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Programming a Tethered Multi-Rotor System

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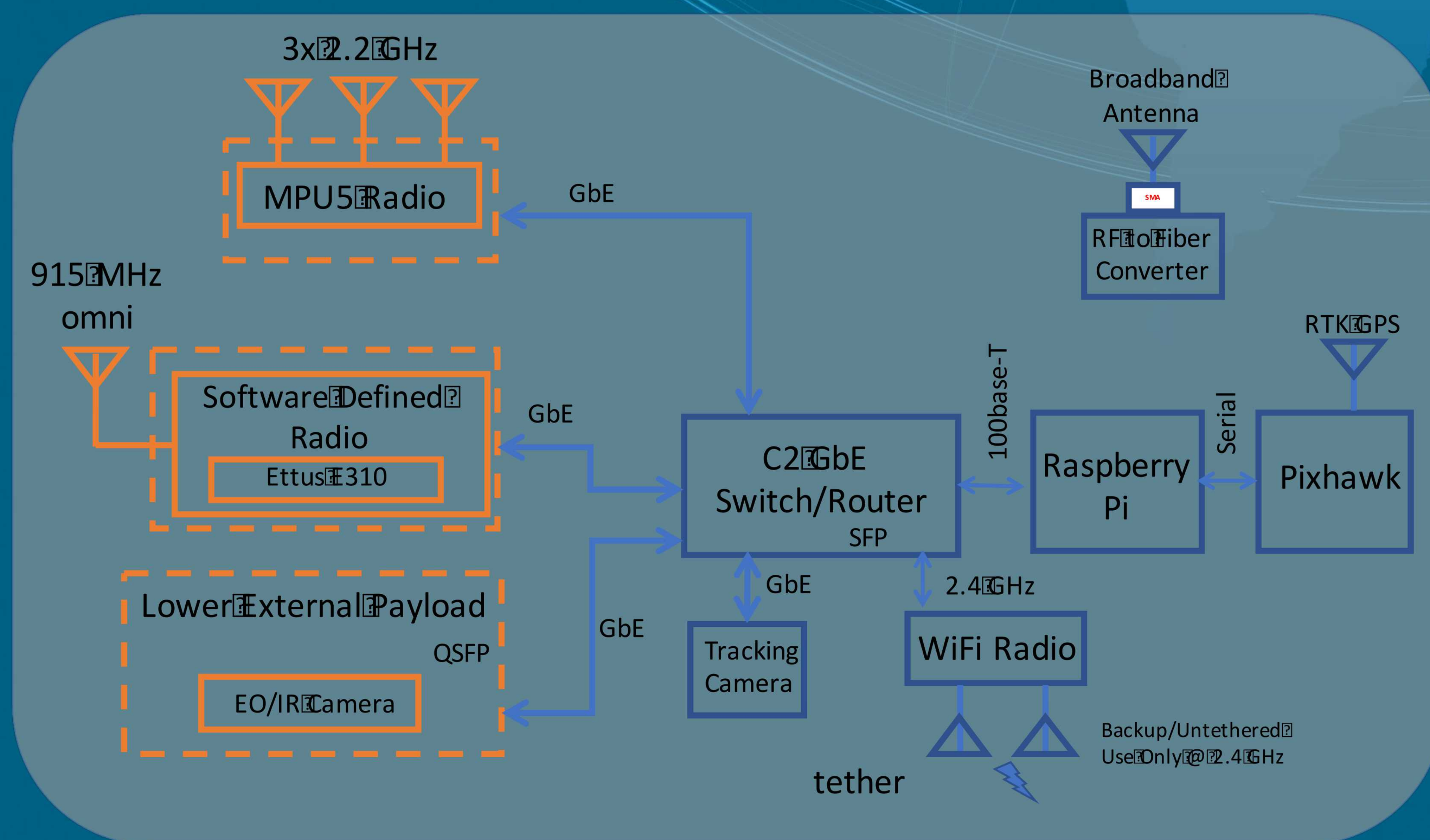
Problem Statement:

Unmanned aerial vehicles (UAVs) are remote controlled by a human operator, and with the appropriate components, provide the user with the ability to be well informed in dangerous settings.

Our mission is to develop the backend and frontend of the UAV to facilitate its use and control in unfavorable settings.

UAVs are real-time systems that require rapid response to changing sensor data. A Raspberry Pi controls all the components on the UAV, helps alter the UAV's path based on the sensor data and user input, and facilitates the ability to follow objects.

