) and the signal integrity preservation.
2. Is retiming of signals required?
 - Retiming is not specifically called out. Retiming may be needed depending on the specific application or circuit architecture. If your circuit implementation requires retiming, please propose and justify an appropriate proposer-defined metric and outline your approach for achieving it.
3. Is the CUI package distributed at Proposers Day complete? Does it contain all CUI material?
 - Yes, as of 1/16/2026. Additional Controlled Unclassified Information (CUI) material, such as the CUI Q&A, will be distributed as it becomes available. DARPA requires *Attachment K: PICASSO CUI Materials Request Form* to be filled out entirely, signed, and submitted following the instructions in the PS in order to distribute any CUI material.
4. Can we have an extension of the Abstract and Proposal deadlines?
 - Not at this time. If any PS deadlines are changed in the future, the change will be published on sam.gov.
5. Are milestone payments and exit criteria best effort? Or do you need to meet metrics to get paid?
 - Final exit criteria will be clearly defined during award negotiations for selected proposals. These criteria will focus on verifying observable technical achievements that demonstrate substantial progress towards the project's overarching goals. While specific metrics may be used as indicators, the ultimate determination of successful completion will be determined through a comprehensive assessment of the deliverable content and the Performer's contributions to the project's critical path, as assessed by the DARPA Program Manager and/or Agreements Officer's Representative (AOR). This approach ensures a balance between rigor and flexibility, recognizing that groundbreaking research often necessitates an iterative and adaptive approach.

6. Is ROI (return on investment) considered, as this was seen in Government solicitations from other agencies?
 - ROI is not part of the PICASSO evaluation criteria listed in the PS.
7. Does the PS require teaming?
 - Teaming is not required. As stated in the evaluation criteria, the Government will evaluate if the proposed technical team has the expertise and experience to accomplish the proposed tasks. Diversity of expertise may be achieved through teaming.
8. When will feedback on abstracts be received? Will it give time to develop the full proposal?
 - DARPA recognizes the importance of providing timely feedback on abstracts to allow performers adequate time to develop full proposals. While PICASSO operates on aggressive timelines to meet mission-critical objectives, DARPA's goal is to review abstracts promptly to ensure performers have sufficient time to incorporate feedback and prepare comprehensive full proposals within the established deadlines.
9. Can a prime also act as a sub on another project? If so, is there a limit on the number of projects one can support?
 - Yes, a prime on one proposal can be a sub on another proposal. There is no limit on the number of submissions as a prime or a sub.
10. For Phase 1 and 2 deliverables; is there an expectation for a simulation, or for physical test, i.e., post-tapeout demo?
 - Both Milestones 6 and 12 list hardware demonstration and characterization as exit criteria.
11. How many projects/proposals does the PICASSO program foresee funding for Phase 1?
 - DARPA anticipates funding multiple projects on the program.
12. We already have patented technology does that limit us?
 - The PS discusses the requirement for IP and data rights in detail, as well as what information should be provided in the proposal. See *Section F. Intellectual Property* on pg. 8 and *Attachment C, Section 9 Intellectual Property (IP)* on pg. 8 of Attachment C.
13. Can non-U.S. citizens present at the oral presentations?
 - U.S. Permanent Residents will be allowed to attend and present at the Oral Presentation if they submit DARPA Form 60 at least 7 business days in advance of the presentation. Non-U.S. Persons will **not** be allowed to attend the Oral presentations. Attendance will be strictly enforced.

14. Can we leverage technology from DARPA LUMOS?

- DARPA encourages the use of any technology or technical approach to meet the program goals and metrics. Using integrated optical gain is within the scope to meet the metrics. Please ensure that any IP or technology from previous DARPA-funded efforts are identified as necessary.

15. Will the design repository be created and provided by DARPA? If so, who will have access?

- Yes, this service will be identified by DARPA. The Government will provide access to organizations working towards achieving the PICASSO program goals, including meeting the TA2 goals. Access outside of the program can be negotiated on a case-by-case basis. Proposers should identify any anticipated restrictions on access to IP, as outlined in *Attachment C, Section 9 Intellectual Property (IP)*.

