TITLE: Counter-UAS Technologies for Swarming UASs

TECHNOLOGY AREAS: Information Systems

ACQUISITION PROGRAM: PEO Ammunition

OBJECTIVE: Develop and demonstrate a low-cost and lightweight countermeasure system that can be used to detect, disrupt, disable, and neutralize enemy unmanned aerial systems (UASs) platforms in swarming scenario.

DESCRIPTION: The role of unmanned aerial systems (UASs) in the battlefield continues to grow for both US forces and our enemies. These platforms serve a variety of roles, including support of communications, surveillance, and even attack capabilities. Their relatively low cost and access to previously-unavailable vantage points has led to their increasingly-pivotal role in ensuring battlefield dominance. To ensure our military’s continued technical and tactical superiority on the battlefield, it is imperative that technologies are developed and deployed to enable the detection and neutralization of enemy UASs. These technologies should include capabilities to 1) identify the UASs themselves to include swarm of UASs and 2) initiate countermeasures that are effective in defeat swarming UASs. These countermeasures may include either a) disrupt these platforms’ autonomous flight-control and navigation capabilities or b) cueing a weapons system like the Remotely-Operated Weapon Station (RWS) or other medium or large-caliber weapon. The objective of these capabilities is to enable the detection and capture and/or destruction of all enemy UASs on the battlefield.

PHASE I: The objective of this phase will be to develop concepts to support the detection and disruption of swarming UASs. This Phase should include a review of concepts suitable for installation on a variety of platforms, including fixed-site, vehicular, and airborne (e.g., on Army UASs) as well as interface requirements for cueing C-UAS weapons. Upon completion of Phase I, the contractor shall provide one or more baseline designs, as well as a review of the relevant performance and interface requirements necessary to support swarming UAS countermeasures.

PHASE II: The objective of Phase II will be to demonstrate a lightweight, low-cost swarming UAS countermeasure system suitable to one or more of the platforms described above. This Phase will include testing of the sensor system at a Government facility, including both laboratory and over-the-air testing, as well as demonstration of interoperability with RWS and/or other counter-UAS weapons. Based on the results, a final design will be identified and a prototype will be delivered.

PHASE III: Based on Phase II results, a prototype UAS countermeasure system will be optimized for commercialization and transition to military platforms. The prototype will be adapted to provide unclassified UAS protection capabilities for public/civil service agencies (e.g., critical infrastructure, public safety, etc.) and commercial entities requiring facilities and personnel protection and protection from industrial espionage (e.g., power and communications companies, the media and entertainment industries, auto industry, etc.). Transition opportunities identified during Phase I and Phase II will be used to tailor and deliver specific configurations of the system. The Army wants to cover the spectrum of military operations, from the brigade level and above out to the tactical edge. One application in the military area will use this system against drones by signal jamming the Command and control link or blocking, and the radar detection and conventional counterattack used against any other aircraft. Another application of such systems to be deployed by the army will be to use system capabilities in terms of using detection of the datalink to geolocate the threat UAV ground station and support its engagement using heavy weapons fire. After this Phase III is completed the most likely path for transition of this SBIR from research to operational capability will be to transition the final product/technologies into Program of records (PORs) across multiple PMs such as PM EW, PM RADAR, PM AMMO and other agencies.

REFERENCES:

1. Swarming and the Future of Warfare

2. Faculty Explore Defensive 'Swarming' Strategies to Counter UAVs
   http://www.nps.edu/About/News/Faculty-Explore-Defensive-Swarming-Strategies-to-Counter-UAVs.html

3. Flight Demonstrations of Unmanned Aerial Vehicle Swarming Concepts
   http://www.jhuapl.edu/techdigest/TD/td2701/Bamberger.pdf

KEYWORDS: Unmanned Aerial System (UAS), Swarming, Threat Detection