**Swarm Drone Formation Control and Shape Arrangement**table of contents

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**Abstract**

Key milestones:

10.4 : Converted a binary photo to a route for the drones

1.6 : Created a simulation for their flight path (for better visualization)

24.6 : Managed to connect multiple drones after weeks of struggling (after contacting Ryzo support, guy from git, and countless forums...) - from direct wifi (peer to peer) to ap (station) mode through UDP connection

15.7 : Integrated the 2 libraries we developed to make the drones receive commands from the simulation pattern

7.8 : Decoded the H264 stream to a png image

8.8 : Multiple integrations and upgrades – created a log for feedback and a battery check

Challenges we faced and important notes (conclusions):

* When turning a drone to a station (ap mode) and connecting it to the router, the wifi name (SSID) must only have letters. Otherwise, get 'ep not recognized' error
* We took 1 drone from Intel - wasn't Tello Edu and thus couldn't connect to the router.
* We took 3 drones from CRML lab - 1 didn't take off, the other one doesn't recognize any command besides "takeoff". The 3ed one responds well and is stable.
* We needed to establish a UDP connection and find out to which port it transmits.
* Decoding the messages we receive from the Tellos Camera.
* Rearranging them in the right order

Sources:

SDK (ap and basic commands) manual - https://dl-cdn.ryzerobotics.com/downloads/Tello/Tello%20SDK%202.0%20User%20Guide.pdf

Basic swarm SDK - https://tello.oneoffcoder.com/swarm.html

H264 decoder (for the streaming in UDP channel) - https://github.com/DaWelter/h264decoder/tree/master

Notes:

Guide for H264 decoder installation and usage-

- Go to https://github.com/DaWelter/h264decoder/tree/master

- Install vcpkg; guidlines:

https://vcpkg.io/en/getting-started.html#:~:text=Installing%20vcpkg%20is%20a%20two,installed%20from%20the%20command%20line.

- Go back to stage 1 (h264 git) and follow the instructions to build/install

Give up if it doesn't work

To install ffmpeg:

https://phoenixnap.com/kb/ffmpeg-windows

Drones details:

Interface: 192.168.10.2 --- 0x12 :

Internet Address Physical Address (MAC) Type

Orange - 192.168.10.1 60-60-1f-dc-61-3c dynamic

Pink - 192.168.10.1 60-60-1f-dc-61-10 dynamic

Archive

Meetings' summary- num | desciption:

1. Discussed possible ideas : drones, dog robots, chat-gpt to robot creation

2. Discussed possible direction with drones: navigating in tiny passages, carrying, swam operations, with chat-gpt

3. Created a diagram and inital prep report

4. worked (seperatly) on establishing the environment (connecting drone to router in AP mode and turning router into a bridge, and translating creating the bit-map to drone coordinates location.

5. calman filter - could use to find the correct coordinates and stabilize.

What’s next

1. Look at