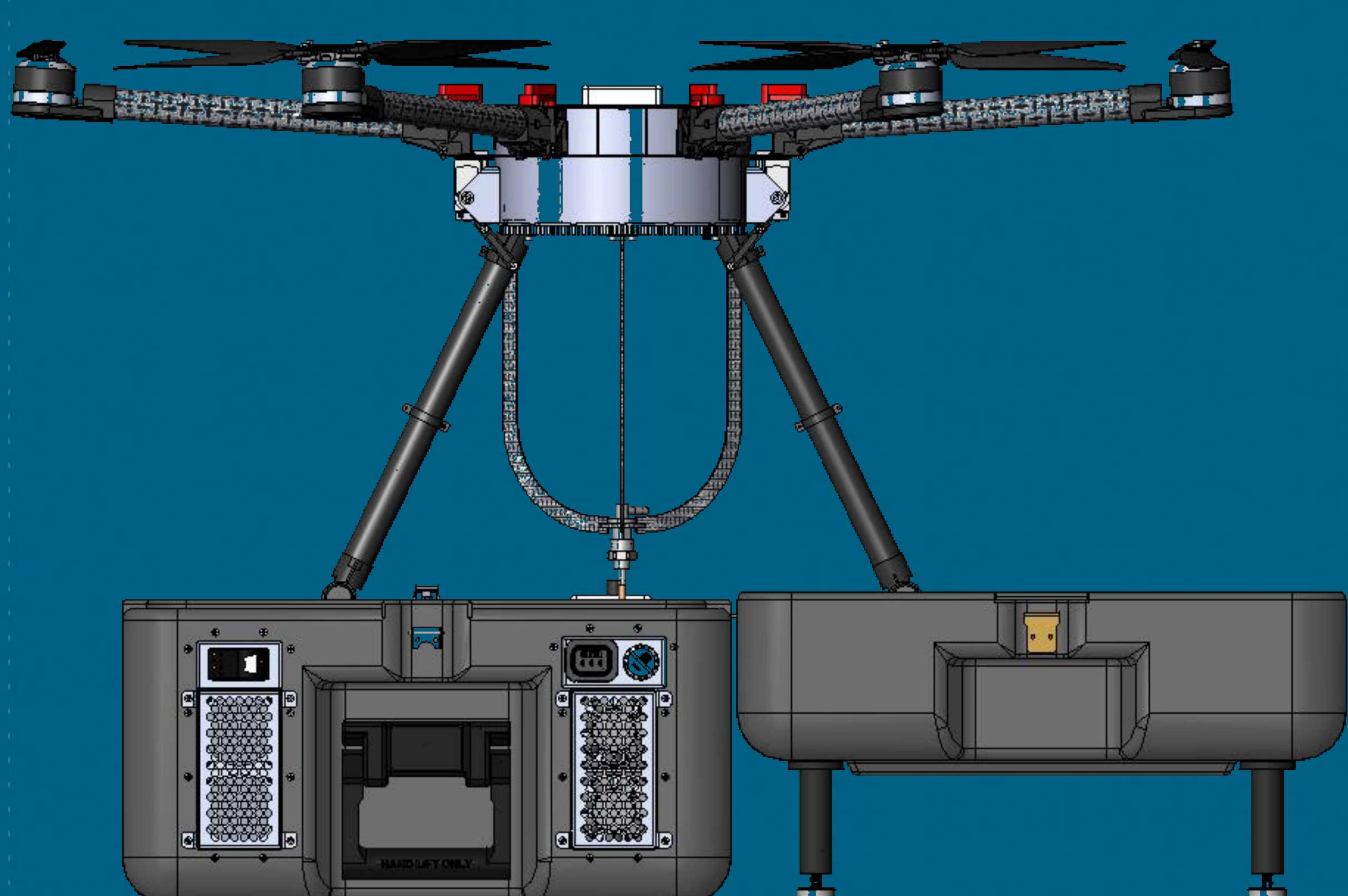


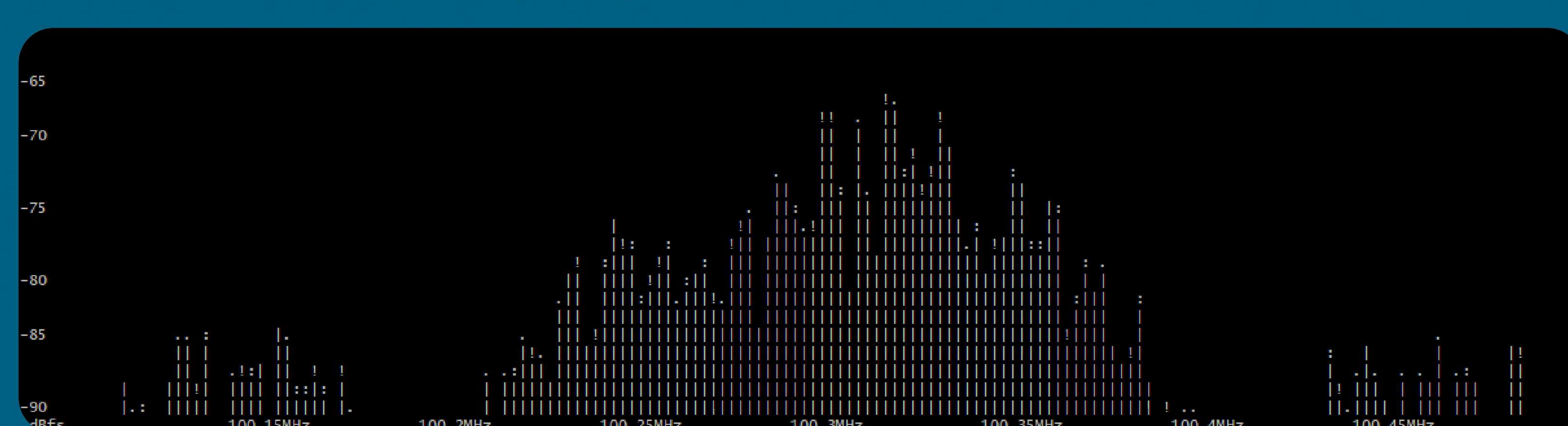
Components on UAV:

