CS 491/691: Introduction to Aerial Robotics

Delta Drone

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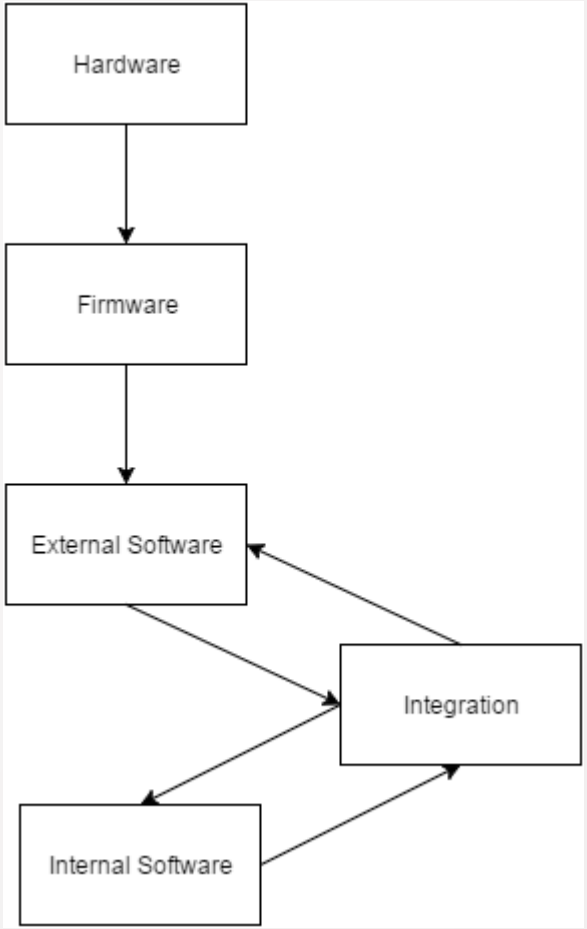
Motivation and Problem Description

- Motivation
  - Explore the basic concepts and methodologies involved in modern aerial robotics along with their real-world applications
- Problem
  - Implement a viable, fixed-wing, delta-configuration UAV with both manual and autonomous flight capabilities
- Application
  - Data collection through both simple and complex sensor systems during short flights

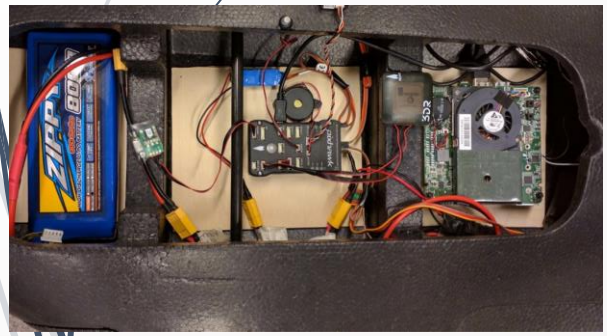
Proposed Approach

- Hardware
  - Drone assembly and semi-fixed components
- Firmware
  - QGroundControl
    - Calibrate sensors
    - Calibrate remote
- External Software
  - ROS/MAVROS on laptops
- External Integration w/ Software
  - Connected to PX4 w/ laptops
    - Confirmed communication/data gathering
- Internal Software
  - ROS/MAVROS on NUC
- Internal Integration w/ Software
  - Connected NUC to PC4
  - SSH into NUC for “remote” access



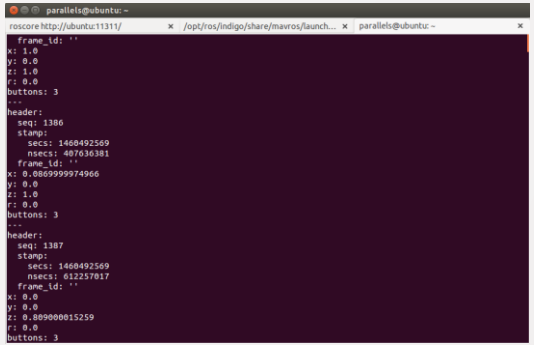
System Description

- Delta-Configuration UAV Plane
- Pixhawk flight controller handling flight mechanics
- Intel NUC for Data Collection and Video Recording
  - Running ROS Indigo
- GPS, Accelerometer, Magnetometer, and Air Speed Sensors for inflight measurements



Unfinished hardware internals

Screenshot from qgroundcontrol



Screenshot from ROS

Results

- Hardware successfully assembled and ground-tested
- Firmware configured for Delta Drone flight mechanics
- Initial setup of Intel NUC complete for use in data collection and video recording
- Capable of autonomous flight
- System ready for flight testing - first planned flight on 4/30