



Dwight Look College of

ENGINEERING
TEXAS A&M UNIVERSITY

Team 08: Marching Band LPS

Bi-Weekly Update 2

Alex Flores, Vlad Lebedev

Sponsor: Troy Morris, Andrew Morris

TA: Vishwam Raval

Problem Statement

- Problem: Marching bands require very precise positioning for their shows. Currently, the only method of review for marcher positions is a band tower, which is only accessible to the band directors.



Our Solution

- Solution Proposal: We are developing a system of wearable transmitters that send signals to stationary receivers for location calculation. This data is then sent to a web application that is accessible to both marchers and the director for a true bird's eye view.

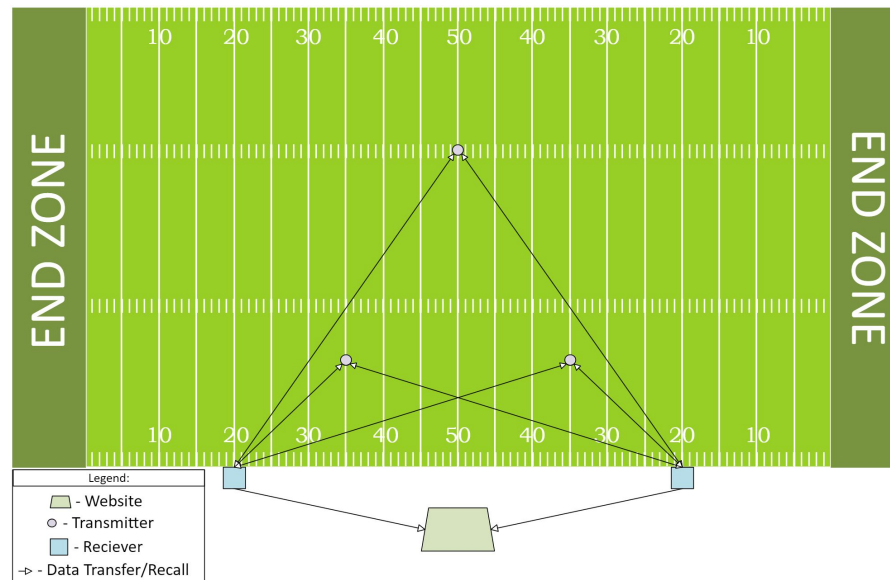
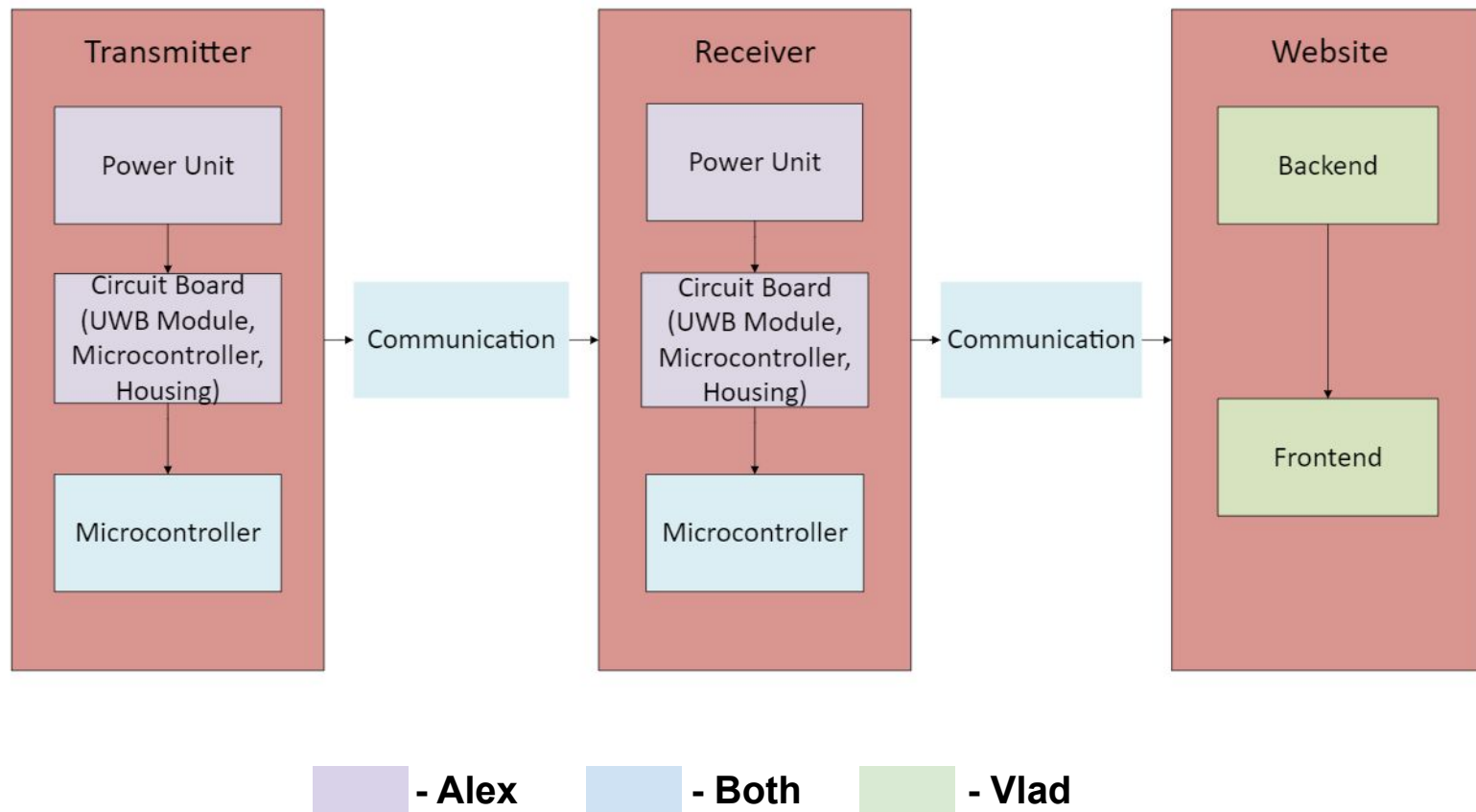
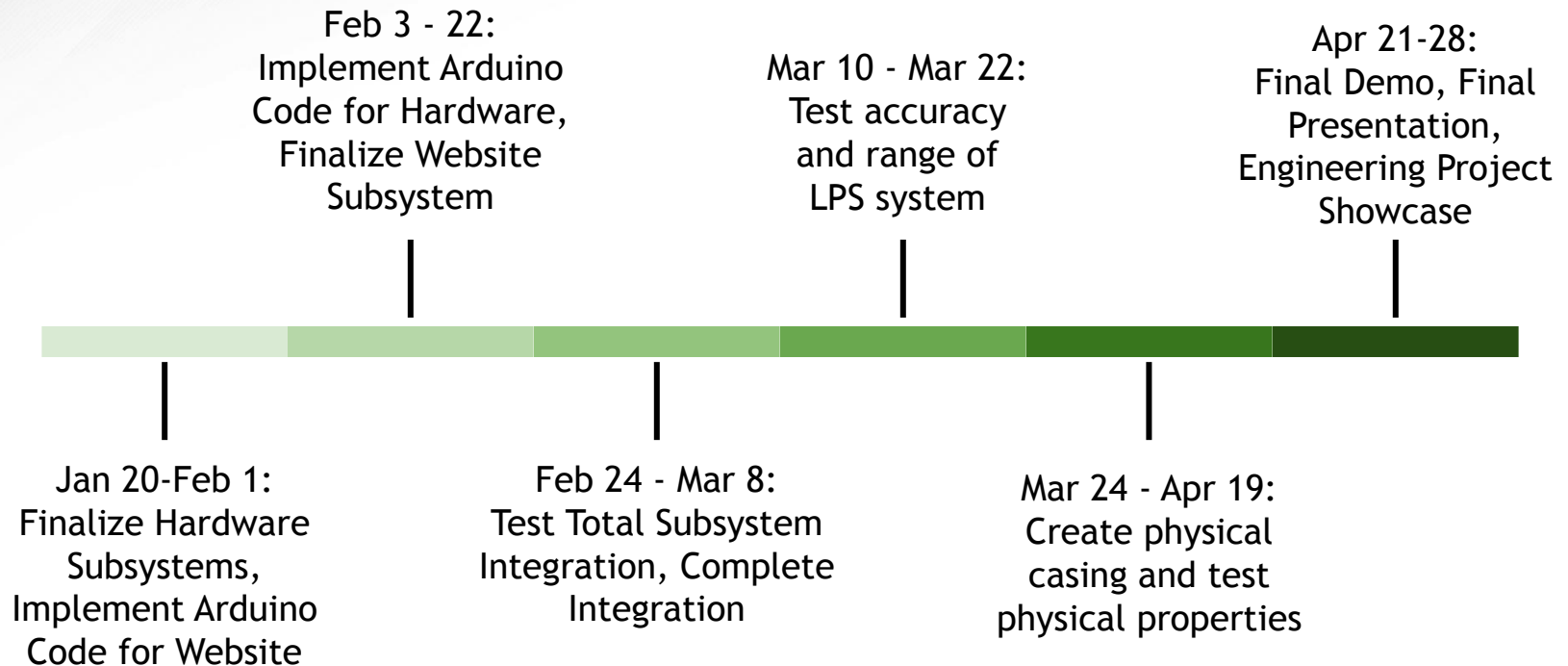