16. What is the guidance on sharing PICASSO CUI materials?

- The details are provided in the CUI Guide. CUI material can only be shared with individuals on the *Dissemination List*. This includes *U.S. Citizens And Permanent Residents affiliated with PICASSO Proposers* on a need-to-know basis. Foreign entities cannot receive PICASSO CUI materials.

17. Can subcontractors performing fundamental research have foreign nationals working on the project?

- Yes. DARPA does not restrict foreign nationals on subcontractor efforts deemed fundamental research.

18. Will performers be required to mark their future materials as CUI? Or will this be determined by the government?

- The requirements for document marking are detailed in the program CUI guide. DARPA anticipates that meeting the program goals and metrics will require the ability to create, process, store, and transmit CUI information. The Government will evaluate the proposer ability to handle CUI information as a part of the “DARPA Mission” evaluation criterion, see *Section II: Evaluation Criteria*.

19. Can PICASSO CUI be shared with foreign individuals during the proposal preparation phase?

- See question 16 above.

20. Please elaborate on how CUI requirements may or may not flow down into foundry manufacturing processes. Is there a need for International Traffic in Arms Regulations (ITAR) flow or domestic-only flow?

- The CUI guidance is provided in the INFORMATION PROTECTION GUIDANCE CHART in the program CUI Guide. Sharing CUI information with foundry

manufacturing processes should be on a need-to-know basis only, and, if required, will result in a CUI requirement for the foundry. It is anticipated that not all foundry manufacturing processes will have a need to handle CUI information. It is the responsibility of the prime proposing organization to establish the appropriate protections.

21. Will DARPA assist or guide categorization and labeling of IP w/ correct Export Control Classification Number (ECCN) for Export Control?

- No. Determination of potential ITAR and Export Administration Regulations (EAR) export control is the responsibility of the proposing organizations. DARPA will provide guidance for controlled information as identified in the program CUI guide.

22. Will the Government provide EDA enterprise-wise tool suite for the performers?

- No.

23. How should we handle gaps that we identify in EDA?

- DARPA anticipates that any potential gaps in EDA capabilities will be identified in the course of the program and will be addressed collaboratively with EDA providers and developers. The proposers are encouraged to establish collaborative relationships or teaming with photonic automated design tool providers as required to achieve the program goals. Proposers should outline their teaming approach to mitigating any potential capability gaps.

24. Can you please confirm that offerors that include significant participation from a non-traditional defense contractor or nonprofit research institution are exempt from cost share?

- In accordance with 10 U.S.C. 4022(d), 1/3 cost share is not required if there is at least one nontraditional defense contractor or nonprofit research institution participating to a significant extent.

25. The PICASSO PS does not emphasize EDA focus, but EDA will be critical in achieving large scale photonics design and may need further EDA development? What is the role of an EDA company?

- The proposers should address this through their teaming arrangements. It is expected that the proposing teams will have the expertise to address any potential gaps in the critical path to achieving the program goals as a part of their effort.

26. What is the definition of “an optical component”?

- Functional photonic circuit element altering the properties of light signals, such as amplitude, phase, frequency, polarization, bandwidth, spectral composition, or modal content. This includes light generation, amplification, attenuation, phase shifting/modulation, detection, (de)multiplexing, filtering, polarization

rotation, out-of-plane coupling, splitting/combining, resonant, diffractive, interferometric devices, or circuit elements performing any other signal processing function. Waveguide optics for interconnection, including straight waveguides, adiabatic tapers, bends, and crossings, are not counted as separate components. In addition, devices/elements that are not an essential part of the processing chain but are included for the sole purpose of testing or debugging are not counted as separate components.

27. What is the definition of “circuit depth”?

- The number of optically connected functional components (see question 26 above) that an optical signal traverses as part of the circuit operation. The PICASSO program is specifically interested in optical processing chains that perform numerous functions (in series, nested, recurring, or otherwise) before being terminated by an O-E conversion.

28. What constitutes a component in the metric requirement?

- See question 26 above.

29. Will the interface control document (ICD) be coordinated between teams? Will there be different ICDs for different applications?

- Yes, the ICD will be collaboratively developed. The interface requirements may be different for different proposed applications. However, the intent is to assemble the interface requirements and definitions into a single document.

