

PhD Dissertation Defense Announcement
Mechanical and Aerospace Engineering Department
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Cooperative Manipulation and Formation Control Using Multiple Aerial Vehicles

By

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Abstract

This dissertation focuses on cooperative systems, where uncrewed autonomous systems (UASs) collaborate to achieve a common goal. In the lack of human intelligence, decision making and perception capabilities, UASs could mutually benefit from each other's capabilities when they are deployed and utilized together. This research specifically explores the collaboration of UASs under constraints that necessitate varying levels of coordination and cooperation. The study's objective is to develop and integrate cooperative guidance and control algorithms for selected UASs in constrained mission scenarios, including cooperative aerial payload manipulation via multi-rotors with suspension cables and formation tasks using a team of airship and multi-rotors. These algorithms are tested in high fidelity simulations to assess multi-agent collaboration effectiveness in realistic flight tasks.