



## Program Solicitation

Translating All C TO Rust (TRACTOR)  
INFORMATION INNOVATION OFFICE

**DARPA-PS-24-20**

**September 6, 2024**

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## 1. PROGRAM SOLICITATION OVERVIEW INFORMATION

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Information Innovation Office (I2O)
- **Funding Opportunity Title** – Translating All C TO Rust (TRACTOR)
- **Announcement Type** – Program Solicitation, Initial Announcement
- **Program Solicitation Number** – DARPA-PS-24-20
- **Dates/Time – All Times are Eastern Time Zone (ET)**
  - Posting Date: September 6, 2024
  - Proposers Day: August 26, 2024
  - Abstract Due Date: September 20, 2024 by 2:00 PM ET
  - Questions Due Date: October 1, 2024 by 2:00 PM ET
  - Proposals Due: November 6, 2024 by 2:00 PM ET
  - Estimated Program Start Date: May 1, 2025
- **Concise Description of the Program:** The Defense Advanced Research Projects Agency is soliciting innovative proposals for novel techniques to eliminate software memory safety vulnerabilities by large-scale code conversion from C to safe, idiomatic Rust. The goal is to achieve the same quality and style that a skilled Rust developer would produce, thereby eliminating the entire class of memory safety security vulnerabilities present in C programs. This program may involve novel combinations of software analysis, such as static analysis and dynamic analysis, and machine learning techniques like large language models.
- **Anticipated individual award:** Multiple awards are anticipated.
- **Types of Instruments that may be awarded:** Other Transaction (OT) for Prototype agreements
- **Cost Sharing Requirements:** in accordance with 10 U.S.C. § 4022, cost sharing may be required for OT for prototype awards.
- **Attachments to DARPA-PS-24-20:**
  - Attachment A: Proposal Summary Slide
  - Attachment B: Proposal Instructions and Volume I template for Technical and Management
  - Attachment C: Proposal Instructions and Volume II template for Cost
  - Attachment D: DARPA Standard Cost Proposal Spreadsheet (Do not modify standard spreadsheet)
  - Attachment E: Model OT (Fixed Support Nontraditional)
  - Attachment F: Model OT (Fixed Support Traditional Cost-Share)
  - Attachment G: DARPA Task Description Document (TDD)
  - Attachment H: Associate Contractor Agreement
- **Questions & Answers (Q&A):** DARPA intends to use electronic mail for all correspondence regarding this Program Solicitation. Administrative, technical and award questions should be emailed to the agency point of contact stated immediately below. All questions must be written in English and must include the name, email address, and the telephone number of a point of contact. DARPA will attempt to answer questions in a timely manner; however, questions submitted after the aforementioned questions due date above may not be answered. DARPA will post a link to the Q&A list here: <https://www.darpa.mil/program/translating-all-c-to-rust>.

- **Agency contact**

- Point of Contact:

- The Solicitation Coordinator for this effort can be reached at:  
TRACTORTEAM@darpa.mil  
DARPA/I2O  
ATTN: DARPA-PS-24-20  
675 North Randolph Street  
Arlington, VA 22203-2114

## **2. PROGRAM SOLICITATION (PS) AUTHORITY**

This Program Solicitation (PS) may result in the award of Other Transaction (OT) for Prototype Projects, which can include not only commercially available technologies fueled by commercial or strategic investment, but also concept demonstrations, pilots, and agile development activities that can incrementally improve commercial technologies, existing Government-owned capabilities, and/or concepts for broad defense and/or public application(s). The Government reserves the right to award an OT for Prototypes under 10 U.S.C. § 4022, make multiple OT awards, or make no award at all. Follow-on production contracts or transactions may also be awarded pursuant to 10 U.S.C. § 4022. In all cases, the Government Agreements Officer shall have sole discretion to negotiate all agreement terms and conditions with selected proposers.

## **3. ACQUISITION STRATEGY**

### **I. ELIGIBILITY**

This PS encourages submissions from all responsible sources capable of satisfying the Government's needs, including large and small businesses, nontraditional defense contractors as defined in 10 U.S.C. § 3014, and research institutions as defined in 15 U.S.C. § 632.

Federally Funded Research and Development Centers (FFRDC), University Affiliated Research Centers (UARC), and Government Entities interested in participating in the TRACTOR program or proposing to this PS should first contact the Agency Point of Contact of this solicitation prior to developing and submitting an abstract and/or proposal submission.

### **II. ABSTRACTS**

Submission of an abstract is a mechanism for potential proposers to gain feedback prior to investing resources for a full proposal. As such, this solicitation strongly encourages the submission of an abstract in advance of a full proposal submission. DARPA will review abstracts for compliance; only conforming abstracts will be reviewed and receive feedback. DARPA will provide feedback either encouraging or discouraging a full proposal submission. See Section 5 for further details.

**NOTE:** DARPA will not pay the costs associated with the preparation or submission of an abstract.

### III. OTHER TRANSACTION AGREEMENTS

OT for Prototype agreements offer DARPA and performers the flexibility to negotiate terms and conditions which closely reflect private-sector or commercial contracts. Thus, standard Government regulations, such as the Federal Acquisitions Regulations (FAR) or Defense Federal Acquisitions Regulations Supplement (DFARS) do not apply. Most notably, performers will be provided the flexibility of using their existing accounting systems and negotiating intellectual property rights in accordance with their standard business practice.

