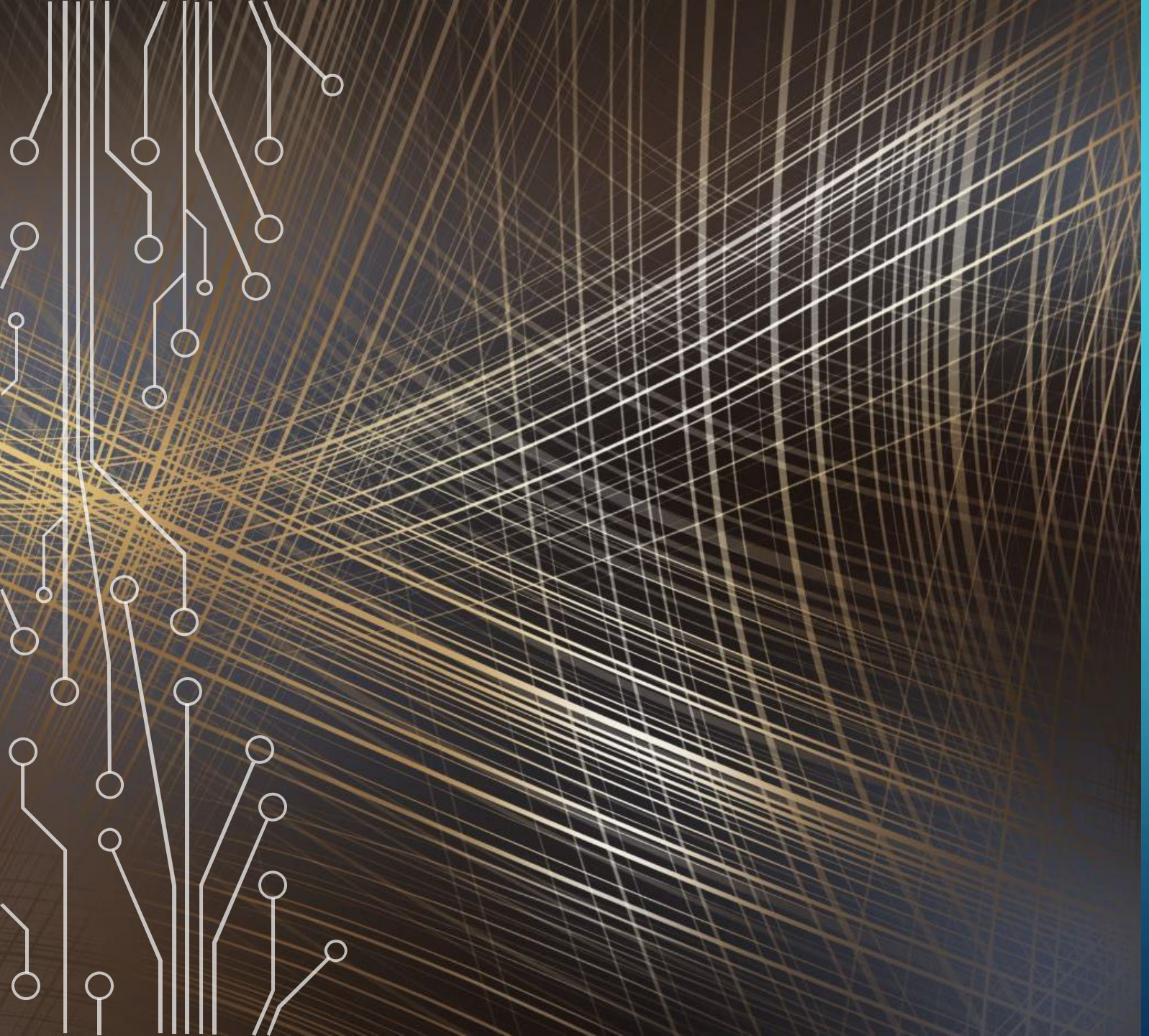
MARS ROVER

BY: ALVARADO, GEORGIAN, WEIKUN, YANG



TOPICS COVERED

- APPROACH
- TIME VS ACCURACY
- TEMPERATURE
  1. DHT-11
  2. PI
- IMPROVE SENSOR PERFORMANCE
- CONCLUSION

APPROACH

- FOCUSED ON FUNCTIONALITY
- CONSIDERATION OF SENSORS
- INTEGRATION WITH DHT
- ACCURACY AND PRECISION OF DATA
- IMPROVEMENTS WITH MOBILITY

APPROACH DESCRIPTIONS

1) FUNCTIONALITY: Ensuring the rover can move and operate along a pre-determined waypoint mission.

