Computer Science

Guest Speaker

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Date: Wednesday, January 30, 2019
Time: 2:30pm
Location: 223 Atanasoff

Networking for Autonomous Swarms

The Air Force Research Laboratory's Cooperative Heterogeneous Autonomous Resilient On-Demand Networking (CHARON) program is an effort to research, design, develop, integrate, test, evaluate, and experiment in innovative technologies and techniques for elastic tactical networking for autonomous swarms.
This talk will introduce the three main components of this program and discuss the expected results of CHARON. Specifically, we will discuss:

- Dynamic Network Management: The performance of communications systems is generally defined through the metrics goodput, latency, and reliability. While the tradeoff between these three metrics is usually decided by the communications system designer, there are often tradeoffs that could be better made on-demand to give preference to one or the other metric. This focus area seeks to develop a Dynamic Network Management (DNM) protocol that will translate a set of application parameters into a set of points in the feasibility region of the network.
- Network Protocol Design: The primary objective of this effort will be to develop distributed network protocols at layer three and above that are predictably flexible in terms of the relative priority of latency, goodput, and reliability. These capabilities will need a set of protocols that can be predictably set to operate across a specific feasibility regime. The parameters must able to be tied back to the original optimization objectives.
- Distributed Airborne Tactical (DAT) Beamforming: The primary objective of this effort is to develop low-cost distributed beamforming capabilities with swarms of omni-directional antennas. An extension of cooperative communications technologies that enables spatial diversity can be shown to allow omnidirectional radio systems to cooperate and form a pseudo-phased array with distributed elements for the purpose of directional transmission and range extension.

Part of the Computer Science Seminar Series

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