### IV. HYBRID PROGRAM APPROACH

The TRACTOR Program will be segmented into two tracks, the Research Track and the Competition Track. **This PS applies only to the Research Track.** Any information contained within this PS concerning the Competition Track, including references to future prize competitions, is shared for situational awareness only.

- **Research Track:** Proposers who respond to this solicitation and are selected for potential award under Technical Area 1 and Technical Area 2 will become TRACTOR performers within the Research Track. The Technical Areas are defined in Section 4. Program Information. Proposers are allowed to submit a single proposal for both TA1 and TA2. Such a joint proposal might only be selected to perform on one technical area, so proposals should clearly separate their costs, milestones, and Technical Description Document/Statements of Work across both Technical Area 1 and Technical Area 2 Phases 1 and 2.

TRACTOR performers will develop open-source prototype software translation tools, which DARPA intends to make available to competitors for use in the prize competitions. Performers will be ineligible to compete in TRACTOR prize competitions within the Competition Track.

- **Competition Track (for informational purposes only):** The TRACTOR Program intends to hold prize competitions to further the objectives of the TRACTOR program, including test and evaluation of the TRACTOR tools developed by TRACTOR performers on a wide variety of input software.

Additional information regarding the Research and Competition Tracks can be found in Section 4.VIII and IX.

### V. INFORMED BUDGET

DARPA anticipates individual awards for TA1 will be scoped for a level of effort at or below \$5M. TA2 awards are anticipated to be scoped at a level of effort between \$1M and \$2M. Proposers are strongly encouraged to select a cost point that is commensurate with the scale and complexity of the proposed approach. Proposals that simply propose a budget targeting the aforementioned values without evidence linking the technical level of effort to the proposed budget are strongly discouraged and will be reflected in the evaluation results of the scientific review process.

DARPA intends to make multiple awards to pursue various innovative approaches in Phase 1. Based on Competition Track results, challenge problem results, available funding, and/or programmatic decision points, select performers may advance to Phase 2.

## 4. PROGRAM INFORMATION

### I. TECHNICAL DOMAIN

DARPA is soliciting innovative submissions in the following technical domain:

Buffer overflow vulnerabilities and other related memory safety software flaws allow an attacker to inject messages that hijack control of a computer. These vulnerabilities are only possible because programs written in C and C++ don't force their developers to check conditions, such as array bounds or pointer arithmetic for correctness. Google and Microsoft have estimated that 70% of their security vulnerabilities stem from these memory safety issues<sup>1,2</sup>. The same problems occur in the defense industrial base's software. While there are a variety of approaches to mitigate these risks, newer programming languages, like Rust, can eliminate them while preserving efficiency. However, significant and expensive manual effort is required to rewrite legacy code.

The United States has at least two decades of experience applying sophisticated tools towards mitigating memory safety issues in C and C++. Despite these efforts, the software engineering community has largely concluded that bug finding tools are not sufficient. It's preferable to use "safe" programming languages that reject unsafe programs at compile time. The White House recently emphasized the importance of safe programming languages in its efforts, including "Back to the Building Blocks: A Path Towards Secure and Measurable Software"<sup>3</sup> and the "National Cybersecurity Strategy Implementation Plan."<sup>4</sup> The White House also conducted a public Request for Information on the topic, showing broad support and an urgent need for memory safety technologies.<sup>5</sup>

### II. PROGRAM VISION

The goal of the TRACTOR program is to develop tools to eliminate software memory safety vulnerabilities by large-scale code conversion from C to memory-safe Rust using a combination of static analysis, dynamic analysis, and machine learning (ML) techniques such as large language models (LLMs).

TRACTOR aims to automate the process of transitioning legacy C to Rust, with the same quality and style that a skilled Rust developer would employ, thereby

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<sup>1</sup> <https://security.googleblog.com/2019/05/queue-hardening-enhancements.html>

<sup>2</sup> <https://msrc.microsoft.com/blog/2019/07/we-need-a-safer-systems-programming-language/>

<sup>3</sup> <https://www.whitehouse.gov/wp-content/uploads/2024/02/Final-ONCD-Technical-Report.pdf>

<sup>4</sup> <https://www.whitehouse.gov/wp-content/uploads/2024/05/National-Cybersecurity-Strategy-Implementation-Plan-Version-2.pdf>

<sup>5</sup> <https://www.whitehouse.gov/wp-content/uploads/2024/08/Summary-of-the-2023-Request-for-Information-on-Open-Source-Software-Security.pdf>

permanently eliminating the entire class of memory safety security vulnerabilities present in C programs.

To automatically rewrite legacy C code to Rust, at a scale of billions of lines of code and with minimal human intervention, it is necessary to solve the problem that C programs can express concepts, like pointer arithmetic, that are not allowed in Rust. Sophisticated algorithms and systems must be designed to achieve these translation goals.

### **III. TECHNICAL INSIGHT**

The TRACTOR technical approach is to eliminate memory safety vulnerabilities by large-scale code conversion from C to Rust using a combination of programming languages and ML techniques, including LLMs. To do this, TRACTOR is structured into two technical areas (TAs): (TA1) C to Rust Translation Research and (TA2) Theoretical Translation Research.

