Collaborative UAV Control for Information Acquisition:ONR Sponsored Research at C3UV

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http://c3uv.berkeley.edu/

C3UV

LTSN

Bat IV

- 25 lbs payload
- 13 foot wingspan
- 27m/s at cruise
- 8 hour duration

- Piccolo Autopilot
  - GPS and Pitot Static
  - 900 mHz radio for ground station communication
  - Allows for waypoint and turn rate tracking.

- Computing
  - 2 x 1.8 GHz Pentium
  - Onboard sensing, planning and control
  - Vehicles cooperate over an 802.11b ad-hoc network

- Sensors
  - Visual, near infrared, and thermal cameras
  - Three axis sensor gimbal

Berkeley Zagi

- 6oz sensor payload
- 6 foot wingspan
- 14 m/s at cruise
- 30 min flight duration

- Piccolo Autopilot
  - GPS and Pitot Static
  - 900 mHz radio for ground station communication
  - Allows for waypoint and turn rate tracking.

- Computing
  - 1.6 GHz Pentium
  - Onboard sensing, planning and control
  - Vehicles cooperate over an 802.11b ad-hoc network

- Sensors
  - Visual or near infrared camera

Rascal

- 12 lbs payload
- 9 foot wingspan
- 22m/s at cruise
- 1.5 hour duration

- Piccolo Autopilot
  - GPS and Pitot Static
  - 900 mHz radio for ground station communication
  - Allows for waypoint and turn rate tracking.

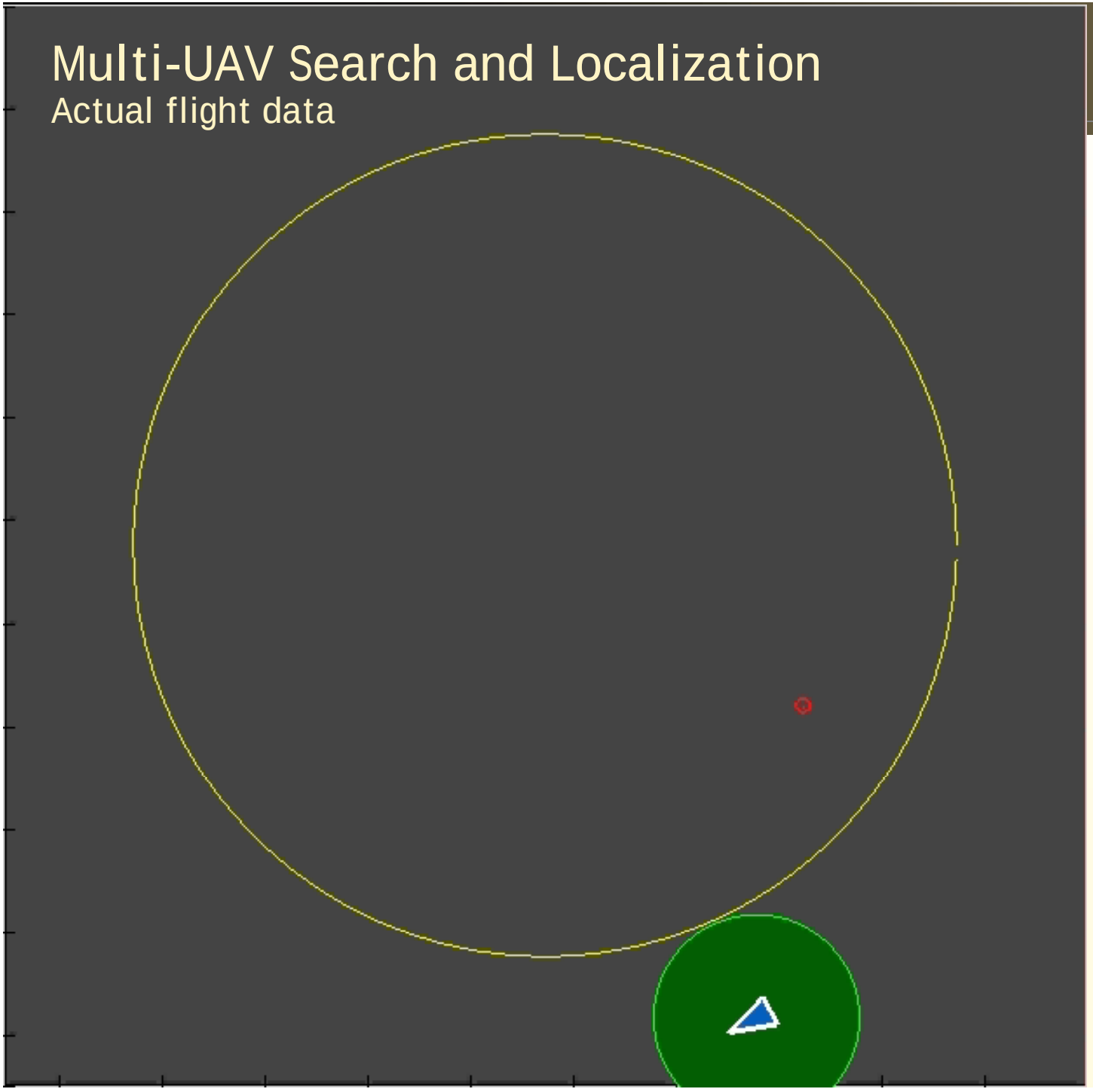
- Computing
  - 1.8 GHz Pentium
  - Onboard sensing, planning and control
  - Vehicles cooperate over an 802.11b ad-hoc network

- Sensors
  - Visual, near infrared, and thermal cameras
  - Left looking single axis sensor gimbal

A Flight Ops Day

Multi-UAV Search and Localization

Actual flight data

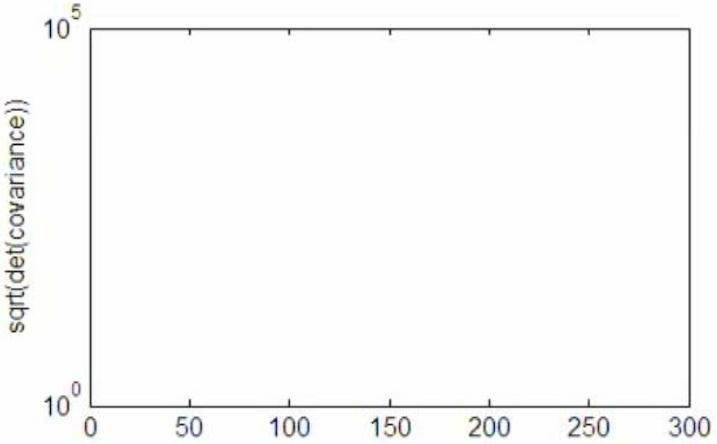


- 2006: Fake Sensor
- 2007: Sensor in the loop
  - Static target
- 2008: Sensor in the loop
  - Moving target
  - Search
  - Localize
  - Track (loop not yet closed)

LTSN

Sensing: Grid-based Bayesian Estimation

Measure of uncertainty



Posterior distribution p(X | z)

Sensor

Sensor Modeling

Likelihood function p(z | X)

Filtering

Making it easy: Aerobots on the web

http://www.google.com/search?client=safari&rls=en&q=berkeley+uav+iphone&ie=UTF-8&oe=UTF-8

Berkeley Group Uses iPhone to Control UAV Squadron - UAVs - Gizmodo† - 3 visits† - 10:11amThe Center for Collaborative Control of Unmanned Vehicles (C3UVóthe "3" makes it hip) at the University of California, Berkeley has developed a system that ...gizmodo.com/.../berkeley-group-uses-iphone-to-control-uav-squadron

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