

# Indoor Localization for Drone Flight Control

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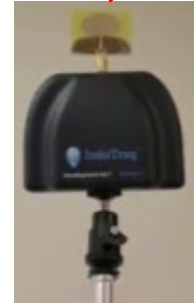
(ECE 4312-801C-1212, Professor Joseph Cleveland)

## Sponsor Overview:

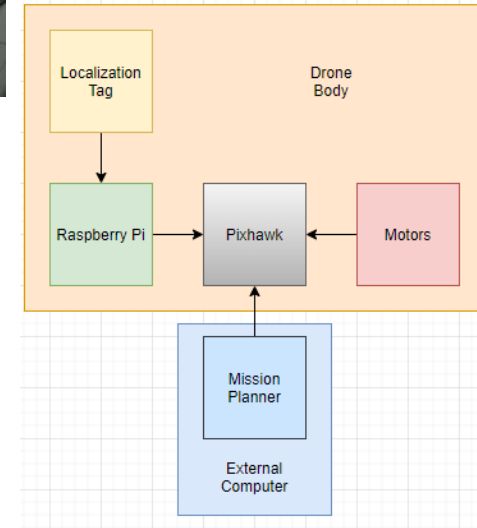
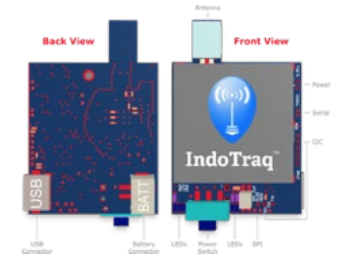
A research team at SMU has set up a lab known as MuDDI (Multi-Dimensional Drone Communications Infrastructure) with the intention of drone study. Our project represents their addition of indoor localized flight to create a controlled environment for drone related experiments.

## Project Description:

The goal of this project is allowing drone flight to be conducted autonomously within the MuDDI facility. Since the facility has a metal roof which does not allow the use of GPS, we need to use an indoor localization system (IndoTraq) in place of GPS. In order to achieve the project goal, the localization system must properly interface with an onboard flight controller (Pixhawk) and computer (Raspberry Pi), and an external flight planning software (Mission Planner).



*Project photos*



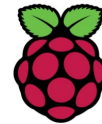
# Technology Stack



IndoTraq™



MissionPlanner



Raspberry Pi

# Objectives

- Have Raspberry Pi read in data from tag through USB connection
- Convert cartesian data to GPS NMEA data
- Send GPS NMEA data through Raspberry Pi GPIO ports to flight controller serial port
- Configure Mission Planner to support localized flight

# Results

- Localization system operational
- Raspberry Pi is able to read in location data
- Able to convert from cartesian to GPS
- Knowledge of how to send data to Pixhawk flight controller from Raspberry Pi
- Mission Planner configured for localized flight

The screenshot shows the Mission Planner software interface. At the top, there are tabs for Tracking, Settings, GPS Mode, I/O Settings, IMU Calib., Tag Calib., Anchor Calib., Anchor Positions, TCP/UDP Server, Terminal, and Program. The Terminal window displays a list of NMEA data points, each starting with '\$' and containing coordinates and other data. Below the terminal, there are two server configuration panels: 'UDP Server' and 'TCP Server'. The UDP Server panel has a 'Port' field set to '8234' and a 'Start' button. The TCP Server panel has a 'Port' field set to '8234' and a 'Start Listening' button. At the bottom, there is a 'Command:' input field, a 'Send to Wifi' button, and a checked checkbox for 'Log Wifi Data'.