C to Rust Translation Research (TA1) performers will build C to Rust translation systems. In the first phase (30 months), performers will focus on single-threaded user level application translation. In the second phase (18 months), performers will expand to support multi-threaded user level application translation. DARPA anticipates that TA1 teams will use various combinations of programming languages analysis techniques (e.g., static analysis or fuzzing) and ML techniques (e.g., LLMs). If LLMs are a part of the technical approach, it is advised to make this use pluggable, i.e., allowing any eventual user of a TRACTOR tool to substitute their choice of LLM for the TRACTOR tool to use (see the Questions & Answers (Q&A) document for further rationale).

Theoretical Translation Research (TA2) teams will study the foundations of programming language translation in multithreaded settings. This effort by the TA2 teams will ultimately support the TA1 teams' efforts when they begin translating multithreaded code. It is anticipated that TA2 teams will be experts at using formal analysis tools (e.g., Coq, Isabel/HOL, ACL2, PVS), allowing for formal models of the complexities of modern multicore central processing unit (CPU) memory systems and how these CPU features will interact with the problem of translating C to Rust (e.g., reasoning about how the resulting Rust code's feasible concurrent execution paths will be equivalent to a subset of the original C code's possible execution paths).

### **IV. TECHNICAL CHALLENGES**

TA1: The core technical challenge of translating C to safe, idiomatic Rust is that C programs can express concepts that are not allowed in safe, idiomatic Rust. C programs can do pointer arithmetic or otherwise treat pointers as if they were integers. Additionally, Rust has restrictions on how mutable state can be managed. These issues, among others, mean that C programs cannot simply be transliterated into Rust and be expected to work correctly. Additionally, in a multi-threaded context, C programs will often include their own concurrency primitives or may depend on machine-specific memory system semantics, while Rust offers structured concurrency features that are

safe and portable. While the specific multi-threaded challenges have not yet been selected, teams should plan on supporting POSIX-style threads. Similarly, proposals should assume that “C” means “C as compiled by the current LLVM clang compiler.” Support for other C compilers is not required.

TA2: As described above, multi-threaded C programs may depend on machine-specific memory semantics, while we wish to translate these programs to safe, idiomatic Rust with all of Rust’s structured concurrency features. Translation between the various forms of C concurrency and Rust raises a challenge with respect to the semantics of concurrent software. We need formal modeling tools that allow us to reason about “equivalence” of the translated code. Even defining “equivalence” in this context is a significant research challenge, which the TA2 teams will pursue.

Please see the Q&A document at (<https://www.darpa.mil/program/translating-all-c-to-rust>), for anticipated technical questions and answers TRACTOR proposers may have.

## **V. GOVERNMENT EVALUATION TEAM**

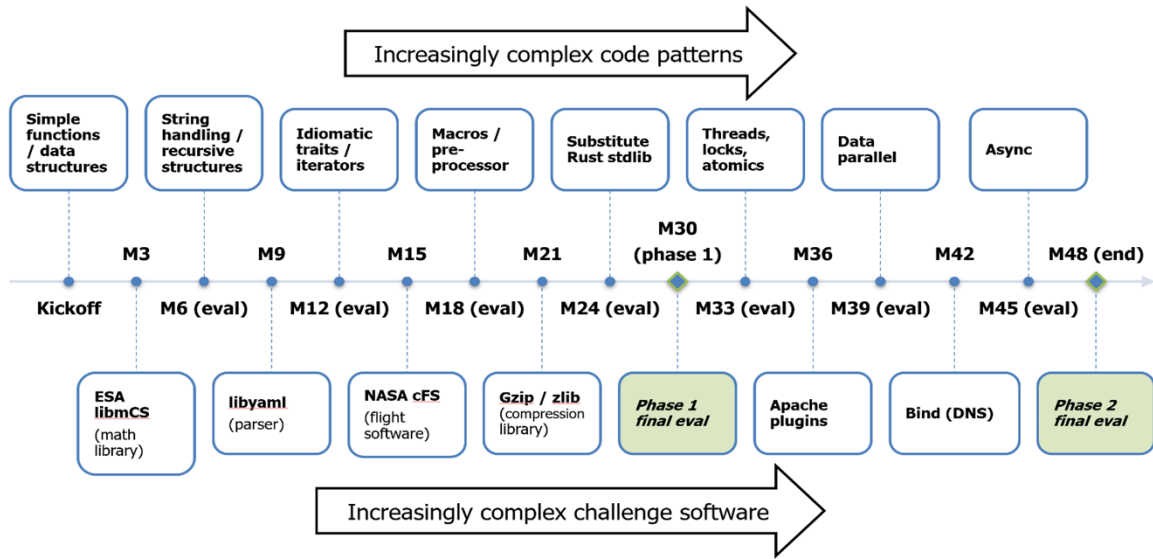
A government test and evaluation (T&E) team will create challenge problems over the life of the program, provide an infrastructure for T&E of performer tools, and report to DARPA program management regarding performance of tools.