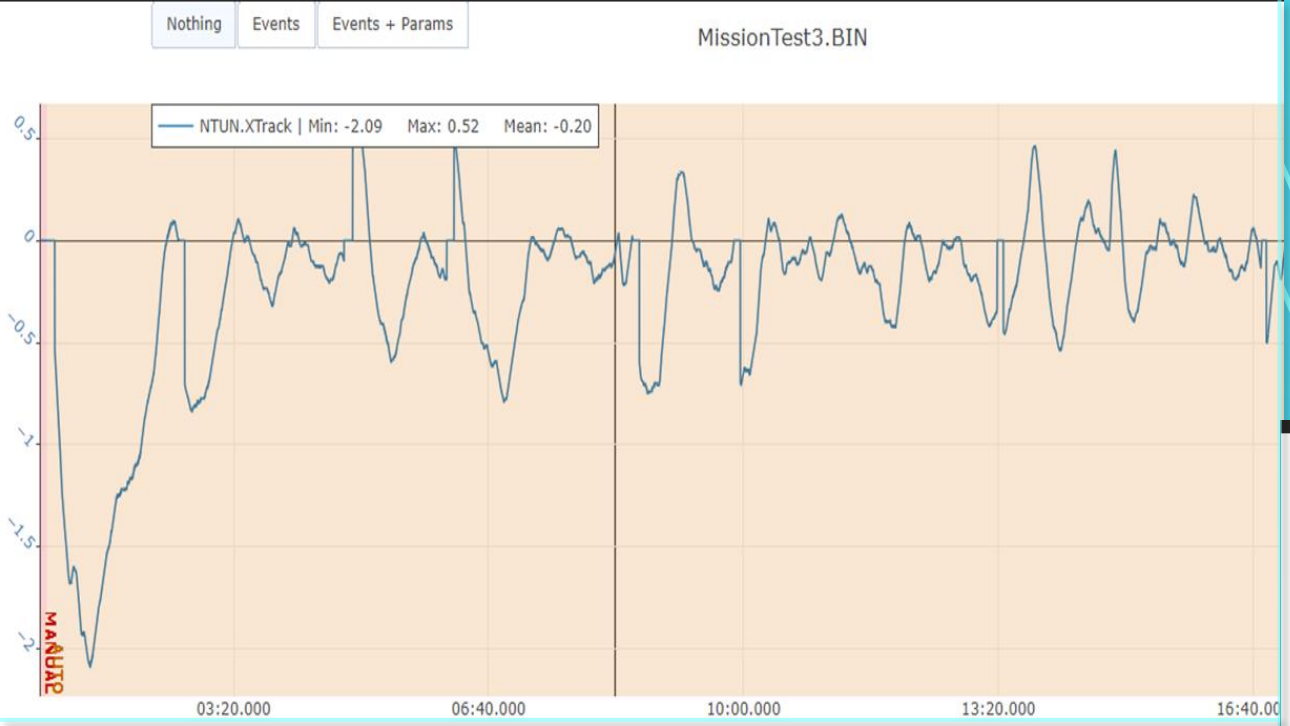
2) SENSOR: Determining which sensor could be integrated easily and have an obtainable ground for comparison.

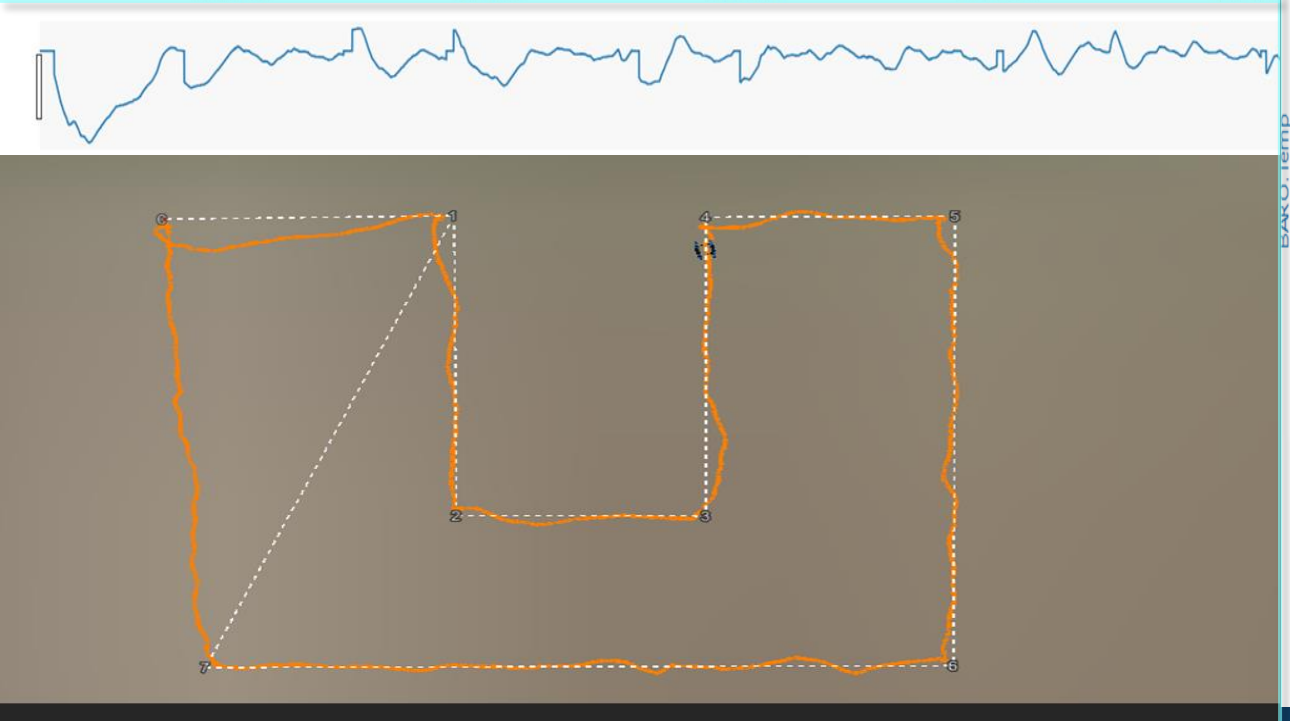
3) DHT INTEGRATION: Utilizing micro-SD card to capture and export data from Arduino.