30. Who defines the ICD interfaces? DARPA or the performer?

- It is anticipated that certain interface characteristics may be application specific and, therefore, will be performer-defined and further developed and refined in the ICD working group. There will be common interface requirements, for example, the requirements listed as metrics in the CUI Addendum.

31. Are the TA1 ICDs unique to each performer or will there be a single ICD that all performers must comply with?

- The intent is to assemble the interface requirements and definitions into a single document.

32. Will DARPA consider technical approaches for Technical Challenge 1 (TC1) that include the use of optical amplifiers?

- Use of integrated optical amplification is within scope. TC1 emphasizes the fundamental tradeoff between gain and noise figure in a typical amplifier device. The program seeks innovative approaches that break this tradeoff at the circuit level.
- Non-integrated (external) amplifiers, such as fiber amplifiers, are not allowed.

33. Are noiseless amplifiers within scope?

- See question 32 above.

34. Can we include electronic control circuitry?

- Yes. Analyze and discuss the electronic circuitry overhead (power, area, integration complexity, yield, reliability) from a system perspective and from an application perspective.

35. Can we use peripheral electronics feedback to control optical noise in the photonic circuitry?

- Yes. See question 34 above.

36. Is quantum computing an acceptable application?

- There are no restrictions on the proposed applications. All proposed applications will be evaluated based on the application impact to the U.S. Government as discussed in *Attachment C*. Proposals should demonstrate analytically the application benefits from further scaling of the photonic circuit size and complexity (in terms of included additional functionality). See pg. 6, *Attachment C*.

37. Are applications for PICs addressing atoms (quantum space)?

- See question 36 above.

38. Is ruggedization, reliability of the proposed circuit part of the evaluation of a proposal?

- Ruggedization and reliability are not specifically called out in the evaluation criteria. Discussion is encouraged if required by the proposed application.

39. Are you interested in quantum applications?

- See question 36 above.

40. Is Terahertz silicon photonics is of interest?

- See question 36 above.

41. Are optical wavelength and/or bandwidth specified?

- No. They are performer defined, based on the targeted application. The proposal should include a discussion on the proposed materials platform and manufacturing maturity in support of the proposed wavelength range. See pg. 6, *Attachment C*.

42. Is circuit reconfigurability necessary?

- Reconfigurability is proposer defined based on the targeted application. It is not required, and it is not excluded.

43. Is there is any interest in programmability of the whole system?

- See question 42 above.

44. Is the application space completely proposer-defined, what about the metrics?

- See question 36 above. The PICASSO program metrics are defined in the CUI Addendum. Proposed-defined metrics are optional, based on the specifics of the application or the approach.

45. Figure of merit (FOM) is proposer-defined, but is the figure of merit part of the evaluation?

- Application-specific figures of merit are proposer defined. The evaluation includes the expected application-level performance improvement vs. current state-of-the-art or electronic implementations. See pg. 6, *Attachment C*.

46. There are no metrics on power, does that mean power is not considered?

- “Power” is not defined as a program metric. However, it is anticipated that power (optical power, power consumption, power efficiency, or other power-related metric) will be a strong component of most application-specific FOMs and should be analyzed from a system perspective. See questions 44 and 45 above.

47. Will any metrics be provided regarding power efficiency?

- See question 46 above.

48. Is wavelength band specified?

- See question 41 above.

49. Can you clarify “broadband”?

- Optical bandwidth is application specific and may be a key factor in most application FOMs. It is performer defined, if applicable. Bandwidth is one of the key attributes differentiating optical solutions vs. electronic solutions, and it is anticipated to be heavily leveraged.

50. How is signal-to-noise ratio (SNR) defined, especially the spectral bandwidth for SNR – does the proposer define or the application?

- It is anticipated that the exact definition of SNR will be heavily dependent on the application. Discuss and justify the proposed definition based on application-level performance.

51. Will reliability or other qualifications be part of the evaluation?

- For “reliability”, see question 38 above. See the discussion on pg. 6, *Attachment C and Section II: Evaluation Criteria* on pg. 9, *Program Solicitation* for other qualifications.

52. Can proposers offer more than one application?

- Yes. Offering multiple applications is encouraged.

