PROJECT TITLE: COLLABORATIVE TRANSPORTATION OF A COMMON OBJECT USING MULTIPLE UNMANNED AERIAL VEHICLES (UAVs)

Professor Manish Kumar  
Department of Mechanical Engineering  
629 Rhodes Hall  
Cincinnati, OH 45221-0072  
Tel: (513) 556-5311  
Email: manish.kumar@uc.edu

Project Description

Given recent success in autonomous systems, there is a growing interest in aerial and self-driving cars to enhance human mobility. The long-term goal of this project is to develop aerial car technology to provide human transportation for daily commute as well as for quick relief during emergency applications. Most of the current drone taxi designs are based on a single drone with huge payload capacity. This research, on the other hand, focuses on developing aerial cars based on multiple drones collaboratively lifting a payload. Such an aerial car would offer many merits such as modularity for varying payloads and fault tolerant capability as opposed to current drone taxi designs. The researchers at CDS and UAV MASTER labs are working on developing hardware platforms as well as software interfaces and associated flight control algorithms for realizing such aerial cars. For this WISE project, the student will use DJI Flamewheel drones with Pixhawk as their flight controller. Force torque sensors fabricated from inexpensive load cells will be used to measure the contact forces and torques acting at the drones which will be used to implement control schemes. The UAV MASTER lab is also equipped with motion capture system consisting of an array of cameras measure the precise position of the drones. This system will be used for developing accurate control schemes. The student will be engaged in hardware integration, algorithm development for sensing and control, as well as its implementation on real drones. More information on the current research activities in the lab can be obtained from the website https://ceas.uc.edu/research/centers-labs/cooperative-distributed-systems-lab/projects.html.