BuddyCam

Final Project Review

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Meet the Team

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The Current Issue

There is growing concern in regard to the relationships between law enforcement officers and the public

- Shooting of unarmed civilians
- Excessive use of force
- Protests across the country
- Lack of reliable information
- Violence imposed on officers and public servants

Our Solution: BuddyCam

A deployable Unmanned Aerial System (UAS) capable of autonomously identifying, tracking, and recording officers

- Quadcopter equipped with fixed camera
  - Aerial video capture of officer
  - Raspberry Pi3 for image processing and communication
  - IR beacon tracking provides additional opinion
  - GPS tracking
- GPS Components
  - Android app sending geolocation data
  - Google Compute Engine collecting GPS data

Proposed CDR Deliverables

- Portable IR Beacon

- Video of Subject with IR Beacon

- Image Processing through Google Compute Engine

- Network RaspPi to 4G

- Formatting Flight Controls Based on output of Code

Proposed FPR Deliverables

- Portable IR beacon on PCB, with power supply

- Drone able to track and follow a moving subject
  - Three environmental inputs
    - GPS
    - Image Processing
    - IR Beacon tracking

Specifications

- Fully autonomous after lift-off
- Track and keep subject in frame
  - maximum of 1.6 s out of frame
- Maintain minimum height of 10 ft after initial lift-off
- Maintain line of sight of subject within a radial distance of 15 ft
- Operate and record for at least 10 minutes

Specifications -- Analysis and Justification

"Maintain minimum height of 10 ft / distance of 15ft"

- Initial tests with the drone show that altitude settings are extremely precise, += approximately 1 inch, and thus this measurement can be set to a value seen fit by the user

"Maximum of 1.6s out of frame"

- Based on a median throughput limit of 22.3 Mbps on 4G networks (IEEE Research Publication)

"Operate and record for 10 minutes"

- Based on the specifications and size of battery included with the drone we are using. This can be easily upgraded as seen fit, budget allowing, by law enforcement agency

FPR System Deliverables Overview

Deliverable

1. Portable IR beacon implemented on PCB, with integrated power supply
2. Drone tracking
   a. Based on GPS input
   b. Based on Image Processing
   c. Based on IR Beacon Tracking