53. What does “mode control” mean?

- Control of errors resulting in signal fidelity or functional/performance degradation due to spurious excitations, back-reflections, parasitic resonances,

crosstalk, scattering, unintended coupling, mode leakage, and other parasitic interactions across the photonic circuits.

54. Regarding not proposing TA2 at this time: Are applications required in TA1?

- Yes. Proposed TA1 circuits should be derived from specific application use cases. The importance and impact of these applications is a part of the proposal evaluation criteria. The program will continuously monitor the progress towards the application goals. For example, see Milestones 4 and 9.

55. Clarify TA1 vs TA2 participation?

- Participation in TA1 is not necessary for TA2, nor the reverse.
- For TA2 proposers, there will be an industry day preceding the TA2 solicitation publication, where TA1 results and accomplishments will be shared with perspective TA2 proposers. It is anticipated that TA1 data, learning, and approaches will inform the TA2 system architectures.
- The applications pursued in TA2 may be the same or different from the ones pursued in TA1.

56. What will happen to designs that don't meet the metrics? Will they be still available?

- All designs, successful or unsuccessful, will be required to be delivered. Designs that are functional, regardless of meeting or missing the performance metrics, will be included in the design repository. Designs that cannot be proven functional may not be included.

57. Can you propose to TA2 if you were not a performer in TA1? If so, will those not part of TA1 have access to repositories/material from TA1?

- Yes, participation in TA1 is not a requirement for proposing to TA2.
- DARPA will make every effort to disseminate TA1 information and provide access to the design repository to prospective TA2 proposers. Access to any program data, designs, and other GFI for the purposes of TA2 is subject to the proposer's ability to handle CUI information.

58. Will functional blocks/repositories developed in TA1 be made available to ALL TA2 performers?

- See question 57 above.

59. How will the government keep potential TA2 performers abreast of developments in TA1?

- DARPA will organize and host an industry day preceding the TA2 solicitation publication, where TA1 results and accomplishments will be shared with perspective TA2 proposers.

60. Is there a preference to use a particular photonics platform?

- No. The photonic platform is proposer defined. The proposal should include a discussion on the proposed materials platform and manufacturing maturity. See pg. 6, *Attachment C*.

61. Are overseas fabs ineligible to perform fabrication i.e. AMF, IMBC, LETI?

- Overseas fabs can be used on a limited basis. See PICASSO PS, pg. 5, "There is a strong preference that the proposed efforts use domestic photonic foundries and assembly and packaging services where available. Any proposed use of offshore manufacturing capabilities should be sufficiently justified in the proposal, addressing why equivalent domestic capability cannot be found."

62. Do you need to have the PDK ready for the platform deployed for this effort?

- See PICASSO PS, pg. 5. The PDKs are expected to be either largely available and accessible at the start of the program, or to be developed, matured and validated during the program to fit the needs of the program and to ensure manufacturability.

63. Fabrication can be costly. Does DARPA allow for fabrication cost to be included?

- Proposers should price and budget for all costs required to achieve the technical approach detailed in their proposed Task Description Document (TDD) in support of meeting the PICASSO program objectives and deliverables.

64. Do we need to choose new (novel) materials platform?

- No.

65. How important is the use of commercial Foundry? Can we start development internally and find a foundry later? Can the photonics foundry be an academic facility?

- An important goal of the program is to develop technologies that can be transitioned. This will ultimately mean transferring to commercial facilities for fabrication, assembly, and packaging. The use of commercial foundries, processes, and PDK packages is strongly encouraged. Development in non-commercial fabs is acceptable, as long as there is a clear path for technology transfer and transition. This includes development and maturation of PDK libraries complete with hardware characterization and validation.

66. Will specific foundries be suggested or required for PICASSO?

- No.

67. Will DARPA subsidize fab runs?

- No.

68. Does PICASSO allow or require foundry PDK elements only or are new devices allowed that can be hybrid integrated post-fab into circuits?

- See question 62 above.

69. Although there is a preference for domestic foundries, a strong candidate for PICs material platforms may be thin-film lithium niobate on silicon – domestic foundries exist but wafers needed may be foreign sourced – is this OK?

- Foreign-sourced wafers are acceptable; however, discussion is required on supply chain reliability. See pg. 6, *Attachment C, “Photonic platform”*.

70. What is the guidance on using ‘existing components’? Is there a desire to use PDKs at established PIC fabs or a DARPA preference?