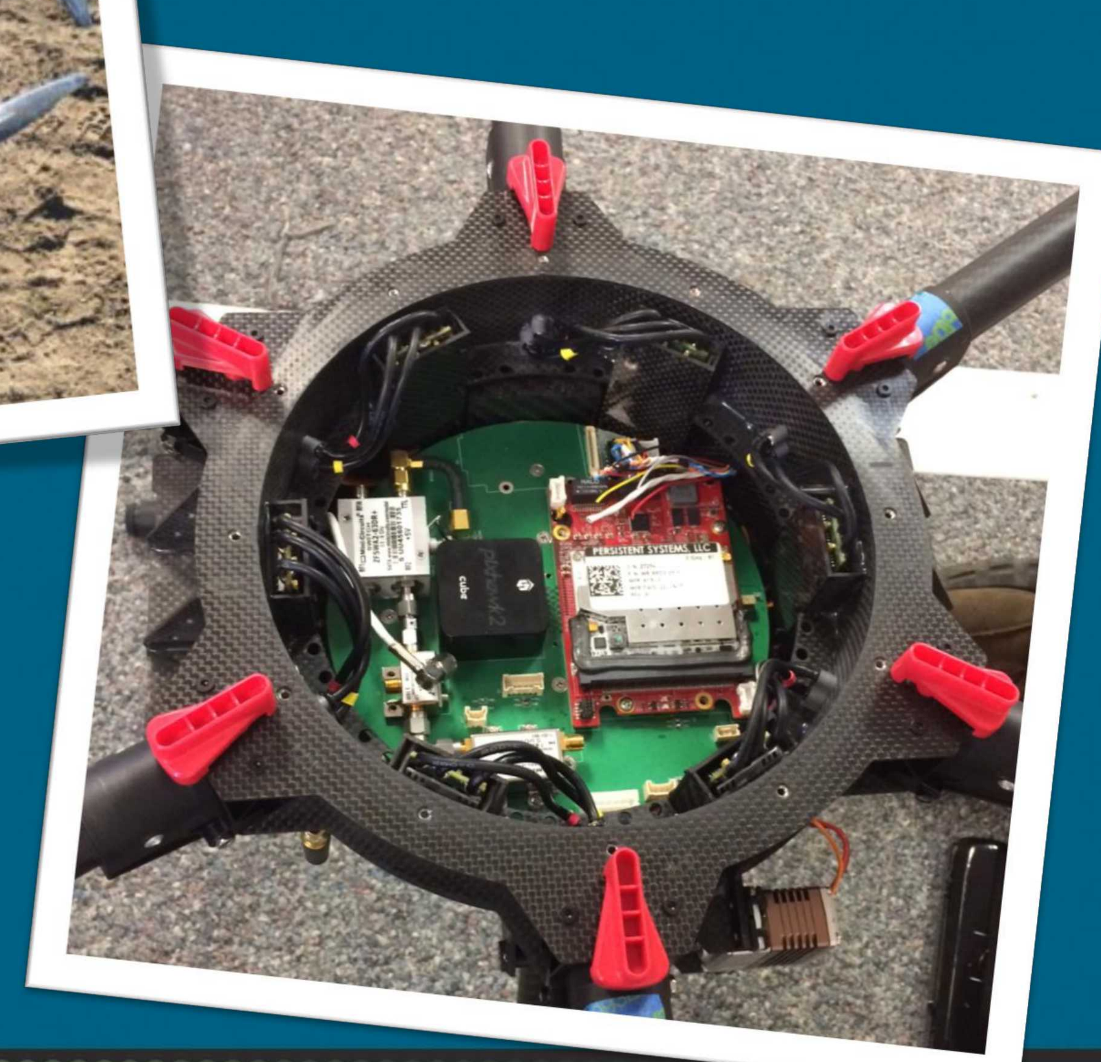
SDR, Wave Relay, PixHawk, Surveillance System (360 Degree coverage with 30 Gb/s downlink), Sensors, and Dynamic Disconnect from tether

Components on Ground-Base Controller:

Tether Reel, Laptop, and Power







We configured a Software Defined Radio (SDR) to be used for reconnaissance and defensive measures in the RF domain.

Our long term goal is to provide a tool to monitor the entire RF spectrum and alert the user to changes in the environment.

- GNURadio (SDK providing signal processing features) used for testing and providing a proof of concept multimode receiver