## **VI. MILESTONE STRUCTURE / EVALUATION CHALLENGES**

The TRACTOR program will be structured as a series of milestones, corresponding to specific features of the C programming language. The challenge problems will be selected to exercise these specific features and will grow in complexity as the TRACTOR program advances. DARPA expects to have both “micro challenges” (i.e., small programs, hundreds of lines of code) and “large challenges” (growing from thousands to millions of lines).



Figure 1 below represents a notional conception of this timeline for Research Track performers.



The specific deadlines, language features, and challenge problems have not yet been determined. DARPA and its Test & Evaluation partner will finalize the initial set of challenge problems and milestones prior to the kickoff where selected performers will begin their research. As TRACTOR research commences, and we discover that some tasks are easier or harder than expected, we may choose to adjust the challenge problems and milestones appropriately.

Figure 1- Notional challenge problem timeline

## VII. PROGRAM METRICS

TRACTOR program metrics for TA1 are broken down into three categories that quantify the successful translation of C to Rust:

- Coverage goals:** the percentage of successful translation is defined as a fraction of C functions translated to Rust, which are “safe,” i.e., which do not make use of Rust’s “unsafe” coding features. Of course, just because the code is safe, it might not be correct. To that end, performers will be required to demonstrate that the new Rust code is “equivalent” to the original C code. We encourage performers to innovate in their interpretation of “equivalence” and how they might provide the best possible evidence of equivalence. However, in order to have something measurable, performers must, at a minimum, synthesize unit tests for the Rust code that can be measured, via standard code coverage tools. Performers may construct these tests in a variety of ways, including but not limited to fuzzing the original C code to get input/output pairs to apply to the synthesized Rust code’s unit tests. This code coverage metric is a useful proxy measurement for the quality of the equivalence case being made by the performers’ tool. Additionally, these unit tests will become part of the resulting Rust codebase and will assist future programmers as they maintain the new Rust code.
- Performance goals:** the translated code will be measured for its runtime

performance, both in time and memory usage. Lastly, the performance of the translation tools, themselves, will be measured in terms of lines of code translated per hour of runtime. (We expect TRACTOR tools will operate on large batches of code, requiring significant computational resources, rather than offering a fast, interactive experience.)

- Productivity goals:** in addition to these quantitative measures, there will be qualitative measures related to code quality, i.e., whether the output Rust code is written in an “idiomatic” style as a human expert might have written it. These metrics measure the extent to which the output of the TRACTOR tools is ready for production use versus requiring additional rework. The government test & evaluation team will assign Likert scores to the output code in a fashion similar to how college students’ software is graded. The volume of compiler warnings and “linting” warnings, produced by the standard Rust toolchain, will also be used as a proxy measure for code quality.

		Quantitative	Month 15	Month 30	Multi-threaded Month 48
Coverage goals	}	Successful, memory safe translation (% of functions)	90%	99%	90% multithreaded 99% single
		Tests of equivalence	80%	90%	90% single + multi
Performance goals	}	Performance slowdown	<10%	<5%	<5%
		Memory footprint increase	<20%	<5%	<5%
		Tool runtime & scaling	100 kLoC/hr	1 MLoC/hr	1 MLoC/hr
		Qualitative			
Productivity goals	}	Idiomatic code output (Likert) 1 = worst, 5 = best	2+	4+	4+ single-threaded 4+ multi-threaded
		Code quality (“linter”) tests (warnings per kLoC)	<50	<10	<10 single-threaded <10 multi-threaded

Figure 2- Metrics Summary

**VIII. RESEARCH TRACK**

TRACTOR performers will develop open-source prototype software translation tools, which DARPA intends to make available to competitors in future prize competitions. Those translation tools that are most widely adopted by successful competitors during the prize competitions may be provided performance incentives, which may be negotiated in resulting OT awards.

DARPA will define rules and metrics for measuring adoption of translation tools by successful prize competition competitors upon announcement of each competition.

TRACTOR Research Track performers will be ineligible to enter any future TRACTOR prize competitions as competitors.



- Data Management Plan
- Patent Reports (as applicable)
- Annual Program Plan Document (as appropriate)
- Executive Summary
- Final Technical Report

If further descriptions of the reports listed immediately above are needed, both Attachments E and F Model Other Transactions (Fixed Support Traditional Cost-Share or Nontraditional) include an Attachment 2 titled Report Requirements. Further, proposers are expected to expand this list consistent with their proposed solution, as well as provide a list of hardware and software deliverables.

## 5. ABSTRACT GUIDELINES

Proposers are highly encouraged to submit an abstract in advance of a proposal to minimize effort and reduce the potential expense of preparing an out-of-scope proposal.

### I. ABSTRACT CONTENT

Abstract formatting and content requirements are stated in Appendix A, Abstract Template. Use of Appendix A is strongly encouraged in development of abstract submissions. All abstracts submitted in response to this solicitation must include the content requirements and comply with the formatting requirements in Appendix A. Information not explicitly requested in Appendix A may not be reviewed.

