



The University of Texas at San Antonio™

**DATE:**  
**Friday,**  
**January 20, 2023**

**TIME:**  
**1:00pm-2:30pm CST**

**LOCATION:**  
**BSE 2.102**  
**Zoom: 993 9428 7226**



# NASA MIRO CAMEE

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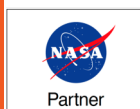
## PRESENTS:

**Kamesh Subbarao, University of Texas at Arlington**

**Title:** *Stability and Performance Assessment of Cooperating Teams of Multi-Agent Systems*

Traditional control design methodologies can guarantee stability and performance of systems modeled as linear time invariant systems. However, when multiple such “optimal” vehicles are put together in a team, what guarantees for stability and performance can one expect? This talk focusses on this aspect. The well-known linear parameter varying control methodology is adopted to develop a full envelop robust controller for high performance aerial vehicles. A novel distributed version of this controller will be introduced that addresses the challenge of the computational effort required for synthesizing a robust controller for the group. This novel framework provides performance guarantees and can be rapidly evaluated for sufficiently large groups. The presentation will also discuss some procedures to compute stability and robustness margins as well as input time delays to address the communication among multiple vehicles. The results are less conservative and more accurate than the current state-of-the-art algorithms. Some interesting modalities that allow hackers to compromise a mission will be shown that are derived purely from this robust control framework. The presentation will focus on a novel uncertainty quantification framework which allows us to compute the sensitivity of the performance to individual vehicle connectivity – some intuitive connection topologies will be discussed in this context. While the frameworks mentioned previously will be shown in the context of multiple cooperating unmanned vehicles, the presentation will also underscore the applicability to many classes of mechanical, and aerospace systems.

**Zoom link:** <https://utsa.zoom.us/j/99394287226>



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