

**AFRL CALL FOR RESEARCH**

1. **Research Title:** Planning, Guidance, and Control for Multiple UAV Cooperative Operations
2. **Individual Sponsor:**  
 Dr. Derek Kingston, AFRL/RQQA  
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3. **Academic Area/Field and Education Level:** Aerospace Engineering, Electrical Engineering, and Computer Science / Autonomous Vehicle Guidance, Navigation, and Control, Machine Learning, Robotics (M.S. or Ph.D. level)
4. **Objectives:** Research and develop planning, guidance, and control methodologies for multiple UAV cooperative operations. The approach should address one or more of the following scenarios: combat intelligence, surveillance and reconnaissance, resource allocation, or cooperative operations in urban terrain.
5. **Description:** Increasingly, UAVs will need to operate in teams to semi-autonomously perform complex, cooperative tasks. For successful operations, a variety of basic issues need to be considered, including: task coupling; resource allocation; efficient distributed decision and control algorithms that account for global goals and mission objectives; algorithms for real-time multiple-task assignments with complex task constraints; decentralized decision and control algorithms to provide robustness and flexibility; effects of network communication delays on team assignment decisions; effects of uncertainty through information theory and game theory; cooperative control of micro air vehicles in urban environments, which needs to account for high uncertainty due to limited sensors, processing power, and communication links; mixed initiative control, in which the human operative interacts with automated decision systems to maximize mission effectiveness; and scalable planning for heterogeneous systems of systems.
6. **Research Classification/Restrictions:** Unclassified
7. **Eligible Research Institutions:**

**DAGSI** (Wright State University, AFIT, Ohio State University, University of Dayton, Miami University, Ohio University, University of Cincinnati)

**AFIT (only)**

**USAFA (only)**

If you are submitting a topic for the USAFA, indicate if you are also interested in sponsoring a USAF Cadet in summer 2015 (Average cost for USAF Cadet for 33 days is \$5000)

Yes

No