### II. ABSTRACT SUBMISSION REQUIREMENTS

- Abstract submissions are due: **September 20, 2024, by 2:00 PM ET.**
- Abstracts must be submitted to the DARPA Broad Agency Announcement Tool ([BAAT](#)). Please visit [Proposer Instructions and General Terms and Conditions](#) for specific information regarding submission methods through BAAT. Submissions sent through other mediums, channels, or after the prescribed PS deadline will not be considered, reviewed, nor evaluated.
- Abstracts containing Controlled Unclassified Information (CUI) must be encrypted when submitting the file; see Section 7.I for additional details. Classified submissions are not anticipated.
- Proposers are responsible for clearly identifying proprietary information on the Abstract cover page. Marking must state, “Proprietary”. Note, “confidential” is not a classification marking used to control the dissemination of U.S. Government National Security Information as dictated in Executive Order 13526 and should not be used to identify proprietary business information.

### III. ABSTRACT FEEDBACK

All proposers will receive written feedback either encouraging or discouraging a full proposal submission. The Government’s feedback determination will be accompanied by a brief technical analysis which resulted in the feedback response. Feedback will be

sent to the administrative and technical points of contact noted in the abstract cover page.

Regardless of DARPA's response to an abstract, proposers may submit a full proposal. DARPA will review all conforming full proposals using the published evaluation criteria and without regard to any comments resulting from the review of an abstract.

**NOTE:** Submission of an abstract is not required to submit a proposal to this solicitation. Additionally, all parties, whether encouraged or discouraged to submit a full proposal, are eligible to submit a proposal to this solicitation.

## **6. PROPOSAL GUIDELINES**

### **I. PROPOSAL PREPARATION REQUIREMENTS**

All proposers must be registered in the System for Award Management (SAM) and have a Unique Entity Identifier (UEI) number in order for their proposal to be found conforming. Proposers must maintain an active registration in SAM.gov with current information at all times during which a proposal is under consideration or have a current award with DARPA. Information on SAM registration is available at SAM.gov.

**NOTE:** New registration takes an average of 7-10 business days to process in SAM.gov. Registration requires at a minimum the following information:

- SAM UEI number
- Tax Identification Number
- Commercial and Government Entity (CAGE) Code. If a proposer does not already have a CAGE code, one will be assigned during the SAM registration process.
- Electronic Funds Transfer information (e.g., proposer's bank account number, routing number, and bank phone or fax number.)

### **II. PROPOSAL CONTENT**

Proposal formatting and content requirements are stated in Attachments A-G. Use of Attachment A, B, C, D and G is required; use of all other Attachments is strongly encouraged in development of proposal submissions. Information not explicitly requested in this solicitation, including the Attachments, may not be reviewed.

### **III. PROPOSAL SUBMISSION REQUIREMENTS**

- Proposal submissions are due: **November 6, 2024, by 2:00 PM ET.**
- Proposals must be submitted to the DARPA [BAAT](#). Please visit [Proposer Instructions and General Terms and Conditions](#) for specific information regarding submission methods through BAAT. Submissions sent through other mediums, channels, or after the prescribed PS deadline will not be considered, reviewed, nor evaluated.
- Proposals containing CUI must be encrypted when submitting the file; see

Section 7.I for additional details. Classified submissions are not anticipated.

- Proposers are responsible for clearly identifying proprietary information on the Proposal cover page. Marking must state, “Proprietary”. Note, “confidential” is not a classification marking used to control the dissemination of U.S. Government National Security Information as dictated in Executive Order 13526 and should not be used to identify proprietary business information.

#### **IV. PROPOSAL EVALUATION CRITERIA**

All conforming proposals will be evaluated by Government Reviewers against the evaluation criteria, listed in descending order of importance, described immediately below:

- **Overall Scientific and Technical Merit**

The proposed technical approach is innovative, feasible, achievable, and complete.

The proposed technical team has the expertise and experience to accomplish the proposed tasks. Task descriptions and associated technical elements provided are complete and in a logical sequence with all proposed deliverables clearly defined such that a final outcome that achieves the goal can be expected as a result of award. The proposal identifies major technical risks and planned mitigation efforts are clearly defined and feasible.

The proposal clearly explains the technical approach(es) that will be employed to meet or exceed each program goal and metric listed in Section 4.VII. and provides ample justification as to why the approach(es) is feasible. The Government will also consider the structure, clarity, and responsiveness to the TDD; the quality of proposed deliverables; and the linkage of the TDD, technical approach(es), risk mitigation plans, costs, and deliverables of the prime awardee and all subawardees through a logical, well structured, and traceable technical plan.

- **Potential Contribution and Relevance to the DARPA Mission**

The potential contributions of the proposed effort are relevant to the national technology base. Specifically, DARPA’s mission is to make pivotal early technology investments that create or prevent strategic surprise for U.S. National Security.

In addition, the evaluation will take into consideration the proposed technology transition strategy and the extent to which the proposed intellectual property rights will potentially impact the Government’s ability to transition the technology, as applicable.

- **Cost Realism**

The proposed costs are realistic for the technical and management approach and

accurately reflect the technical goals and objectives of the solicitation. The proposed costs are consistent with the proposer's TDD and reflect a sufficient understanding of the costs and level of effort needed to successfully accomplish the proposed technical approach. The costs for the prime proposer and proposed subawardees are substantiated by the details provided in the proposal (e.g., the type and number of labor hours proposed per task, the types and quantities of materials, equipment and fabrication costs, travel and any other applicable costs and the basis for the estimates).

