GiBLiT

STILL COMPILING

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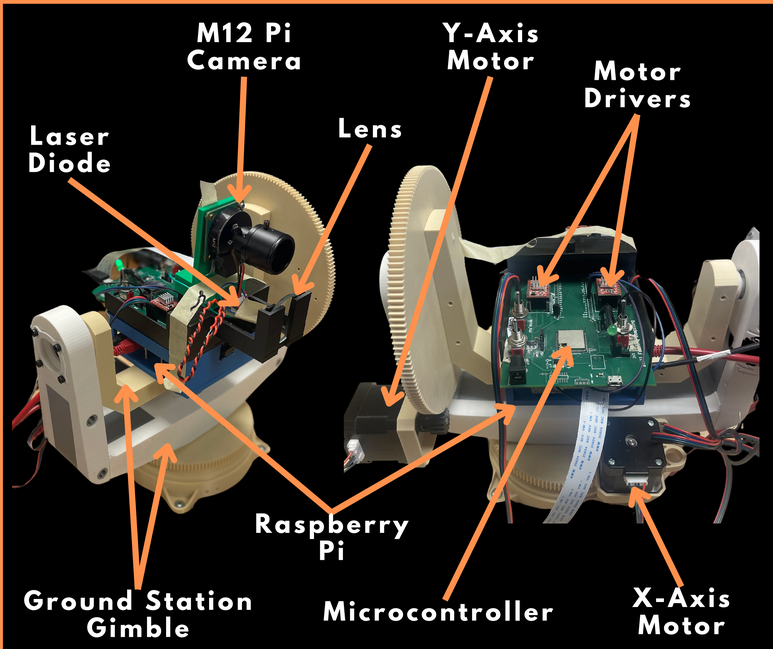
Ground-Based Tracking Station and Laser Transmitter that Replaces Interceptable RF Communication

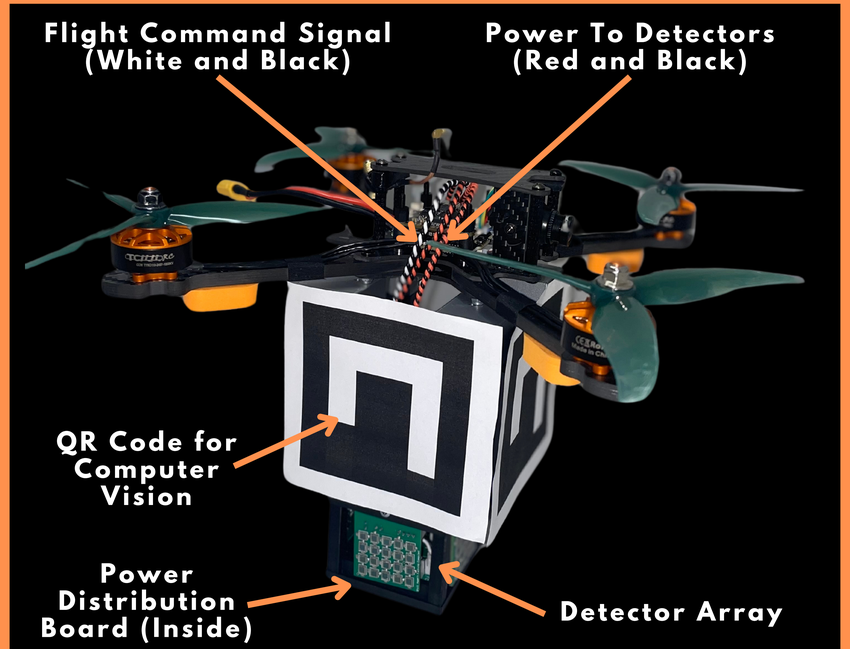
Features

- Four-Sided Receiver Circuit Enables Yaw Control
- 5 m/s Max Trackable Velocity
- 1 m/s^2 Max Trackable Acceleration
- 7.5 meter Max Operational Range
- Images Processed at 45 fps
- Search Behavior on loss of visual contact

Ground Station

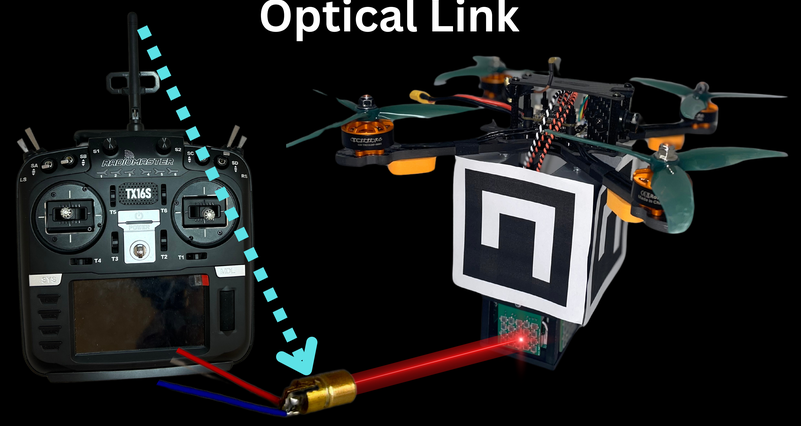


Drone

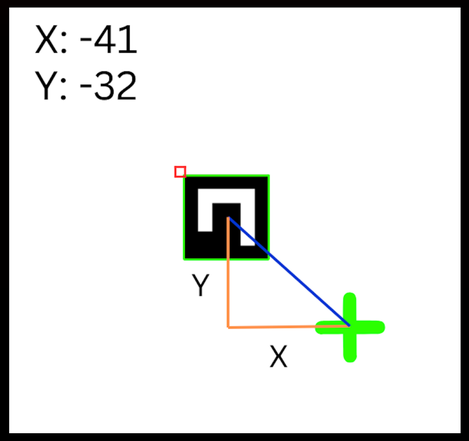


RF Link

Optical Link



Computer Vision Control Loop



The Raspberry Pi M12 Camera detects the QR marker and calculates the distance from the center of the marker to the setpoint. That distance is fed into the ESP32 via UART and used in a PID Control Loop, which calculates a frequency to drive the stepper motors

Challenges

- Maintaining Up-Link through PID Control Loop
- Small Solid Angle of Laser Beam Creating “Dead Spots” on Receiver
- Mechanical Jitter Impacting Control Loop and Inducing Motion Blur
- Image Processing Speed Limiting Max Acceleration
- Mounting Hardware Payload to Drone

Compiling Sketch...

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