Lab overview: Autonomy in flight

October 16, 2018
Design for challenging environments

Exploit angular momentum with a stationary platform
- Quadcopter with momentum wheel
- Trade off: Better stability vs Greater weight
Experiments

See video at https://www.youtube.com/watch?v=XcZh4_J4yGM
Video

See video at
https://www.youtube.com/watch?v=MSvoQT__c9U&t=4s
ME 136: Introduction to Control of Unmanned Aerial Vehicles
(Fall 2018, Prof. Mark Mueller, 3 units, undergrad elective)

You will learn

- 3D modeling
- Dynamics, sensors
- Estimation & Control

You will do (team of 3, take-home hardware+labs)

- Implement closed-loop feedback (C++ on microcontroller)
- Compete against classmates in flight!

Enrollment is capped – Listed prereqs are flexible
Open to all majors – More https://tinyurl.com/UAVClass
Ongoing work

▶ Motion planning through highly complex flow fields
▶ Precise maneuvers in constrained spaces
▶ Underwater/Aerial Vehicles

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Fire Research Group

Possible projects:

- Highly localized fire extinguisher (e.g. embers):
  - Thermal camera to detect hot spots
  - Water jet
  - Automatic refilling