## V. PROPOSAL REVIEW AND SELECTION PROCESS

It is DARPA's policy to ensure impartial, equitable, comprehensive proposal evaluations based on the evaluation criteria listed in Section 6.IV and to select the source (sources) whose proposal is determined to be the most advantageous to the TRACTOR program objectives.

DARPA will conduct a scientific and technical review of each conforming proposal. For the purpose of this proposal evaluation process, a conforming proposal is defined as follows:

**Conforming proposals** contain all requirements and fall within the scope detailed in this solicitation.

- Proposals that fail to include required information may be deemed non-conforming and may be removed from consideration. Non-conforming submissions may be rejected without further review. A proposal will be deemed non-conforming under this solicitation if the proposal fails to meet one or more of the following solicitation requirements:
  - The proposed concept is applicable to the TRACTOR program.
  - The proposers meet the eligibility requirements.
  - The proposal met the submission requirements.
  - The proposal includes all required attachments and met the content and formatting requirements in the attachments.
  - The proposer's concept has not already received funding or been selected for award negotiations for another funding opportunity (whether from DARPA or another Government agency).

Non-conforming proposals may be removed from consideration. Proposers will be notified of non-conforming determinations via email correspondence.

All proposal evaluations will be based solely on the evaluation criteria in Section 6.IV. Upon evaluation against the above proposal evaluation criteria, DARPA will determine if the proposal is considered selected for funding or not selected for funding.

**NOTE:** proposals will not be evaluated against each other during the scientific technical review process, but rather evaluated on their own individual merit to determine how well the proposal meets the criteria stated in this solicitation.

For the purpose of this proposal evaluation process, a selectable or non-selectable proposal is defined below. Given the limited funding available for TRACTOR, not all proposals considered selectable may be selected for a potential award.

- **Selectable:** A selectable proposal is one that the Government has evaluated against the proposal evaluation criteria listed in the PS and the positive aspects outweigh the negative aspects.
- **Not-Selectable:** A proposal is considered non-selectable when the Government has evaluated it against the proposal evaluation criteria listed in the PS and the negative aspects outweigh the positive aspects.

**NOTE:** Sample TRACTOR Model Other Transaction (OT) Agreements are included as Attachments E and Attachment F. The Government strongly encourages proposers to select the appropriate version and submit an edited TRACTOR Model OT with their proposal submission.

## **VI. PROPOSAL NOTIFICATION AND FEEDBACK**

All proposers will receive electronic correspondence stating whether their proposal is selected for negotiation of potential award. Upon notice of proposal selection, and subject to the availability of funds, the Government may indicate a full proposal selection or that only part of the proposed effort has been selected for negotiations and may request a revised proposal for only those selected portions, if not apparent through the delineation of proposed tasks. Further, upon notification of a proposal selection, DARPA may allow informal feedback sessions to discuss strengths and weaknesses noted in the scientific and technical review. Subcontractors shall note that informal feedback sessions must be requested by the prime proposer; subcontractors may attend the informal feedback session at the invitation of the prime proposer.

## **VII. AWARD GUIDELINES**

The Government Agreements Officer reserves the right to negotiate directly with the proposer on the Award Articles (terms and conditions) prior to execution of the resulting OT agreement, including payment terms, and will execute the agreement award on behalf of the Government. Be advised, subject to the availability of funds, only a Government Agreements Officer has the authority to enter into, or modify, a binding agreement on behalf of the United States Government.

In order to receive an award:

- Proposers must also register in the prescribed Government invoicing system (Wide Area Work Flow):  
<https://wawf.eb.mil/xhtml/unauth/registration/notice.xhtml>).
- Proposers must be determined to be responsible by the Agreements Officer and must not be suspended or debarred from award by the Federal Government nor be prohibited by Presidential Executive Order and/or law from receiving an award.
- Being asked to submit a proposal does not guarantee that a proposer will receive an award. The Government reserves the right to not make an award.



## **7. AWARD ADMINISTRATION INFORMATION**

### **I. CONTROLLED UNCLASSIFIED INFORMATION (CUI) AND CONTROLLED TECHNICAL INFORMATION (CTI) ON NON-DOD INFORMATION SYSTEMS**

As of the time of publication of this solicitation, all proposal submissions are anticipated to be unclassified (i.e., no classified submissions will be accepted) and will not contain controlled unclassified information (CUI). If a proposer anticipates submitting a proposal with CUI, the proposer should first consult the Agency Point of Contact in Section I, Program Solicitation Overview Information prior to submitting a proposal.

For unclassified proposals containing CUI, applicants will ensure personnel and information systems processing CUI security requirements are in place.

If an unclassified submission contains CUI or the suspicion of such, as defined by Executive Order 13556 and 32 CFR Part 2002, the information must be appropriately and conspicuously marked CUI in accordance with DoDI 5200.48. Identification of what is CUI about this DARPA program will be detailed in a CUI Guide and will be provided upon request.

Proposers submitting proposals involving the pursuit and protection of DARPA information designated as CUI must have, or be able to acquire prior to contract award, an information system authorized to process CUI information IAW NIST SP 800-171 and DoDI 8582.01.

Further information on CUI identification, marking, protecting and control, to include processing on Non-DoD Information Systems, is incorporated herein and can be found at [www.darpa.mil/work-with-us/additional-baa](http://www.darpa.mil/work-with-us/additional-baa).

