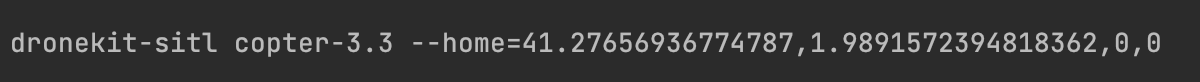
Experiment

Basic idea is to create a programme for taking photos based on the received taking-photos-waypoints file (which will be emitted by dashboard created by Theo).

Experiment is in an virtual GCS-UAV environment.

1. A drone simulator *dronekit-sitl* is running on the laptop on tcp port 5760



1. My phone is the GCS of this experiment. ALTA QGC is listening on udp port 14550
2. On Raspberry Pi, *MAVProxy* is set to connect all components 

--master is to connect the drone simulator on my laptop which has ip address 10.10.10.201 and *dronekit-sitl* is on port 5760.

--out(1) is for internal connection, specially to run other Python code.

--out(2) connects GCS which is my phone.

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Flight plan



I did a simple flight plan which contains 6 points, starting from left-bottom point. Waypoints can be .json format and then is transformed to the format like this.

图片包含 文本

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This is 7 waypoints, the 7th one is the same as 1st one and the last one is dummy waypoint that is used as a signal that the drone can execute RTL process.

文本

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These are 12 taking-photos-waypoints in which 1,3,5,7,9,11 are the same as waypoints.

After the drone takes off, every time when it reaches a taking-photo-waypoint, it will change flight mode to LOITER and wait 10s to take photo.

Problem: Flight mode won’t be changed to LOITER after taking off. Is it really hovering? Or how can we hover a drone at certain location using drone

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Each waypoint can be reached and the route is totally correct, but there is a problem with the altitude, which is sometimes negative on Mission Planner’s monitor. In the Dronkit-SITL’s terminal shows hitting the ground at 0.5 meters per second after RTL.

文本

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I don’t if it’s a normal notice or a real ERROR.

I changed json.loads() to .load() to read from a test file, this effects

if command == 'executeFlightPlan':

def executeFlightPlan2(waypoints\_json):

if command == "executePicturesPlan":

def executePicturesPlan(pwaypoints\_json):

Error: A network protocol error occurred when communicating with the broker. This is an error happened when I was testing telemetry information receiving process. Running on only one external broker(:8000 websockets) is the primary reason. I need to open another broker. And it’s impossible to run a .conf which only contains websockets listener, at least to open a default listener 1883 with mqtt protocol.

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Drone now can take photos once reach a photopoint, but there are some problems.

Distance threshold needs to be defined carefully depending on different mission(overlap, GSD, camera parameters, speed…).

If the drone has missed one photo point, it would keep focusing that missing point, which makes no photos would be taken until the end.

图形用户界面

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Solutions: Config-Standard Params-WPNAV\_SPEED = 250

The default speed value 500 is too high for this mission, camera sometime misses photo points specially towards a corner-situated photo point. I tried to increase telemetryIfo refresh rate from 0.25 to 0.15 but didn’t work (Maybe other value?).

Last photo point can’t be last waypoint at least different coordinates because once the drone reaches last waypoint, it will rise RTL instantly. Add a dummy photo point is a viable method.

Internal broker on Raspi has a problem, clients disconnect after a while( < 1 min).

More studies: raspistill on fast moving drone is necessary to test several times. Ground speed, camera stabilization and environment light condition all will effect the final quality of images. Until now I’m using sports mode(--ex sports), it’s ok for relatively fast moving. However during dusk or indoor light, it doesn’t have a enough exposure time. My idea is to be able to hover while the drone is taking pictures and then moves to next waypoint. I’m trying to add waypoints cmd to the drone one by one so that it can take picture before it gets a next waypoint cmd.