SPECIAL NOTICE DARPA-SN-19-60
Air Combat Evolution (ACE) AlphaDogfight Trials
WEBSITE: **https://www.arcnetconsortium.com/arcnet-technology-opportunities/**
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SUMMARY:
The Defense Advanced Research Projects Agency (DARPA) Strategic Technology Office (STO) will host the Alpha Dogfight Trials, a demonstration of artificial intelligence (AI) dogfighting algorithms. Independent of the DARPA/STO Air Combat Evolution (ACE) program, algorithm developers will be given the opportunity to demonstrate algorithm performance in competition style trials against adversaries of increasing complexity. The AlphaDogfight Trials will be solicited under the Autonomy Research Collaboration Network (ARCNet) Consortium, with the goal of reaching non-traditional Department of Defense (DoD) performers and reducing the barriers to entry for the application and contract award processes.

PROGRAM OBJECTIVE AND DESCRIPTION: DARPA has already initiated a program called Air Combat Evolution (ACE) under a separate solicitation. The ACE program will increase warfighter trust in combat autonomy by automating aerial, within-visual-range (WVR) maneuvering, colloquially known as a dogfight, using progressively realistic platforms. (Following demonstrations in modeling and simulation, the program will graduate to small-scale unmanned aerial vehicles, and culminate on operationally representative aircraft). A dogfight represents the progression in autonomy from current physics-based automation generally trusted by operators to more complex human-machine collaboration necessary to realize the promise of future manned/unmanned teaming.

To help expand the base of potential algorithm developers, the ACE program is sponsoring the AlphaDogfight Trials. The AlphaDogfight Trials will be conducted independently of the ACE program, supported by AFWERX and solicited under the ARCNet Consortium, with the goal of reaching non-traditional Department of Defense (DoD) performers with AI algorithm development expertise. The AlphaDogfight Trials will evaluate autonomous dogfighting algorithms based on a variety of artificial intelligence approaches to inform the DARPA ACE program about the advantages and disadvantages of various algorithmic approaches in this application space. The effort will expose potential performers, both traditional and non-traditional, to the ACE program and provide a venue for collaboration and evaluation of capabilities.

The AlphaDogfight Trials will focus on one-versus-one (1v1) dogfights in a simulation environment only. In a 1v1 dogfight, a "Blue-force" autonomous agent will engage in air combat with an adversary "Red-force" autonomous agent within visual range. Starting from several different initial conditions, each aircraft must execute a series of air combat maneuvers to successfully orient the aircraft to a pre-defined position of advantage with respect to the opposing aircraft. In the AlphaDogfight Trials, participants will develop algorithms capable of controlling a simulated Blue aircraft such that it can defeat a simulated Red aircraft in a WVR engagement.

The AlphaDogfight Trials will consist of three events against adversaries of increasing capability/complexity held over the course of 24 weeks:

- Trial 1: Agents will compete against a Government-furnished low performing Red adversary (power, G, maneuver limited)
- Trial 2: Agents will compete against a Government-furnished medium performing Red adversary (power limited)
- Trial 3: Agents will compete against a Government-furnished high performing Red adversary agent (no limits), other performer agents, and human pilots

The AlphaDogfight Trials will be conducted completely independently from the ACE program. Participation in the AlphaDogfight Trials does not guarantee participation in the ACE program. Proposers do not need to participate in the AlphaDogfight Trials to be eligible to participate in the ACE program.

SOLICITATION INFORMATION: The AlphaDogfight Trials will be solicited under AFRL's ARCNet Consortium, which can found at the following website: **https://www.arcnetconsortium.com/arcnet-technology-opportunities/.** The expected release date of the AlphaDogfight Request for Project Proposal (RPP) is late June or early July.

To view and/or respond to the solicitation, proposers are required to join the ARCNet Consortium. To do so, visit the following website: https://www.arcnetconsortium.com/apply/. Joining the ARCNet Consortium is intended to be quick and easy. The minimum qualifications to do so can be found in the application section of the link provided above. The cost is $500 per member annually, regardless of company size or status.

Disclaimer:
This Special Notice is issued solely for the purpose of announcing the AlphaDogfight Trials. It does not constitute a formal solicitation for proposals or any other information.