### **II. COMPETITION SENSITIVE INFORMATION**

DARPA policy is to treat all submissions as competition sensitive and to disclose their contents only for the purpose of evaluation. Restrictive notices notwithstanding, during the evaluation process, submissions may be handled by support contractors for administrative purposes and/or to assist with technical evaluation. All DARPA support contractors performing this role are expressly prohibited from performing DARPA sponsored technical research and development and are bound by appropriate nondisclosure agreements. Input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants/experts who are strictly bound by the appropriate non-disclosure requirements.

### **III. INTELLECTUAL PROPERTY / DATA RIGHTS**

The program will emphasize creating and leveraging open-source technology and architectures. A key goal of the TRACTOR program is to translate all the world's C to

Rust, which is only feasible if any developer, anywhere, can use TRACTOR tools free of cost. Therefore, it is desired that all software (including source code), documentation, and technical data generated under the program be provided as deliverables to the Government, with a suitable open-source license.

To the extent that a TRACTOR tool is designed to use commercial LLM services, those services must be “pluggable,” allowing for the substitution of freely available LLM tools where a TRACTOR user does not wish to pay fees to a commercial LLM service.

**IV. PROCUREMENT INTEGRITY ACT (PIA)**

All awards under this solicitation shall be treated as Federal Agency procurements for purpose of 41 U.S.C. Chapter 21. Accordingly, the solicitation, competitive solicitation process, and awards made thereof must adhere to the ethical standards required by the PIA.

**V. FOLLOW-ON PRODUCTION**

The Government reserves the right to negotiate and award follow-on production contracts and transactions to performers who successfully complete the prototype phase of OT awarded under this solicitation, without further competition, per 10. U.S.C. § 4022.

**VI. HUMAN SUBJECTS RESEARCH (HSR)**

The TRACTOR program does **not** anticipate HSR in proposal submissions. Proposers that anticipate involving human subjects or animals in the proposed research should contact the Agency Contact prior to submitting a proposal to explain why HSR is necessary to successfully complete the proposed research objectives. Proposers who do anticipate proposing HSR must comply with the approval procedures detailed at Human Subjects and Animal Subjects Research, to include providing the information specified therein.

**VII. ORGANIZATIONAL CONFLICT OF INFORMATION (OCI)**

Proposers, through submission of a proposal, are required to identify and disclose all facts relevant to a potential OCI involving the proposer, the proposer’s organization, and/or any proposed team member (proposed subawardee). Along with the disclosure, the proposer shall submit a mitigation plan, which is a description of the action the performer has taken to avoid, neutralize, or mitigate the stated OCI. The Government may require proposers to provide additional information to assist the Government in evaluating the OCI mitigation plan. See Appendix A of Attachment B.

If the Government determines a proposer failed to fully disclose an OCI; failed to provide the affirmation of DARPA support; or failed to reasonably provide additional information requested by the Government to assist in evaluating the proposer’s OCI mitigation plan, the Government may reject the proposal and withdraw it from consideration for award.

**VIII. ASSOCIATE CONTRACTOR AGREEMENT (ACA)**

It is recognized that the success of the TRACTOR research effort depends in part upon the open exchange of information between the various performers involved in the effort. Therefore, any resultant award instrument stemming from this solicitation will include a term/condition classifying performers as “Associate Contractors” and requiring them to enter into an Associate Contractor Agreement with all other TRACTOR performers, with each performer then assuming the responsibilities of an Associate Contractor. See Attachment H.

## 8. PROGRAM SOLICITATION DEFINITIONS

- I. **“Data”** refers to recorded information, regardless of form or method of recording, which includes but is not limited to, technical data, software, mask works and trade secrets. The term does not include financial, administrative, cost, pricing, or management information and does not include inventions.
  
- II. **“Limited Rights”** means the rights to use, modify, reproduce, release, perform, display, or disclose Data, in whole or in part, only within the Government for the limited purpose of evaluation of satisfying the requirements of the Agreement. The Government may not, without the written permission of the party asserting limited rights, release or disclose the Data outside these limited rights, use the Data for manufacture, or authorize the Data to be used by another party, except that the Government may reproduce, release, or disclose such Data or authorize the use or reproduction of the Data by persons outside the Government if—
  - (i) The reproduction, release, disclosure, or use is—
    1. (A) Necessary for emergency repair and overhaul; or
    2. (B) A release or disclosure to—
      - a. (1) A covered Government support contractor in performance of its covered Government support contract for use, modification, reproduction, performance, display, or release or disclosure to a person authorized to receive limited rights technical data; or
      - b. (2) A foreign Government, of technical data other than detailed manufacturing or process data, when use of such data by the foreign Government is in the interest of the Government and is required for evaluation or informational purposes;
  - (ii) The recipient of the Data is subject to a prohibition on the further reproduction, release, disclosure, or use of the technical data; and
  - (iii) The contractor or subcontractor asserting the restriction is notified of such reproduction, release, disclosure, or use.
  