Status

1. Complete
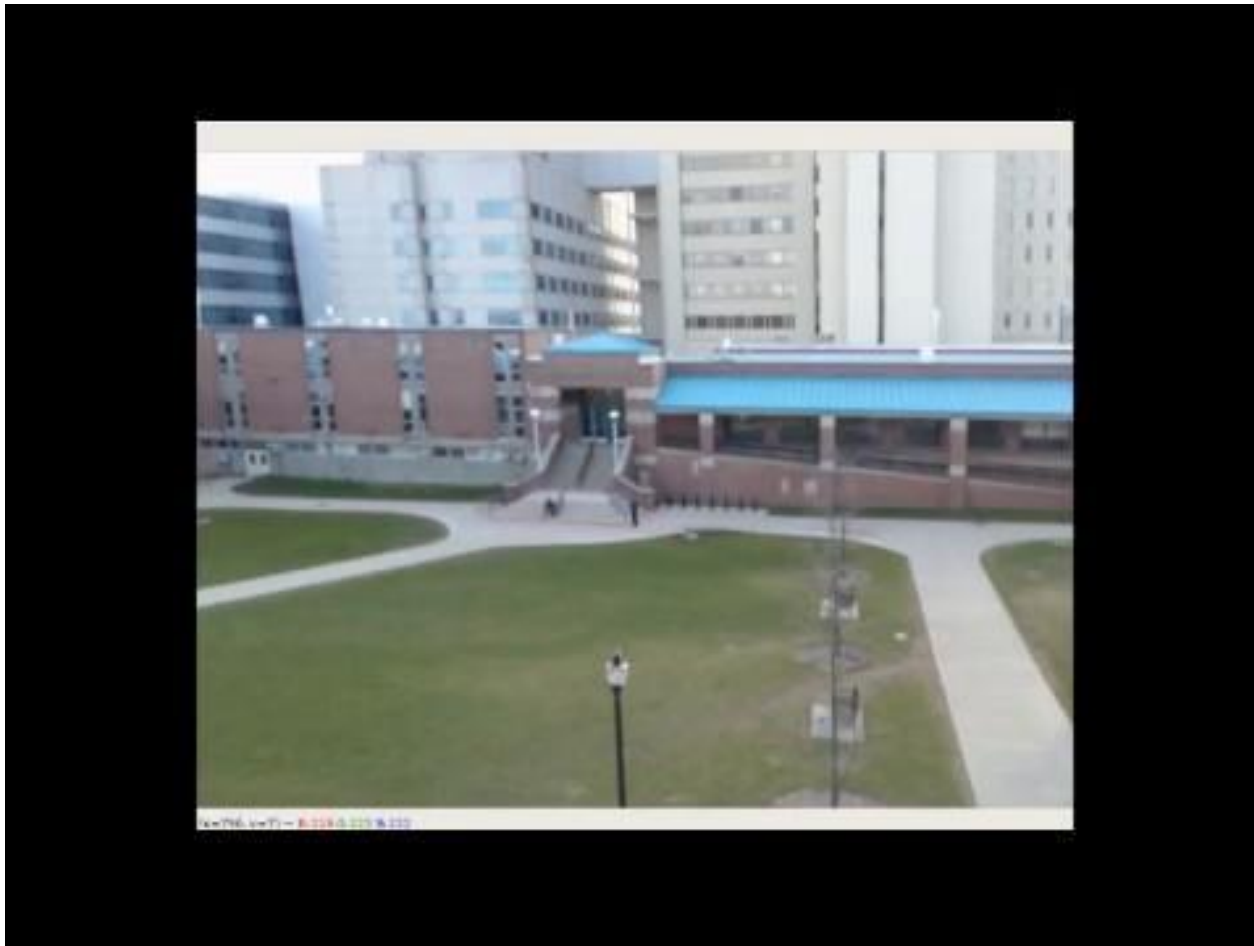2. Complete
   a. Complete
   b. Complete
   c. Complete

Video Demo - GPS Subsystem

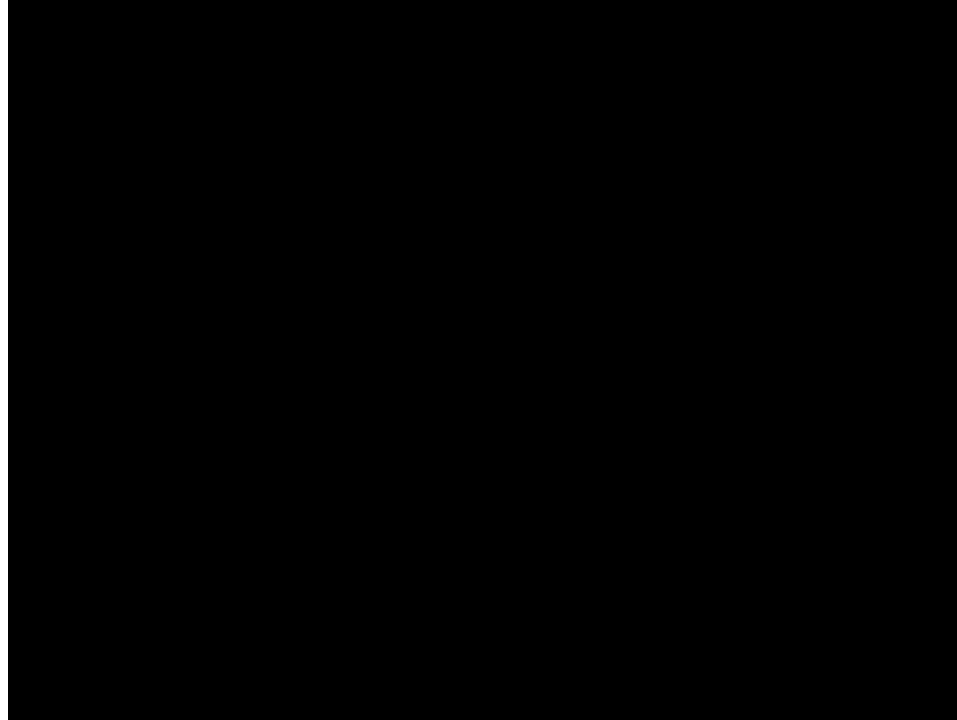# Video Demo - Image Processing Subsystem