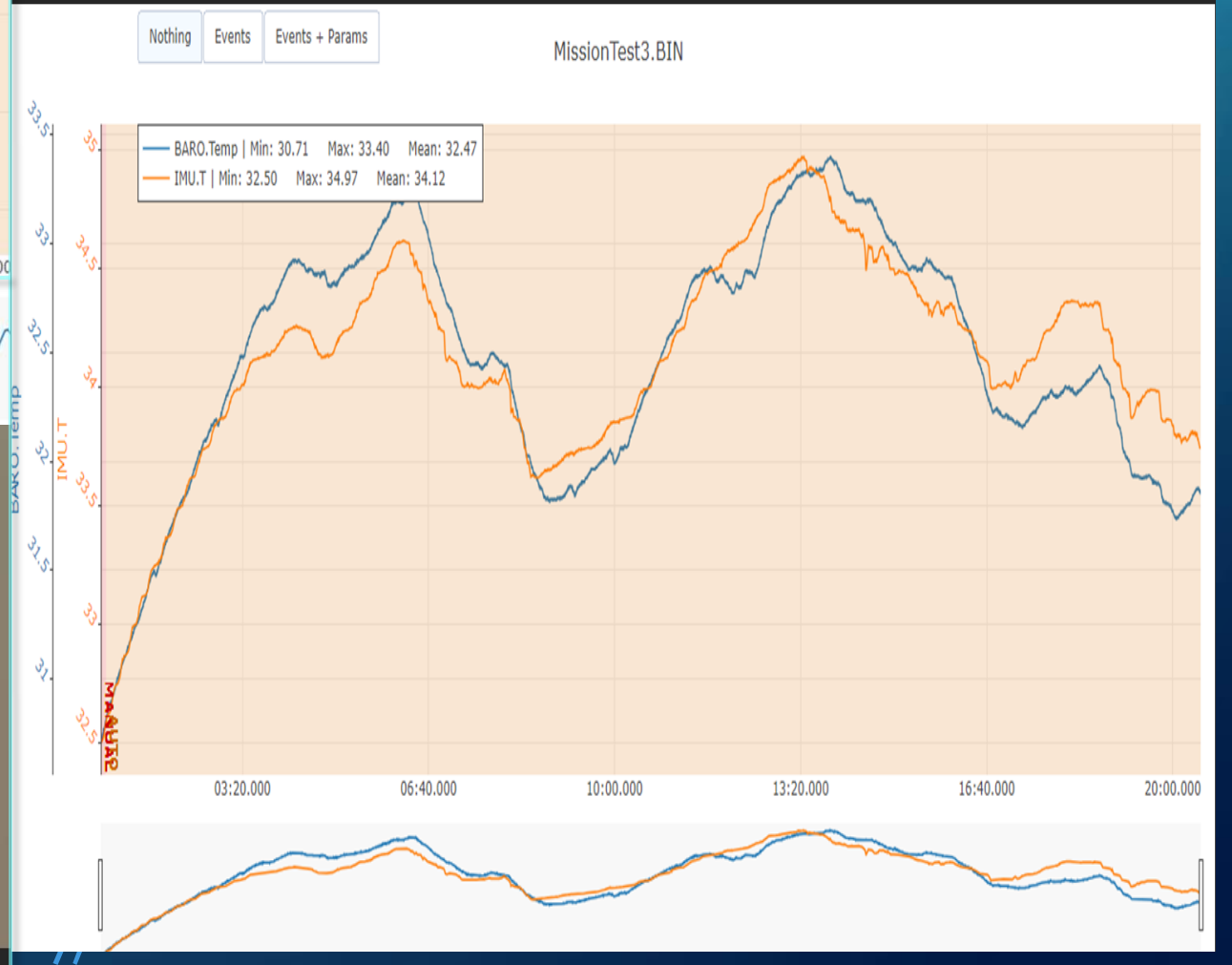
4) ACCURACY/PRECISION: Fine tuning the performance of the rover and its sensors to obtain the most precise and accurate data.

5) IMPROVE MOBILITY: Adjusting PID to provide quicker waypoint timing and waypoint accuracy.

