AES Seminar

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Persistent Coverage Control for Constrained Multi-UAV Systems

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Abstract: Control of multi-agent systems and networks has been a popular topic of research with applications in numerous real-world problems involving autonomous unmanned vehicles (ground, marine, aerial, space) and robotic assets. Despite the significant progress over the past few years, we are not yet in place to deploy arbitrarily large-scale systems with prescribed safety and resilience (against malfunction or malicious attacks) guarantees for a variety of applications, such as surveillance and situational awareness in civilian and military environments. Planning, estimation and control for such complex systems is challenging due to non-trivial agent (vehicle, robot) dynamics, restrictions in onboard power, sensing, computation and communication resources, the number of agents in the network, and uncertainty about the environment. In this talk, we will present some of our recent results and ongoing work on the safe, persistent dynamic coverage control for multi-UAS networks.

Bio: Dimitra Panagou received the Diploma and PhD degrees in Mechanical Engineering from the National Technical University of Athens, Greece, in 2006 and 2012, respectively. Since September 2014 she has been an Assistant Professor with the Department of Aerospace Engineering, University of Michigan. Prior to joining the University of Michigan, she was a postdoctoral research associate with the Coordinated Science Laboratory, University of Illinois, Urbana-Champaign (2012-2014), a visiting research scholar with the GRASP Lab, University of Pennsylvania (June 2013, fall 2010) and a visiting research scholar with the University of Delaware, Mechanical Engineering Department (spring 2009). Dr. Panagou's research program emphasizes in the exploration, development, and implementation of control theoretic methods in order to address real-world constrained control problems via analytic, provably correct solutions. Her research spans the areas of nonlinear systems and control; control of multi-agent systems and networks; distributed systems and control; motion and path planning; switched and hybrid systems; constrained decision-making and control; navigation, guidance, and control of aerospace vehicles. She is particularly interested in the development of provably correct methods for the robustly safe and secure (resilient) operation of autonomous systems in complex missions, with applications in unmanned aerial systems, robot/sensor networks and multi-vehicle systems (ground, marine, aerial, space). Dr. Panagou is a recipient of a NASA Early Career Faculty Award, of an AFOSR Young Investigator Award, and a member of the IEEE and the AIAA.