- See questions 61, 62, and 65 above.

71. Does the recipient foundry need to be CUI capable?

- See question 20 above.

72. Is there a preference for the integration technology? Are monolithic, heterogeneous, hybrid, chiplet (stacked or on an interposer), 2D, 3D, etc. integration approaches acceptable?

- There is no preference for any specific integration technology. The integration should enable chipscale solutions; therefore, the use of fibers as a part of the circuit is not acceptable.

73. Is there a limitation on the number of individual die/substrates that the circuit spans?

- There are no limitations, as long as the connections are not by fiber. See question 72 above.

74. Must proposers contract for and pay for chip fab or will DARPA sponsor an MPW?

- Currently, there are no plans for DARPA-sponsored MPWs.

75. Does the program exclusively seek planar photonic integrated circuits vs. other geometries?

- There is no preference.

76. Is there any requirement for 3D integration?

- 3D integration is acceptable but not required.

77. Is Integration other than monolithic acceptable?

- Yes. See question 72 above.

78. Component level vs circuit level focus: What if we have a new component that is necessary for certain application enablement?

- Use of existing components is acceptable and encouraged. Technical approaches that solely pursue individual device (component) development are discouraged.

79. What if a partner needs my component?

- There are no limitations on sharing component information. See question 78 above.

80. Are neural networks in scope?

- The program is agnostic to the application area proposed. See question 36 above.

81. Can you explain what is meant by the mode control metric and how it is quantified?

- See question 53 above.

82. Is the Net Optical Loss equivalent to Excess Loss? That is, if a circuit has multiple inputs or outputs, are any splitting or combining losses excluded from the measurement?

- Splitting and combining losses are included. See Pg. 6, *Attachment C*, "...optical losses include material loss, device insertion loss, and signal fan-out..."

83. Is there a requirement to include PIC I/O losses in the metrics, or can it be assumed that the optical signal exists entirely on a single die?

- There is no assumption that the circuits are on a single die. If applicable, die-die coupling losses should be accounted for.

84. Will other circuit characteristics important to typical electronic and photonic systems such as bandwidth, linearity, power efficiency, size, etc be evaluated in judging the proposals?

- They may be evaluated as a part of application-specific FOM. Such characteristics should be analyzed by the proposers from a system-level performance perspective.

85. What are the Government's rights to our company's pre-existing intellectual property versus the IP that will be developed under the proposed contract? Will the DoD assume full ownership of our work or acquire a license for use, and how will this impact our ability to secure patents for our inventions? We need to understand how the source of funding affects the Government's data rights and what steps we must take to protect our proprietary information. What is the proper procedure for asserting and marking our data rights within the proposal to ensure our IP, especially that developed at private expense, is properly protected?

- The Government requires, at a minimum, Government Purpose Rights (GPR) as defined on page 8 of the PICASSO PS. *Attachment C* provides guidance on how information regarding IP (to include IP previously developed at private expense and patents) should be disclosed. Additionally, the Model OT is provided as *Attachment I* to assist proposers in understanding how DARPA approaches Patent and Data Rights negotiations. Note that the Government will evaluate the proposed data rights under the evaluation criterium "DARPA Mission". Specifically, the Government will evaluate if: "The proposed intellectual property restrictions (if any) will not significantly impact the Government's ability to transition the technology."

86. If we subcontract, does the prime need to be another company, or can it be a coordinator?

- The prime organization can be any entity capable of satisfying the Government's needs. It is expected that the prime organization performs a significant portion of the technical work on the project.

87. If a foreign company is submitted as a sub, are there rules for how much access and support they can provide outside of sharing any CUI, US-only information? Can they support engineering or are they limited on the effort? Does that level of effort have to be outlined in the proposal?

- Foreign entities as subs are not limited by level of effort, but by the access to program data. It is the prime's responsibility to appropriately protect all the program CUI information. In addition, foreign entities may not be permitted to participate in program meetings.

88. Are FFRDCs allowed to subcontract on this program? If so, is it considered negatively during proposal selection?

- FFRDCs and UARCs are not allowed to participate as subcontractors on any proposal.

89. Is a foreign organization from the UK eligible to participate in a PICASSO proposal or, if it is solely restricted to US participants?