INITIAL DATA





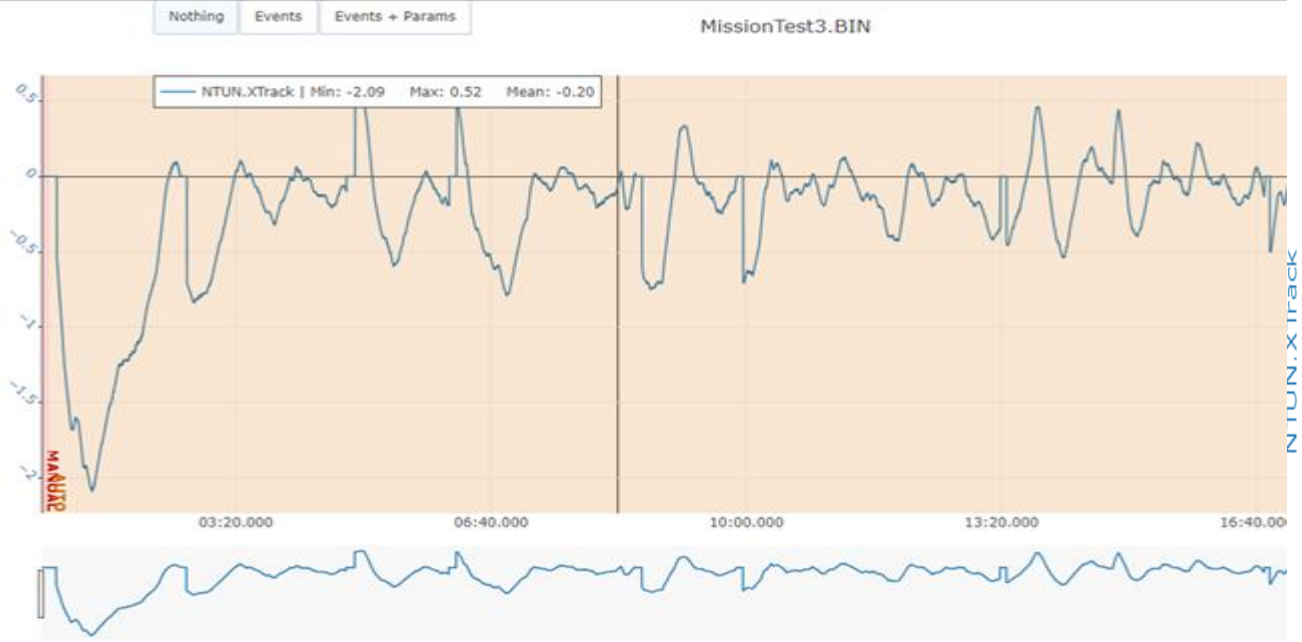


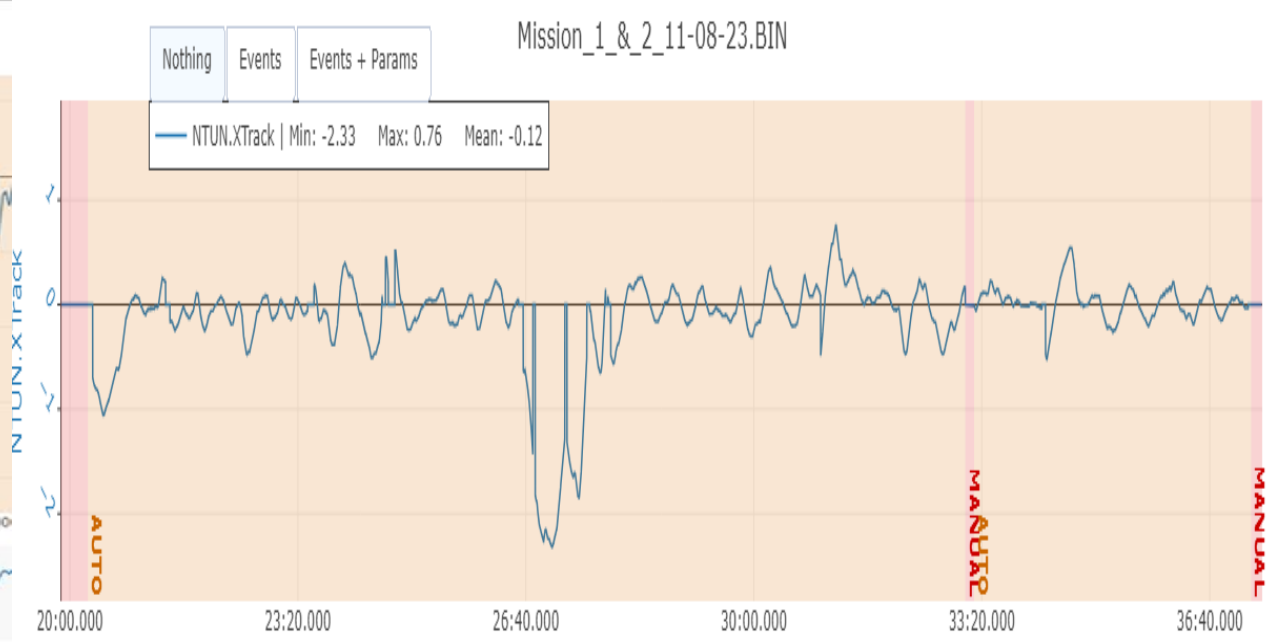
INITIAL DATA FIXES

- PID TUNING
- CHANGE RADIUS SIZE WAYPOINT APPROACH
- CHANGE OF STEERING RATE
- CHANGE TO PIVOT TURNS
- RECALIBRATION OF COMPASS
- FIX THE INITIAL HOME POINT ALTITUDE POSITION
- RE-MAPPED WAYPOINT

TIME VS ACCURACY

Accuracy of the path was chosen over a faster time.


Nothing
Events
Events + Params
MissionTest3.BIN
NTUN.XTrack | Min: -2.09 Max: 0.52 Mean: -0.20
0.5
0
-0.5
-1
-1.5
-2
MANUAL
03:20.000
06:40.000
10:00.000
13:20.000
16:40.000


