Artificial Intelligence Exploration (AIE) Constructive Machine-learning Battles with Adversary Tactics (COMBAT)  
Frequently Asked Questions (FAQ) Document  
PA-19-03-08

Q1: I have experience through the DARPA XD3 program developing an adversarial simulation framework for cyber attacks and defenses that uses Machine Learning (ML) to train adaptive strategies for both combatants, given conflicting objectives and asymmetric action spaces. Rather than Reinforcement Learning (RL), the framework, RIVALS, uses two competing populations of agents and the agents learn through competitive coevolutionary algorithms. Is COMBAT restricted to RL approaches by strict definition?

A1: No, RL is an example of an approach, but other approaches are welcomed.

Q2: We are interested in submitting a proposal for AIE COMBAT, but have a question about the simulation platform. OneSAF will be used to measure performance of the AI Red Force, but information and documentation on OneSAF is not easily available. Will performers be given access to OneSAF as their internal simulation engine, or will we need to propose an alternative solution?

A2: DARPA will sponsor performers to receive copies of OneSAF should the performer elect to use it for their internal simulation engine. However, OneSAF software is Controlled Unclassified Information (CUI) and subject to export controls under ITAR 22CFR ch1 (4-1-13 Ed) 121.8; performers are encouraged to review the OneSAF distribution agreement online (https://www.peostri.army.mil/onesaf) prior to including the use of OneSAF in their proposals.

Q3: We are an AI tech company that has developed AI for both shooter and strategy games. We would welcome the opportunity to see how we could participate with DARPA on the war games project. I have included a deck on our capabilities with Fortnite examples. Would certainly welcome the chance to talk with you by phone this week or next.

A3: The Program Manager and his team are unable to discuss potential proposal concepts at this time. If you have specific technical questions that are not answered by the COMBAT special notice or the larger DARPA AIE announcement, DARPA-PA-19-03, please continue to send those questions to the email box and we will do our best to address them.

Q4: Can a vendor submit multiple proposals to this Notice and be awarded more than one award?

A4: Yes, but multiple awards to the same company are not likely. The company would have to demonstrate the technologies and approaches are completely different, and ensure that separate resources are available to support the efforts, to include firewalled teams.
Q5: We have an already-built world-leading Game Solving System product that we would like to use for this application. In this project we would do modeling work so that this particular application becomes AI understandable and perform integration work so it will work with the Modeling and Simulation package of choice. The developed models and abstractions would have Government Purpose Rights. However, we keep our pre-existing Game Solving System proprietary and do not grant Government Purpose Rights to it. Is this an acceptable arrangement for this program (as it is for other parts of the DoD), or should we not propose to this Notice?

A5: You are encouraged to propose innovative solutions to these complex problems regardless of intellectual property assertions. The first and most important evaluation criterion is **Overall Scientific and Technical Merit**. However, another criterion is the **Potential Contribution and Relevance to the DARPA Mission**. The potential contributions of the proposed effort should bolster the national security technology base, and support DARPA’s mission to make pivotal early technology investments that create or prevent technological surprise. The proposed intellectual property restrictions (if any) should not significantly impact the Government’s ability to transition the technology. The Government will be reluctant to transition a technology with large, long term IP costs, so this should be taken into consideration when proposing to this effort.

Q6: It seems from the Notice that the each performer is supposed to select a Modeling and Simulation package one month into the program. How can performers select a non-free Modeling and Simulation package at that point if it is not part of the budget? Would DARPA pay for it?

A6: The cost of the Modeling and Simulation tool should be included as part of the price proposal.

Q7: We cannot find the continually-updated FAQ that the Notice references. What is the exact URL to it?


Q8: I am really intrigued by the AIE COMBAT Notice you have out on the street. Our company is building a full suite of space capability from the deployment of satellites to the operations and C2 of those satellites layered in with AI/ML applications. One area we are focusing is on the wargaming and training side for satellite operators. I know your focus is terrestrial, but have you considered the space domain as well? Would that also fall under DARPA? We have customers like SDA, Space Force, AFRL etc identified but, again, your COMBAT program has me interested.
A8: The COMBAT program focuses on Army Maneuver Brigade operations that are terrestrial. Some space assets would support their operations but these are not intended to be solicited under the COMBAT AIE.

Q9: As a first time applicant from the commercial sector, I don't know how to approach this process, but I think more research will answer these types of questions (CAGE, proposal format, etc.)

A9: Information concerning the proposal process can be found online at this address: https://www.darpa.mil/work-with-us/.

Q10: The specs of what you're requesting to be integrated ...
   a) Will physics be required on vehicles/soldiers? (I have full rigid-body physics, but if not required I can do millions of entities).

A10a: It is envisioned that performers will model the capabilities of a company (100-150 soldiers) and any supporting platoons (40 soldiers) not the individual soldier or vehicle, therefore, rigid-body physics models are not required.

   b) Networking requirements (are you trying to sync this across a network? I can do 1k+ entities with 64+ clients @ real-time tick rate, using my proprietary networking topology, but again if not required, can massively increase entity count).

A10b: See answer 10a with respect to entity count (company level modeling will likely limit entity count to several hundred total red and blue entities, vs 1k+). Networking is not required at this time, however, in Phase 2, the performer will need to work with the Government on a federated solution which will enable their algorithms to control OneSAF entities for real-time or near-real-time demos.

   c) Source-code ownership of work produced - would I still maintain ownership of it?

A10c: To facilitate transition, the Government would prefer that source code be delivered with Government Purpose Rights. Please ensure that you clearly describe your company’s approach to intellectual property in your proposal.

   d) GPU support ... would you like to perform operations on the GPU or CPU? (I can do either, I'm working on an entirely GPU based AI combat simulation system as one of my sub-projects, and can bump up priority if needed).

A10d: Performers should utilize processing most appropriate for their proposed AI development.
e) I saw in the article you'd accept reduction in AI quality based on "terrain", this is something I've worked on a lot ... sort of AI "level of detail" (LOD), any clarification or expansion would help tailor a proposal.

A10e: The statement from the announcement concerning terrain refers to the modeling of entities within the simulation at the company-level (100-150 soldiers, vice individual soldiers or equipment), which limits the impact of terrain on the capability of the entity. For example, a tree blocking an individual soldier's line of sight to an adversary may prevent an engagement if individual entities are used, but at the company level it is assumed that slight obstructions to line of site, such as light foliage, will not affect the ability of the unit as a whole to engage a target.

f) Are there any existing systems you'd like the applicants to "sync" with ? ie: Unreal Engine, Unity, or similar existing military systems ?

A10f: There is no requirement to be linked to Unreal Engine, Unity, or existing Army Command and Control systems. DARPA will sponsor performers to receive copies of OneSAF should the performer elect to use it for their internal simulation engine. However, OneSAF software is Controlled Unclassified Information (CUI) and is subject to export controls under ITAR 22CFR ch1 (4-1-13 Ed) 121.8; performers are encouraged to review the OneSAF distribution agreement online (https://www.peostri.army.mil/onesaf) prior to including the use of OneSAF in their proposals.