- III. **“Nontraditional Defense Contractor”** is defined in 10 U.S.C. § 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 DoD for the procurement or transaction, any contract or subcontract for the DoD that is subject to full coverage under the cost accounting standards prescribed pursuant to 41 U.S.C. § 1502 and the regulations

implementing such section. This includes all small business concerns under the criteria and size standards in 15 U.S.C. § 632 and 13 C.F.R. Part 121.

- IV. **"Other Transaction"** refers to the type of OT that may be awarded as a result of this PS. This type of OT is authorized by 10 U.S.C. § 4022 for prototype projects directly relevant to enhancing the mission effectiveness of military personnel and the supporting platforms, systems, components, or materials proposed to be acquired or developed by the DoD, or for the improvement of platforms, systems, components, or materials in use by the armed forces.
- V. **"Prototype Project"** is described in the DoD Prototyping Guidebook (Version 3.0, October 2021) issued by the Office of the Under Secretary of Defense for Acquisition and Sustainment.
- VI. **"Restricted Rights"** applies only to noncommercial computer software and means the Government's right to use, modify, reproduce, perform, display, release disclose, or transfer computer software are restricted, except that the Government may use a computer program on a limited number of computers and make the minimum number of copies of the computer software required for safekeeping (archive), backup, or modification purposes. The Government will not transfer the software outside of the Government or for any purpose other than the TRACTOR program, except that the Government may allow the use of the noncommercial computer software outside of the Government under a limited set of circumstances, including use by a covered Government support contractor in performance of its covered Government support contract (management and administrative support), and after the contractor or subcontractor asserting the restriction is notified in writing as far in advance as practicable that a release or disclosure to particular contractors or subcontractor is planned to be made.
- VII. **"Small Business Concerns"** is defined in the Small Business Act (15 U.S.C. § 632).

# APPENDIX A: ABSTRACT TEMPLATE

## ABSTRACT COVER LETTER <PRIME ORGANIZATION LOGO (OPTIONAL)>

DARPA-PS-XX-XX	
Abstract Title	
Submitter Organization	
Type of Organization	<b>Choose all that apply:</b> Large Business, Small Disadvantaged Business, Other Small Business, HBCU, MI, Other Educational, or Other Nonprofit
Technical Point of Contact (POC)	Name: Mailing Address: Telephone: Email:
Administrative POC	Name: Mailing Address: Telephone: Email:
Total Basis of Estimate	Total: \$
Place(s) of Performance	
Other Team Members (Subawardee and Consultants) if any	Technical POC Name: Organization: Organization Type:

**ABSTRACT GUIDELINES:** [All submissions must be written in English with font type **NOT** smaller than 12-point font. Smaller font may be used for figures, tables, and charts. Delete all formatting and content instructions prior to submission. Content recommendations are displayed in blue font and should be deleted prior to abstract submission. **Abstracts have a limit of 3 pages.** Citations and the Basis of Estimate do not count towards the 3-page limit.]

### CONCEPT SUMMARY

[Describe the abstract concept with minimal jargon and explain how it addresses the TRACTOR technical objectives.]

### INNOVATION AND IMPACT

[Clearly identify the outcome(s) sought and/or the problem(s) to be solved with the proposed technology concept. Describe how the proposed effort represents an innovative and potentially revolutionary solution to the TRACTOR technical objectives. Explain the concept’s potential to be disruptive compared to existing or emerging technologies and how the proposed approach will go far beyond current existing capabilities. To the extent possible, provide quantitative metrics in a table that compares the proposed technology concept to current and emerging technologies which may include:

- A progression of increasingly complex technical challenges.
- State of the art / emerging technology “baseline.”

- Aggressive metrics in for each year of the proposed project.
- Summary of specific outcomes from the proposed research.]

**PROPOSED WORK**

[Describe the final deliverable(s) for the project, key interim milestones, and the overall technical approach used to achieve project objectives. Discuss alternative approaches considered, if any, and why the proposed approach is most appropriate for the project objectives. Describe the background, theory, simulation, modeling, experimental data, or other sound engineering and scientific practices or principles that support the proposed approach. Provide specific examples of supporting data and/or appropriate citations to the scientific and technical literature. Identify adoption challenges to be overcome for the proposed technology to be successful. Describe why the proposed effort is a significant technical challenge and the key technical risks. At a minimum, the abstract should address:

- Does the approach require one or more entirely new technical developments to succeed?
- How will technical risk be mitigated?
- What use cases, capabilities, or demonstrations will be featured?]

**TEAM ORGANIZATION AND CAPABILITIES**

[Indicate the roles and responsibilities of the organizations and key personnel that comprise the Project Team. Provide the name, position, and institution of each key team member and describe in 1-2 sentences the skills and experience they bring to the team.]

**BASIS OF ESTIMATE (BOE)**

[Please include a BOE of timeline and federal funds requested, as well as the total project cost including cost sharing, if applicable. The BOE should also include a breakdown of the work by direct labor (fully burden), labor hours, subcontracts, materials, equipment, other direct costs (e.g., travel), profit, cost sharing, and any other relevant costs. The below table may be used for this breakdown:]

<b>Categories</b>	<b>Amount</b>
Direct Labor (Fully Burden)	
Labor Hours	
Subawardees	
Materials	
Equipment	
Travel	
Other Direct Costs	
Profit	
<b>Total</b>	
Cost Sharing (if applicable/appropriate)	