- Foreign entities are allowed as subs, however, they cannot have access to program CUI information and may not be permitted to participate in program meetings.

90. Can bonding (flip-chip) technologies be considered for at least Phase 1 to combine different technologies?

- Yes. There is no preference for any specific integration technology in either phase of the program. See question 72 above.

91. Do Universities count as non-traditional defense contractors?

- A non-traditional defense contractor is defined at 10 USC § 3014 as "an entity that is not currently performing and has not performed, for at least the one-year period preceding the solicitation of sources by the Department of Defense for the procurement or transaction, any contract or subcontract for the Department of Defense that is subject to full coverage under the cost accounting standards." Information on documenting this status can be found in *Attachment F, Other Transaction Certification Template*.

92. Can performers use their own IP in PICASSO designs? If so, how will performer IP be protected in the PICASSO repository?

- The Government has disclosed the use rights required to support the PICASSO objectives on page 8 of the PS. While performers are not prohibited from utilizing IP developed fully at private expense, any restrictions or prohibitions on its use should be detailed in the proposal. This includes IP incorporated into the final deliverable prototype.

93. Please clarify if expenditure based (i.e., cost reimbursement) OT agreements are acceptable?

- DARPA plans to establish fixed milestones based on the deliverables established on page 8 of the PS. DARPA will consider fixed milestones with prospective adjustments to future milestone amounts based on actuals. Prospective adjustments would not exceed the Phase 1 ceiling established at time of award but would not require changes to the Task Description Document (TDD). This approach would require the Performer to provide documentation to support actual expenditures. Notably, while documentation of actual expenditures is required, it need only comply with Generally Accepted Accounting Principles (GAAP) and not the more stringent requirements of Cost Accounting Standards (CAS) or Truth in Negotiations Act (TINA).

94. Can you still submit a proposal if the abstract is not encouraged?

- Yes.

95. Is there a waiver process for FFRDCs to be a sub on a performer team?

- No. FFRDCs cannot participate on this solicitation.

96. Is there a target TRL at the end of each phase?

- No.

97. Is there any possibility that a university that does fundamental research to be a prime – in other words, can a university lead as a prime?

- Per the PS, the Government expects that program goals **cannot** be met by proposers intending to perform fundamental research and anticipates publication restrictions for the resultant awards. Entities that can accept non-fundamental research terms and demonstrate the ability to handle CUI (as outlined in the PS) could be considered as primes. Please see page 13 of the PS for information on potential fundamental research efforts by sub performers.

98. How is the component depth defined? For example, is a MZI counted as one component depth or three (splitter, phase shifter, splitter)?

- According to the definition in question 26 above, an MZI consisting of a splitter, a phase shifter, and a combiner is counted as three components.

99. Is Attachment B, *Proposal Summary Slide*, required with the Abstract submission or with the Full Proposal Submission?

- Attachment B Proposal Summary Slide is not a required submission document. If the proposer chooses to submit Attachment B, it is recommended to accompany the proposal submission and not the abstract.

100. Can one organization serve as a Prime during the abstract phase and then transition to a subcontractor role for the full proposal phase? Is this arrangement permitted under the program?

- No, the Prime organization submitting the proposal should be the Prime organization submitting the abstract.

101. Additionally, are changes to team members allowed between the abstract and full proposal phases?

- Per Item #3 in the Abstract Instructions and Template (Attachment A), full teaming arrangements do not need to be finalized at the time of abstract submission, however as noted above the Prime organization submitting the abstract, should be the Prime organization submitted the full proposal..

102. Could you please clarify the expectation to "propose a plan to get NIST SP 800-171, DoDI 8582.01 and CMMC Level 2 compliant in 4 month's time"? When does this four-month period begin? Does the timeline start upon the submission of our final proposal, or when the work officially commences?

- A "plan" to meet the NIST requirements and protect PICASSO CUI should be included in both the abstract submission (see Attachment A, Section 5) and the proposal (See Attachment C, Section 5). Performers are expected to implement the proposed plan no later than four (4) months from date of any subsequent OT award.

103. In Appendix A, is item 5, "Ability to protect CUI information", included in the 6 page abstract limit?

- It is not included in the 6-page limit.