Nothing
Events
Events + Params
Mission_1_&_2_11-08-23.BIN
NTUN.XTrack | Min: -2.33 Max: 0.76 Mean: -0.12
NTUN.XTrack
AUTO
MANUAL
MANUAL
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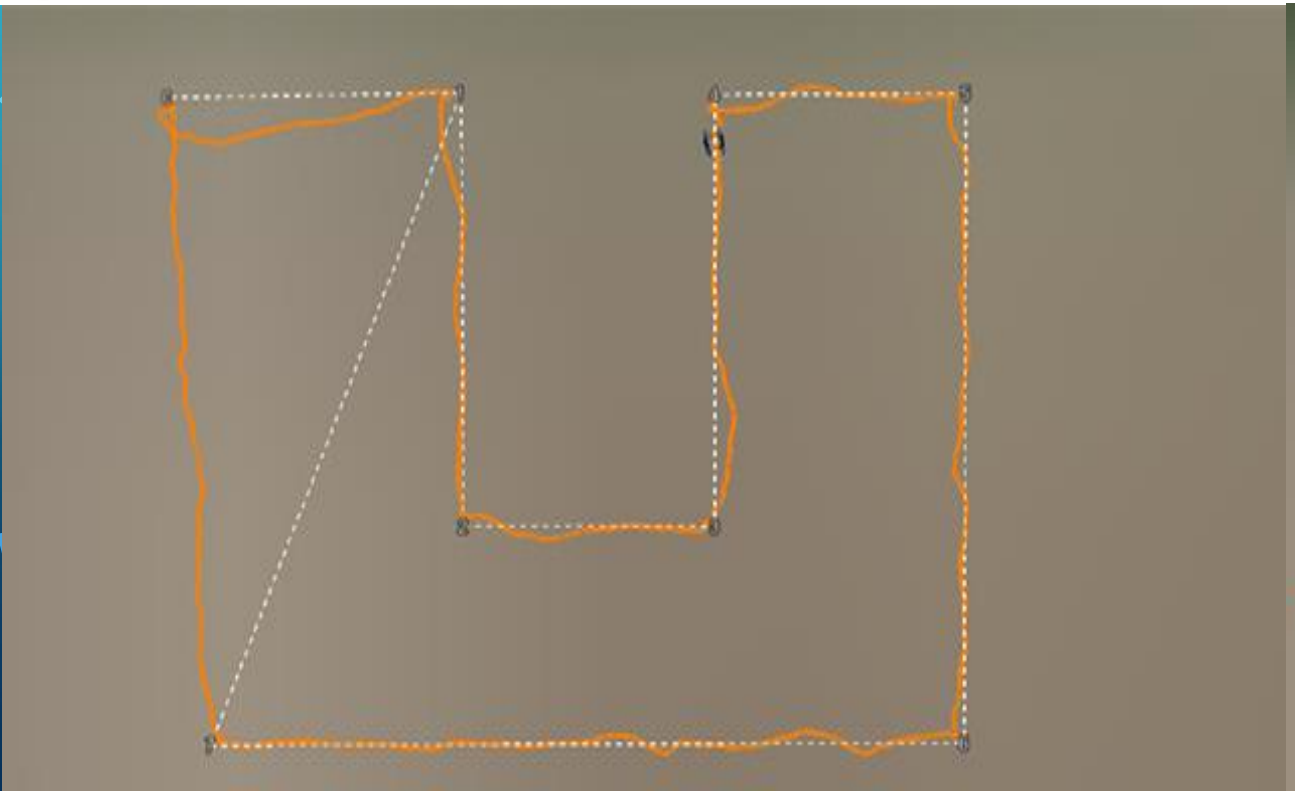
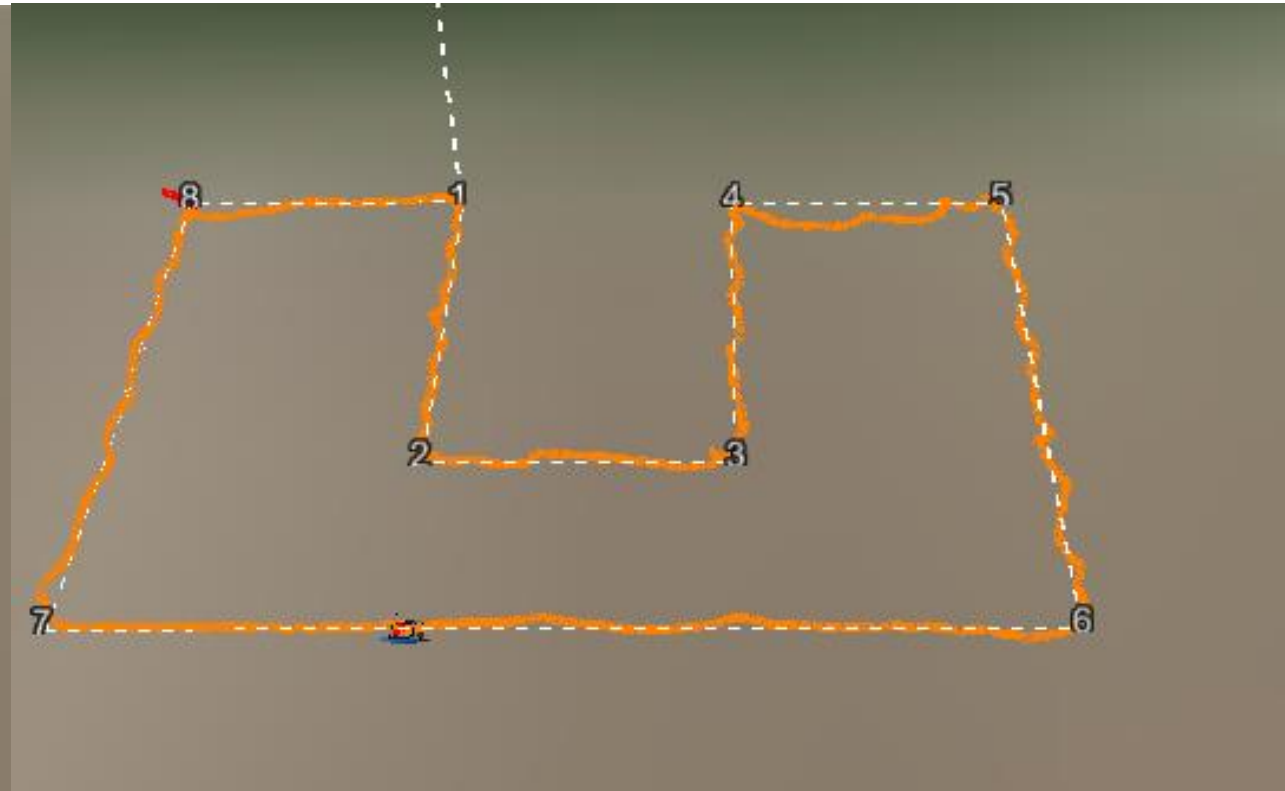
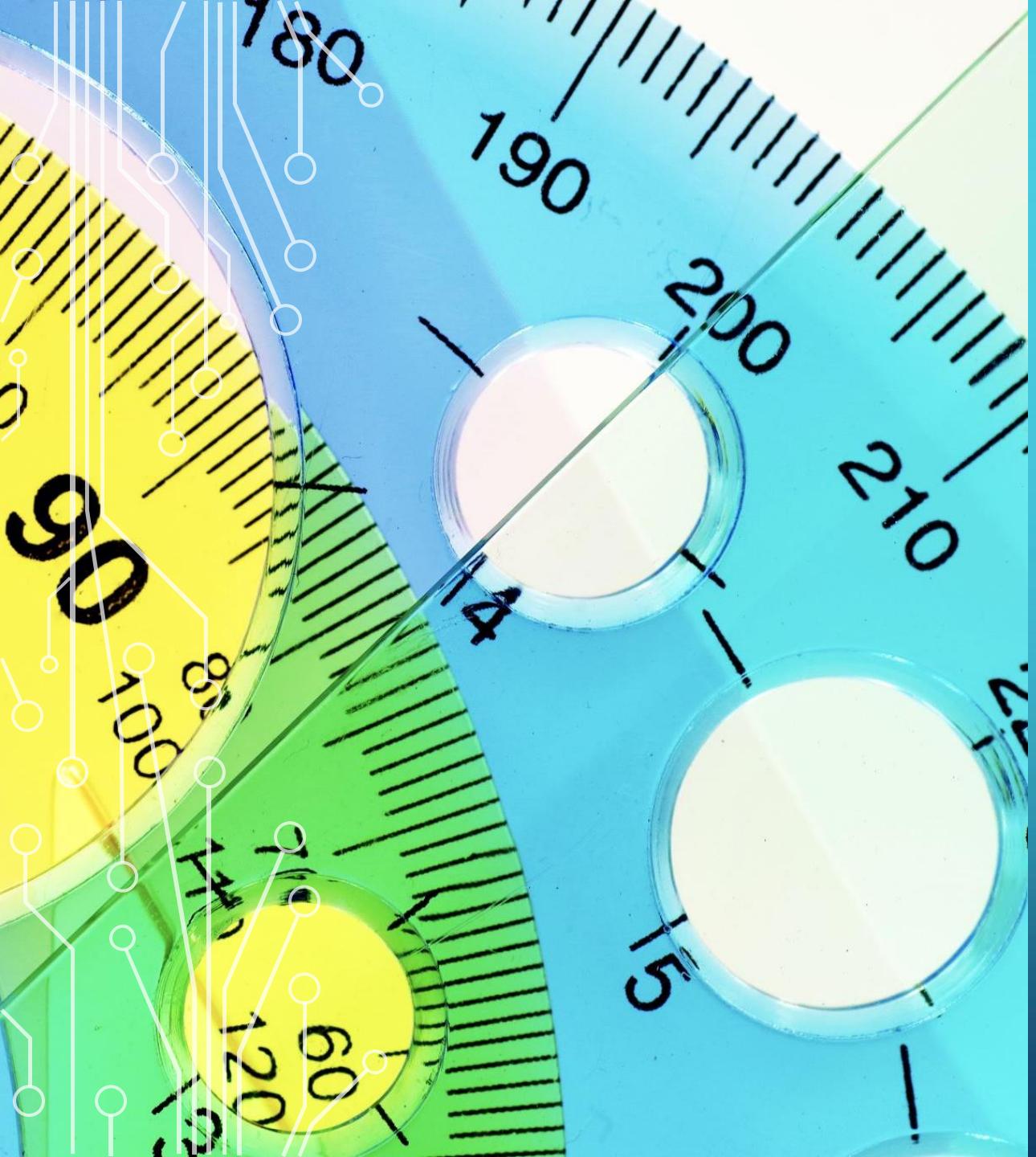
26:40.000
30:00.000
33:20.000
36:40.000

