THE GRANTS.GOV PROPOSAL SUBMISSION DATE HAS BEEN UPDATED TO 24 APRIL 2024. The following answers to questions received from interested Applicants are hereby included as an Amendment to the FOA. Other than the updated proposal submission date in the FOA, the actual FOA Amendment has not been changed. However, the answers provided below are considered part of the FOA Amendment.

Q: To what degree is novel collaborative maneuver behavior approaches (a major part of Cycle 1), still an important part of winning a Cycle 2 proposal?

A: The focus in Cycle 1 was to exhibit maneuvers which followed military doctrine as well as explore novel maneuvers. This was primarily on a A to B navigation task under varying levels of risk. In Cycle 2, maneuver doctrine will be useful for arriving at the contact position favorably. The "Battle Drills" shown in the webinar are the best examples we have found on what the Army teaches its soldiers to do upon contact and should serve as guidelines for how robots should react as well, but it is reasonable to assume that robot formations might react differently than human formations on contact, such as by assuming more risk in order to gather information about the contact.

Q: What is the target ROS2 Distro?

A: Currently, our development is in "Humble" and "Iron", but our target is "Jazzy" for the start of TBAM Cycle 2.

Q: Would improving the perception (using multimodal sensing) for certain maneuverability aspects of the robotic swarm be within the scope of this proposal?

A: The main focus for TBAM Cycle 2 is on the autonomous team decision-making as contact is made with an enemy position in terrain. For research on perception to be in scope for TBAM Cycle 2, some conditions would need to be met: a) Can it be tested effectively in a simulation (alongside the maneuver component)?, b) Is it not duplicative of other research in ARL collaborative research programs?, and c) Is it used to help make decisions for this team as contact is made?

Q: Will virtual <-> physical co-simulation be of interest for this proposal?

A: Physical experimentation is preferred to be done in collaboration with your ARL technical point of contact (TPOC) and with ARL equipment. Hybrid physical and virtual multi-agent reinforcement learning is possible with the ROS2ML-Agents module described in the Webinar.

Q: Are there any guidelines about project budgets?

A: FOA (page 11) states “Multiple awards are expected to be funded out of the Cycle #2 total amount of $2.1M per year. Proposals are expected to be bid at a cost commensurate with the level of effort to include potential option periods.”

Q: Can you contrast more specifically the expectations of "Maneuver" (TBAM) vs. "perimeter defense games" (DCIST)?

A: TBAM is maneuvering into a non-permissive environment where contact is made with an adversary position. For DCIST “perimeter defense games”, the situation is instead the defense of a prepared position from an adversary coming from an unknown direction.

Q: For the ROS2 version of the Unity Simulator, is it known what environments (i.e. Camp Lejeune) will be available?

A: Yes, we intend to upgrade and provide a variety of simulation environments, likely including the Camp Lejeune environment

Q: Are we assuming the Robot have access to a global map and positioning? or only rely on each robot observation?

A: Access to prior information about the terrain of the environment and notional adversary positions is in-scope for TBAM. Localization information can also be exported from the simulator (i.e. “GPS”).

Q: Would scenario wise dynamic shuffling of different maneuver strategies as a framework be of interest to this cycle?

A: As with Cycle 1, the team should adopt an appropriate posture to represent the level of risk as contact is approached. The “maneuver strategies” used to respond to contact should be dynamic in the sense that they would adapt to the terrain at that contact and the adversary which is contacted.

Q: Can you talk a little bit about communication models (centralized, decentralized, opportunistic, denied, etc?) that you are expecting to see from a planning/coordination point of view?

A: Decentralized algorithms are preferred from a realism standpoint – an approach which is brittle to degraded communications or loss of key assets (centralized command element) would be less competitive than something which could be resilient to these setbacks. However, we are not planning to require testing with degraded comms or loss of team members.

Q: You mentioned about metrics across multiple ARL CRPs. For TBAM Cycle 2, since the focus is on the team action to the situation, would you expect that we define our own metrics for evaluating how the proposed method works?

A: We expect metrics to be defined by each team to evaluate their specific approach – some metrics may be shared between teams and could be used to compare alternative approaches.

Q: What compute resources would be expected on the Warthog class of robot? Is BYOC an option (Bring you own compute)?

A: Compute resources are not limited to what is currently practical to deploy on a team of mobile robots.

Q: Is there a plan for collaboration between performers during cycle 2? How should this be addressed in the proposal for cycle 2?

A: Collaboration is encouraged across performers selected for award in TBAM.

Q: Should a multi-organization team submit one proposal (with subawards) or collaborative proposals?

A: If proposing as a multi-organization team, please submit one proposal (with subawards).

Q: Are the example videos reflective of the desired team sizes?

A: Yes, roughly. The desired scale of TBAM robot teams is 10 units.

Q: How much of a focus is agent heterogeneity?

A: Heterogeneous robot teams can be proposed but would not be required

Q: Were there any great successes of cycle 1 that project leadership has made it a priority to build upon cycle 2?

A: Several paper citations from Cycle 1 are included in the FOA but are not required to be incorporated in Cycle 2 approaches.

Q: Can government lab outside of ARL submit proposals?

A: Government Labs are not eligible for awards resulting from this FOA. For FFRDC's see FOA reference below:

FOA, page 5 states, “Federally Funded Research and Development Centers (FFRDCs) are subject to applicable direct competition limitations and cannot propose to this solicitation in any capacity unless they meet the following conditions. (1) FFRDCs must clearly demonstrate that the proposed work is not otherwise available from the private sector. (2) FFRDCs must provide a letter, on official letterhead from their sponsoring organization, that (a) cites the specific authority establishing their eligibility to propose to Government solicitations and compete with industry, and (b) certifies the FFRDC’s compliance with the associated FFRDC sponsor agreement’s terms and conditions. These conditions are a requirement for FFRDCs proposing to be awardees or subawardees.”

Q: Would it be possible to share the slides or recording from this webinar?

A: This is planned pending approval for public release

Q: Are applications from outside the US allowed?

A: Yes

Q: Are DoD FFRDC eligible for funding via a standard cooperative agreement or an interagency agreement?

A: The FOA provides guidance on what is needed for an FFRDC submission.

Q: Are there any constraints on the amount of overhead that can be charged? Should it be 10%? Can it be 30%? Is any special paperwork required to arrange a specific percentage?

A: Overhead rates should be justified / explained by an included letter from an officer of the institution. Agreed upon Government approved rates (DCAA/DCMA/ONR/DHHS) between the proposer and government are preferred.

Q: Suppose that money for the 2-year cycle is awarded. Are receipts or any other report on the spending of the money required? If at the end of the 2 years there is money left, should it be returned?

A: Spending is tracked via an accounting system which requires monthly expenditure reports from your institution**.** Awarded Cooperative Agreements will outline required reporting (technical and financial)**.**

Discussion between the Government (CAM) and awardee can occur for unspent funding, but ultimately the decision for what to do with it will be the CAM’s decision.

Q: Suppose now that an organization from outside the US collaborates with a US organization as a sub-awardee. How does this affect the need for justification of overhead rates and the expenditure reporting? Are there any additional considerations for a subawardee?

A: The prime on the cooperative agreement would be responsible for this reporting, so your institution would need to send them your expenditures. Overhead rates and justifications should be included for the prime and any sub-awardees in the proposal.