This project is to improve a communication system between UAV and ground control station. For example, if the drone finds a suspicious target, it will send the image of the suspicious target to ground control station for a second layer verifying. As current state of the communication is only able to send fixed sensor data back in a fixed frequency.

To implement this feature, we used a software called Qgroundcontrol tool as our ground control station, a pixhawk as a drone, and a 3DR radio as a radio link. (The benefits of the Pixhawk system include integrated multithreading, a Unix/Linux-like programming environment.) Which leads to 3 majority parts of this project, the source code of UAV firmware, Qgroundcontrol, and the communication protocol, MAVLink. Since all the 3 parts are open source, we can modify it to achieve our goals.

Since the code base for this system is quite huge. We divided the goal into several parts. The first sub goal for us is to send a constant self-defined message between UAV and ground control station.

The communication protocol used in this project is called MAVLink. Basically, it consist of 8 field in a fram packet, which is showed in the chart. We had a python program that can generate this particular fram structure automatically as long as we provide a message and its field type and name using certain form in XML file. After that, we modify the source code for the drone and ask it to send back the constant text message after the drone is active. This part of function was called in a fixed frequency by adding the function to the main drone code.