CPS:Medium:Interactive Human-Drone Partnerships in Emergency Response Scenarios

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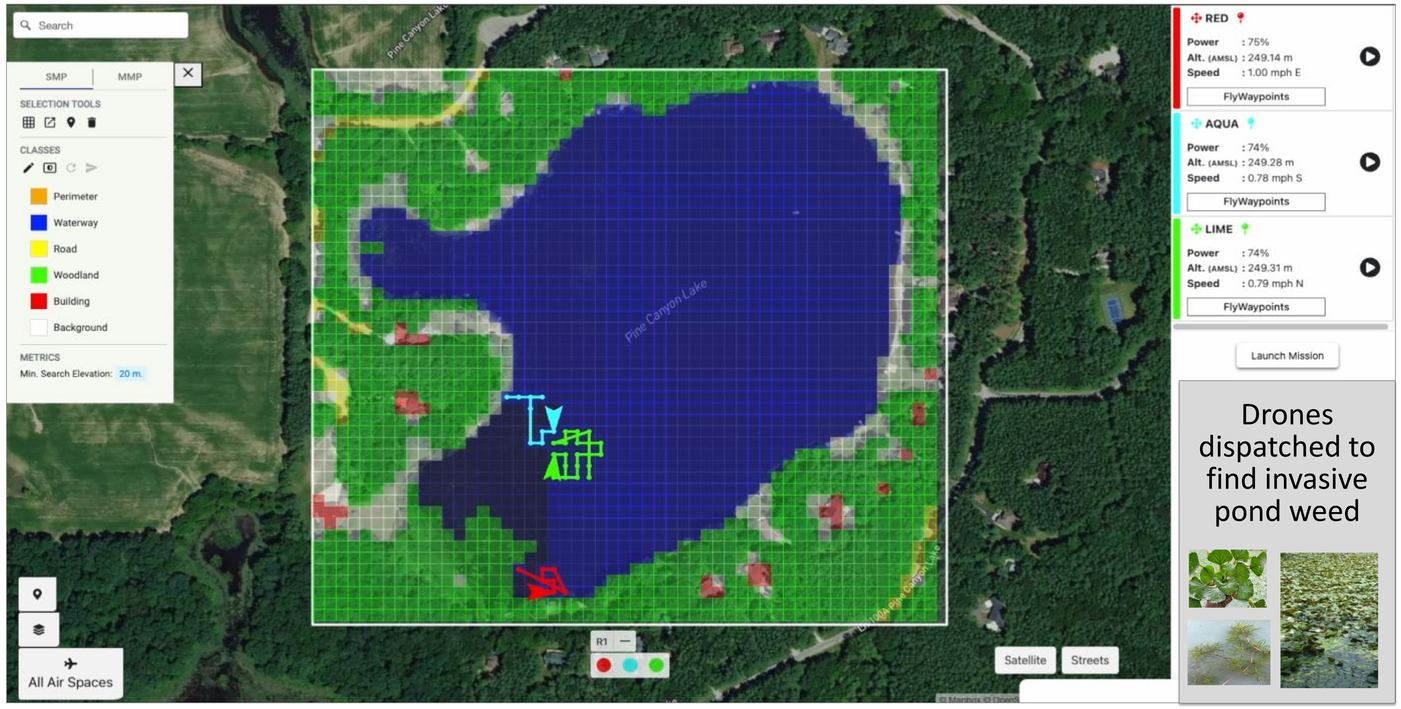
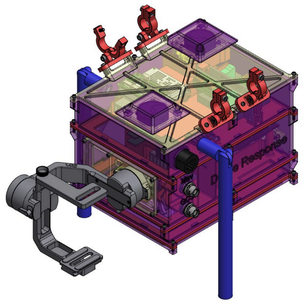
Our air Leasing technology allows drones to operate in shared airspace while maintaining trajectory-aware safe separation distance.

Goals: Deploy a drone swarm capable of performing diverse search and rescue missions. A Smart Mission Planner uses Computer Vision to segment the scene, and then dynamically assign, search and coordinate tasks to individual sUAS.



Drones dispatched to find invasive pond weed

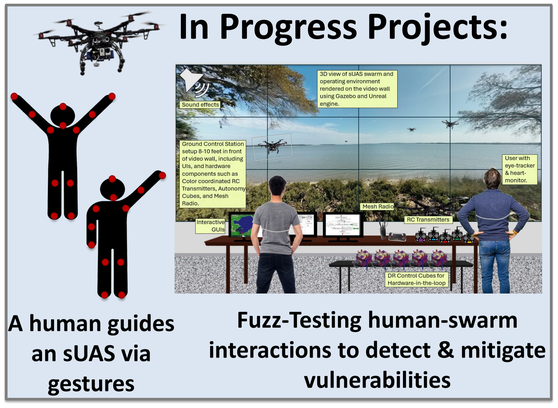
Challenges Met:



- Drone deployment without mid-air collisions using our novel air-leasing technology.
- Dynamically built terrain maps for terrain avoidance and accurate object geolocation.
- Dynamic mission configuration using onboard state machine to support emergency response tasks.
- Dynamic scene segmentation for smart, prioritized search and detect missions.

Plug-and-play Control Cubes attach to diverse Px4 and Ardupilot platforms, providing edge-based computing, sensors, power modulation, and mesh radio connectivity.

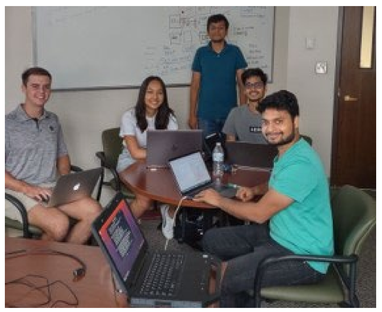
In Progress Projects:



A human guides an sUAS via gestures

Fuzz-Testing human-swarm interactions to detect & mitigate vulnerabilities

Public demo at Skyway-36 showcased swarming capabilities for search-and-rescue, perimeter search, & aerial person recognition.



Undergraduate projects.

DroneResponse Rescue Service: We trained a Computer Vision model to find a 7 foot plane lost in the corn field!

UNIVERSITY OF NOTRE DAME
Drone Response
NSF
Award ID#: CNS-1931962
2019-2025