Video Demo - IR Beacon Subsystem
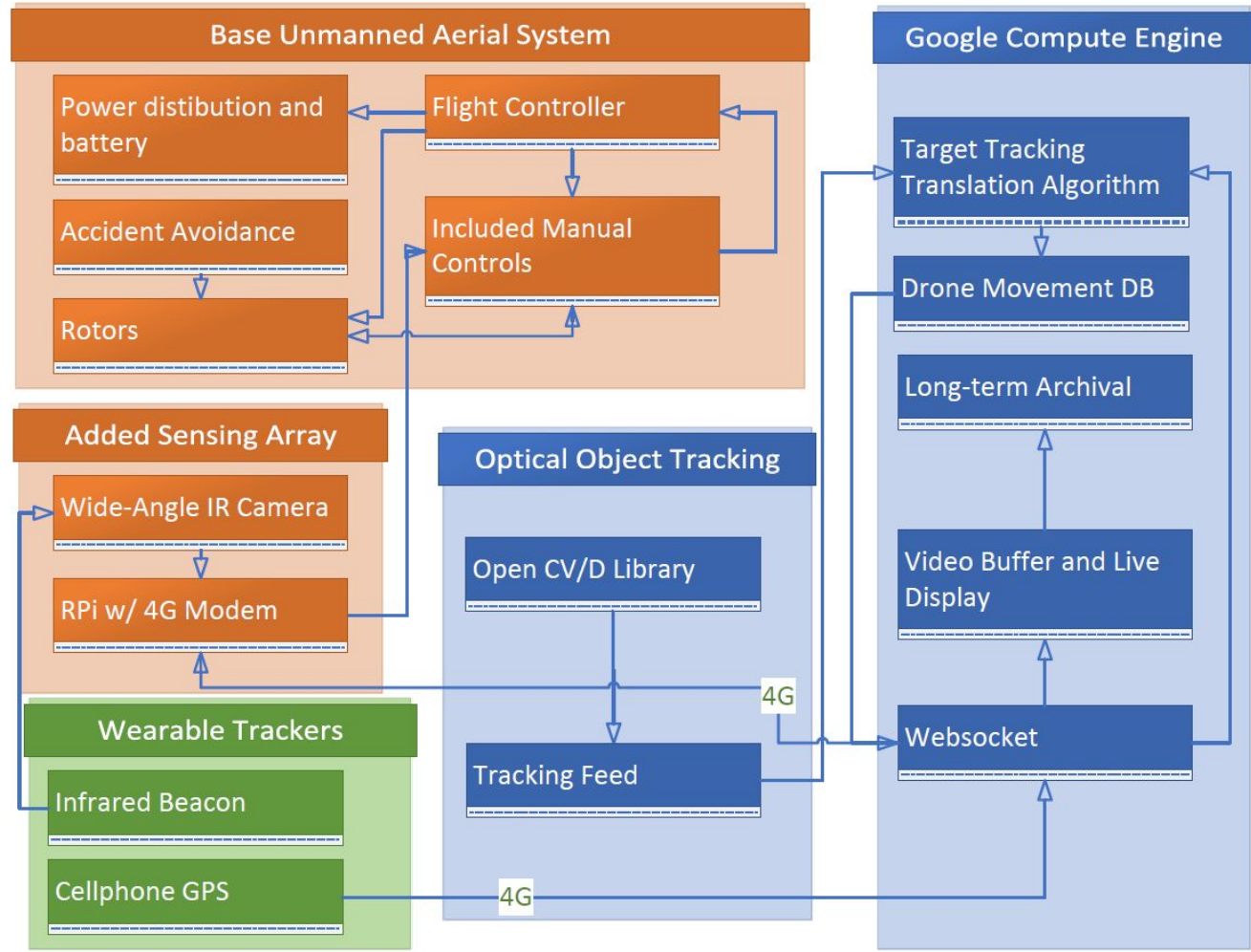
Video Demo - Fully Integrated Subsystems

Video Demo - Fully Integrated Subsystems

Cost Analysis

Item	Quantity	Unit Price	Unit Price Per 1000
3dr Iris+ Drone	1	$600	$600 (variable)
Raspberry Pi 3 B	1	$35	$21
RPi Battery	1	$20	$14
Logitech C920 Camera	1	$99	$85
IR Beacon PCB	1	$90	$8
Data Cables	2	$10	$.75
Totals		$854	$728.25

DEMO

Thank you

Questions