Final Project Review

Team Otto

April 17, 2014

The Team

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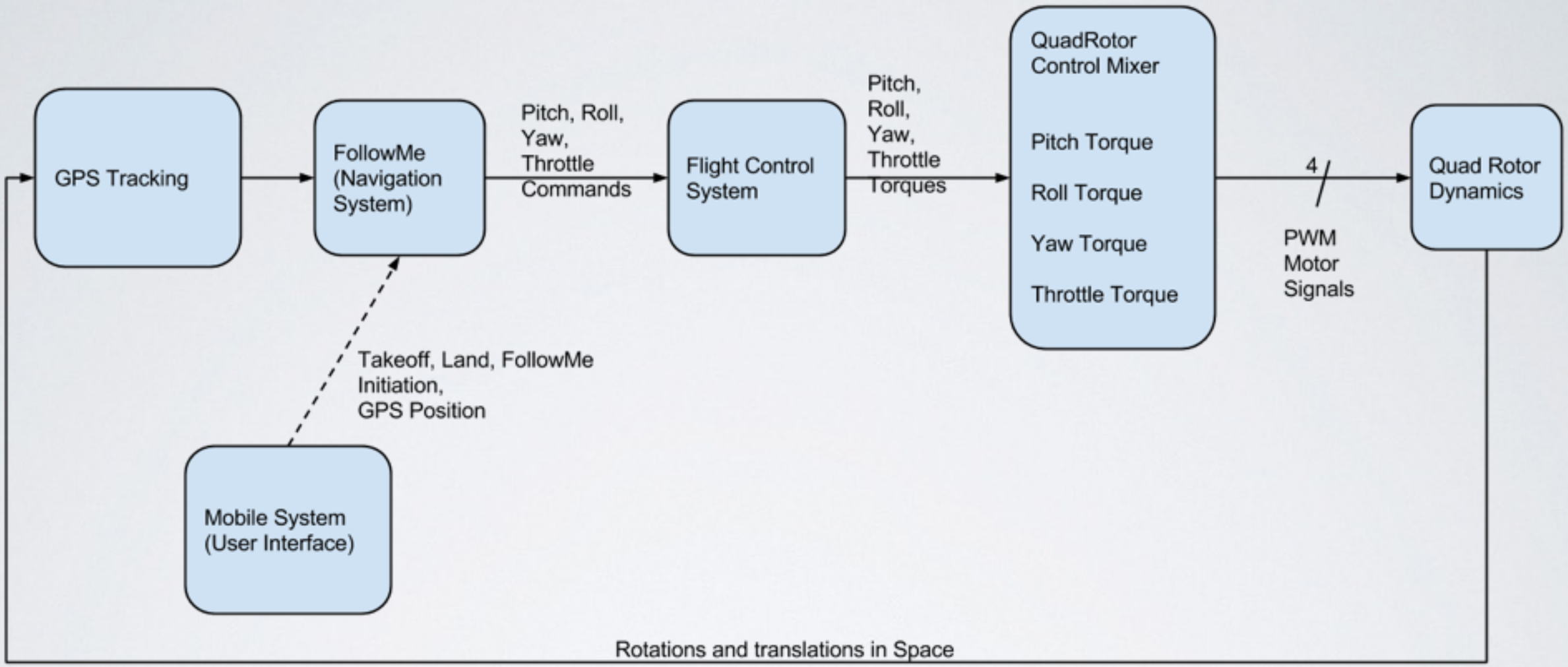
Today

- Otto Description
- System Overview
- Our Final System
- Demo

Otto
The Personal Cameraman

- Drone that follows and records a user while performing action sports
- Autonomous flight requiring no manual control
- Tracks the user using GPS

Otto System Overview



- - - - - -► WiFi -> UART link

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Otto System Overview

FollowMe

- **Takeoff, Land**
  - Autonomous functions initiated by user
- **Flight**
  - FollowMe uses compass and GPS to track the user and command pitch/roll/yaw
  - FollowMe maintains altitude using barometer

Otto System Overview

Mobile System

- **Mobile App**
  - Sends user's GPS location to drone system
  - User input - Takeoff, Land, Raspberry Pi power
  - Displays live diagnostics
- **Messaging Protocol**
  - WiFi channel between phone and Raspberry Pi
  - UART communication between Raspberry Pi and APM Flight Control Board

System Requirements

1. Track user through a fusion of two sensors: GPS and camera
2. **Collect GPS location of user with WiFi connection to user device**
3. Collect finer location data of user through camera tracking
4. **Carry out user takeoff and landing commands**
5. Maintain a user-defined drone/user separation distance
6. **Allow user to start and stop video recording**
7. **Video recording is high-definition (720p or better)**
8. Must maintain visual lock on user for duration of recording
9. **Must take preliminary measures upon reaching critical battery level**
10. **Safety lock in hardware and software**

System Specifications

1. Maximum drone/user separation: 30 meters
2. Minimum drone/user separation: 5 meters
3. Average flight time: 10 minutes
4. Max velocity of drone: 30 mph
5. Max angular velocity of 1.8 rad/sec (103°/sec)
6. **All-up mass must be less than 1.5 kg**
7. Must lift at least 1.5 kg at 50% throttle

What is not working

- **FollowMe**
- User set separation distance
- Camera tracking not integrated

What is working

- **Flight Control System**
  - Altitude control
  - Stable attitude control
- **FollowMe**
  - Autonomous takeoff and land
  - Commands autonomous flight using GPS locations and compass headings

What is working

- **Mobile System**
  - Communication between mobile phone, onboard Raspberry Pi, and flight control board
  - Sends user's GPS data to drone system
  - User input - Takeoff, Land, Raspberry Pi power
  - Displays live diagnostics
  - Map with drone and user

Desired Final Demo

Drone will follow and record user.

- Start Otto from mobile phone
- Walk around the quad
- Otto follows and records the user
- Initiate landing from phone
- Retrieve video

Today's Video Demos

- Takeoff from phone
- Bearing to user in altitude hold
- Following a fixed GPS location
- Full demo tracking the phone against wind
- Tracking the phone
- Land (indoors)

Questions?