Optimized Fleet Management for Drone Delivery Systems

Unmet Needs
While individual drones are becoming increasingly capable, reliable and affordable, there lacks a fleet management system that enables a large fleet of drones to perform automated point-to-point delivery tasks in congested airspace. Without such a system, the benefit of drone delivery will not be sufficiently materialized.

Our solution
This project will create a software tool for managing large-scale concurrent flight missions over the Internet. Pivoted on our **dynamic fleet routing** and **trajectory optimization** algorithms, this tool will integrate the fleet’s distributed onboard sensors and computers with a Cloud-based central controller, to manage all involved resources with high efficiency.

Impact and Potential Customers
Drone delivery can revolutionize the last-mile delivery business for its multifold of benefits over conventional delivery methods. Our first target application is the **on-demand meal delivery** services, which is a $11 bn market in the U.S. today. Our long-term goal is to enable city-wide **drones as a service** (DAAS) platforms so that different municipal departments (e.g., police, fire, EMS, DOT) and individual citizens can request real-time drone-based services (e.g., package delivery, imaging and surveillance) without separately owning and managing their own fleets. All flights will be unmanned, centrally coordinated and taking place within the Class G airspace on certified eVTOL drones.

Team Members
**Dr. Yanchao Liu**, Assistant Professor of Industrial & Systems Engineering, Wayne State University (WSU), member of **AUVSI**; **Adarash Mishra**, BSE Industrial & Operations Engineering, University of Michigan; **Eric Petersen**, Director - Advanced Transportation Innovation Hub, University of Michigan; **Zhenyu Zhou**, Ph.D. candidate, WSU.

Product Prototype (links to video demos)
**On-demand Delivery Simulation** (LinkedIn Post)  **Pitch Slides**  **Fleet Manager View (iOS App)** (LinkedIn Post)  **Outdoor Demo**  **Special delivery** (WSU news)  **No Pilot? No Problem.** (U-M CFE article)  **NSF Grants** (WSU news)

Contact Info: yanchaoliu@wayne.edu; 313-577-3301; 4815 4th Street Rm 2169, Detroit, MI 48201, USA