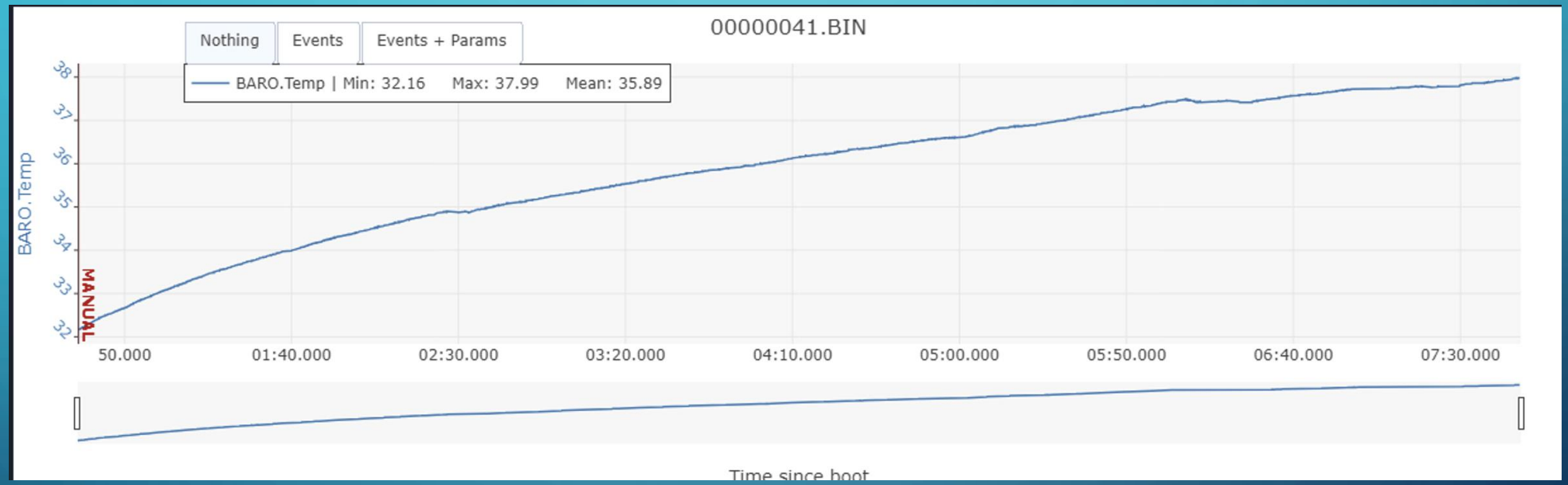



8
1
4
5
2
3
7
6



TEMPERATURE READINGS & COMPARISON

TEMPERATURE {PI READINGS}



AVERAGED 35.89 C
OR 96.62 F

TEMPERATURE {DHT-11 READINGS}

AVG. EXTERIOR READING {TAKE 1}:
21.52 C

AVG. EXTERIOR READING {TAKE 2}:
18.3 C

INTERIOR MOTOR READING {TAKE 1}:
20.7 C

INTERIOR MOTOR READING {TAKE 2}:
21.2 C

AVG. INTERNAL BATTERY READING {TAKE 1}:
23.7 C

AVG. INTERNAL BATTERY READING {TAKE 2}:
22.4 C

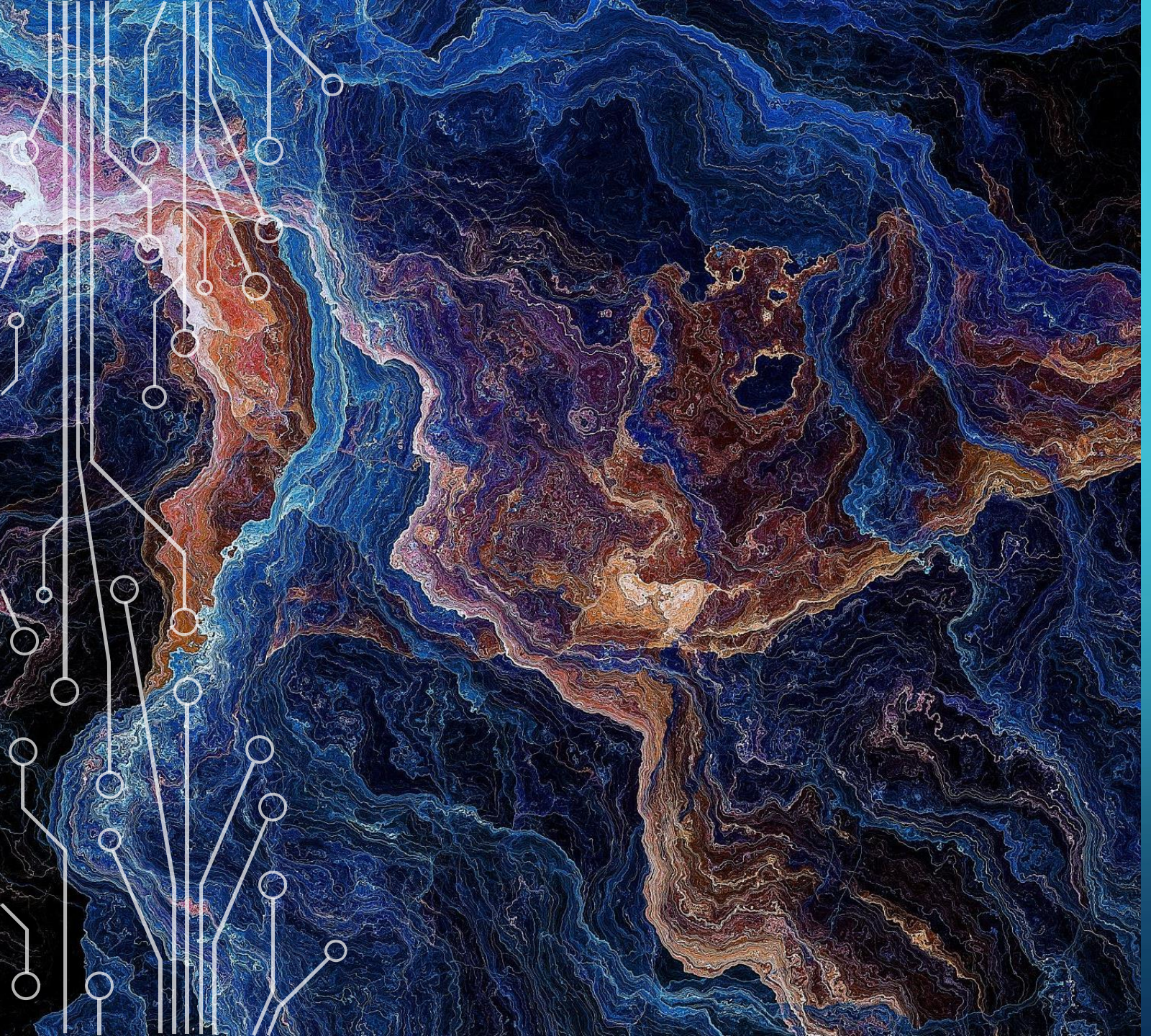
ACTUAL TEMPERATURE OF MEASURED DAY:
19.44 C
67.0 F

IMPROVEMENTS

- Greater separation of DHT-11 from the Rover body (3-D printed rod/stand)
- Better insulation between inside and outside of the rover
- Further testing of the rover and DHT-11 setup in other environments

CONCLUSION

- What was learned
  - Cooperation in a team and communication with team members
  - Motor driver inputs
  - How to utilize a navio2 and raspberry pi
- Applications elsewhere
  - The sensor connections can be used in other builds and other devices and not specific or unique to the rover build.
- Communications between devices
  - How to get systems (Pi, Navio, and Arduino) to communicate and function with one another



THANK YOU!