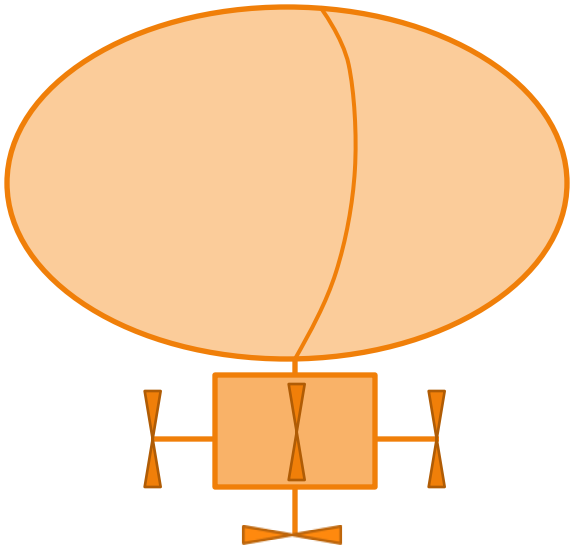


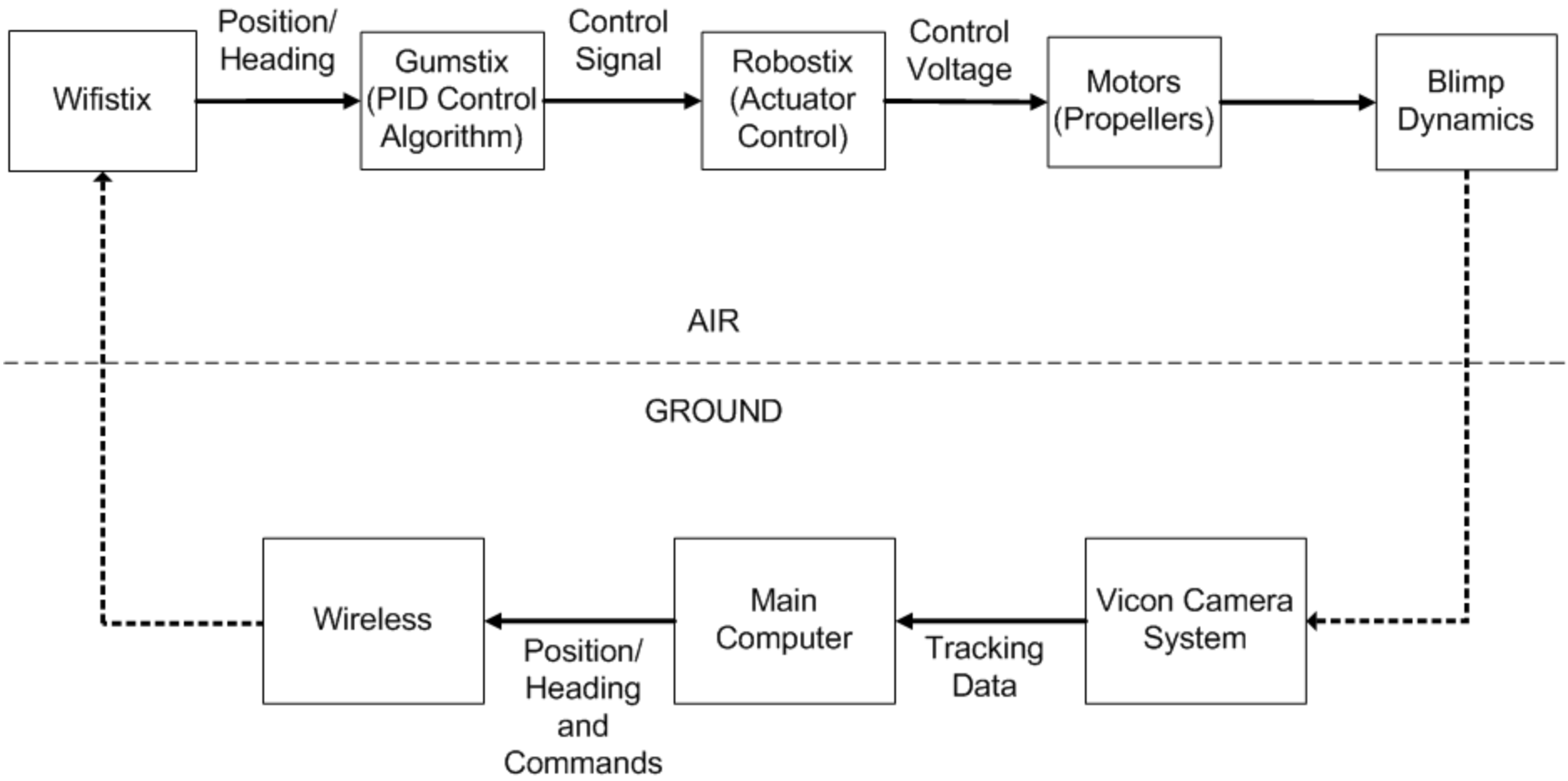
Formation Flying Blimps

Linh Bui, Beth Boardman, Kyle Odland,
Matt Walker, Maggie Wintermute

Project and Customer

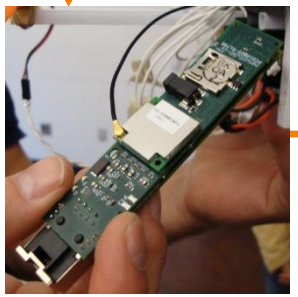
- Distributed Space Systems Laboratory and Professor Mehran Mesbahi of AA
- Constraints
  - Processor delivery
  - Large purchases handled by DSSL
- Blimp Vehicle Goals
  - Establish working and controllable vehicle (waypoint tracking
  - Formation flying and coordinated tasks
  - Provide hardware for future use by DSSL

System Diagram



System Inputs and Interfaces

- Command Inputs
  - Position
  - Desired formation
- System Interfaces

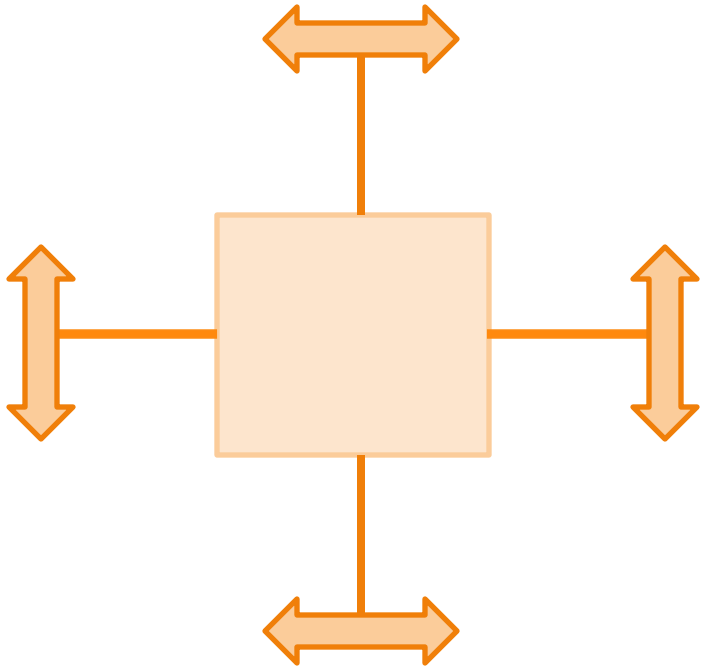


Performance Criteria

- Accuracy and Stability will be valued over speed
- Waypoint tracking (each vehicle)
  - Stable and accurate position tracking
  - Negligible steady state error
- Coordinated tasks (multiple vehicles)
  - Lead/follow
  - Maintain constant separation distance in order to allow cooperative tasks

Project Plan

- Four subsystems
  - Hardware
    - Motor configuration/vehicle design
    - Construct vehicle
  - Power
    - Design circuit board
  - Control
    - Develop plant model
    - Waypoint tracking
    - Coordinated task control law
  - Software
    - Establish communication (Wifi/Processors)
    - Develop code



Personnel Use

- Project lead: Matt Walker
- Hardware lead: Beth Boardman
- Software lead: Kyle Odland
- Power lead: Linh Bui
- Controls lead: Maggie Wintermute
- Responsibilities divided in task list

Related Work and Bibliography

- Blimp modeling
  - “Airship Dynamic Modeling for Autonomous Operations,” Gomes and Ramos
- Gumstix resources
  - Psurobotics.org
- System design
  - 2008 DSSL Blimp final project report