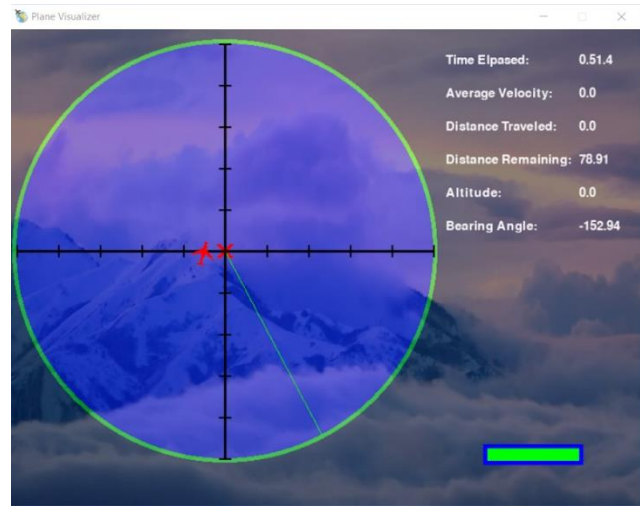


SOFTWARE PROJECT WRITEUP [WEEK 5]

GPS TRACKING APPLICATION

The desktop application designed in *Pygame* functions as a visualizer to plot the position of the plane relative to the position of the destination -> marked as an 'x' on the origin. The scale is 250 m in each direction from the origin. Multiple stats are displayed on the application. Currently, the stats that are working are *Time Elapsed* and *Bearing Angle*. The other stats need functions to be approximated. The position of the plane updates every time a signal is received through a radio transmitter and is extracted from the serial on the Arduino console (updates in real-time with the physical plane).



The symbol of the plane has dynamic turning. Depending on the bearing angle, the symbol rotates up to 360 degrees with multiples of 15 degrees to prevent image degradation. A meter animation at the bottom with dynamic colour changing (increases red value on the RGB scale depending on how full it is getting) has been built but needs to be implemented for changes in values such as velocity.

APP PLANS

- Fix the trajectory code so that it plots the positions the plane has already visited. (stores every 3 secs to prevent segmentation fault)
- Make it more aesthetically pleasing (possibly a complete redesign)
- Implement a system to predict expected trajectory in the form of a line
- Implement a visualization for the altitude and the stabilization of the plane to demonstrate turning, ascension and descension
- Add support for Android since Pygame can be optimized for that

ELECTRICAL COMPONENTS

	<u>Transmitter Components</u>	<u>Receiver Components</u>
<u>Soldered Components</u>		-nRF24L01 Breakout Adapter -Power MB V2 Voltage -Regulator/Power Supply -Arduino Nano iot 33 -Servos x 4 -Motor driver -PCB
<u>Connected Components</u>	-Arduino UNO -nRF24L01 Breakout Adapter -nRF24L01 + PA transmitter	-nRF24L01 + PA receiver to nRF24L01 Breakout Adapter -Connected 3.7 drone dc motors x 2 to motor driver -Connected 7.4V 5200mah LIPO battery to Power MB V2

STABALIZING ALGORITHM (work in progress)

- Completed aileron stabilizer algorithm which ensures that plane is oriented correctly according to the gyroscope

MANUAL CONTROLLER

The remote controller is a PlayStation 4 controller connected to a Laptop which operates the DC motor, Servo Motors and LED lights using the throttles and buttons. The software uses a PlayStation Emulator to receive between 0 and 1 input values for the throttle/turning and 1 or 0 for the buttons. Then, using the serial communication between Python and Arduino the data is output to Arduino's serial monitor. -- Still needs to be integrated with the radio system and tested.

GENERAL FUTURE PLANS

- Connect to radio transmitter with the plane
- Make landing and takeoff algo
- Turning Algorithm
- Optimal Path Algorithm
- Ascent/Descent Algorithm
- Acceleration/Deceleration Algorithm