Diagram of Subsystem Division





Project Timeline



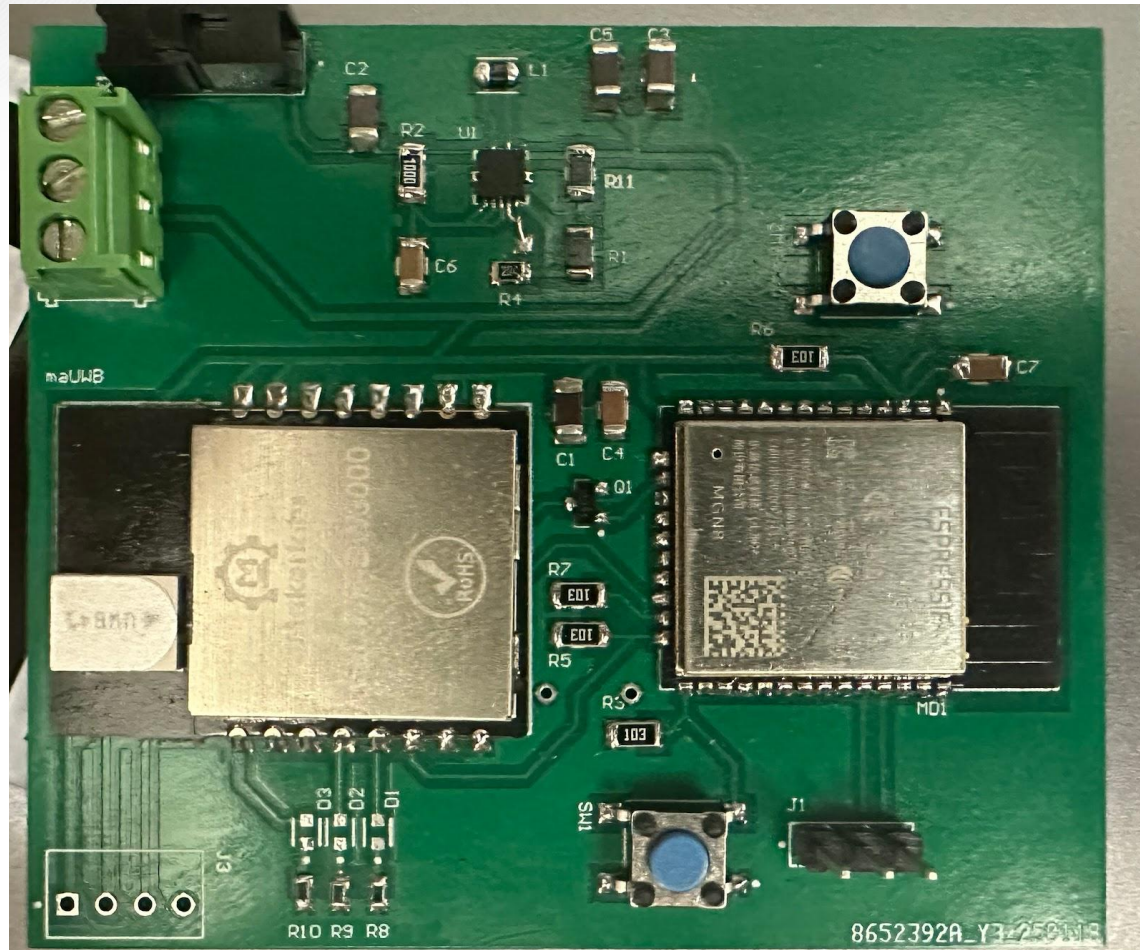


Hardware Subsystem

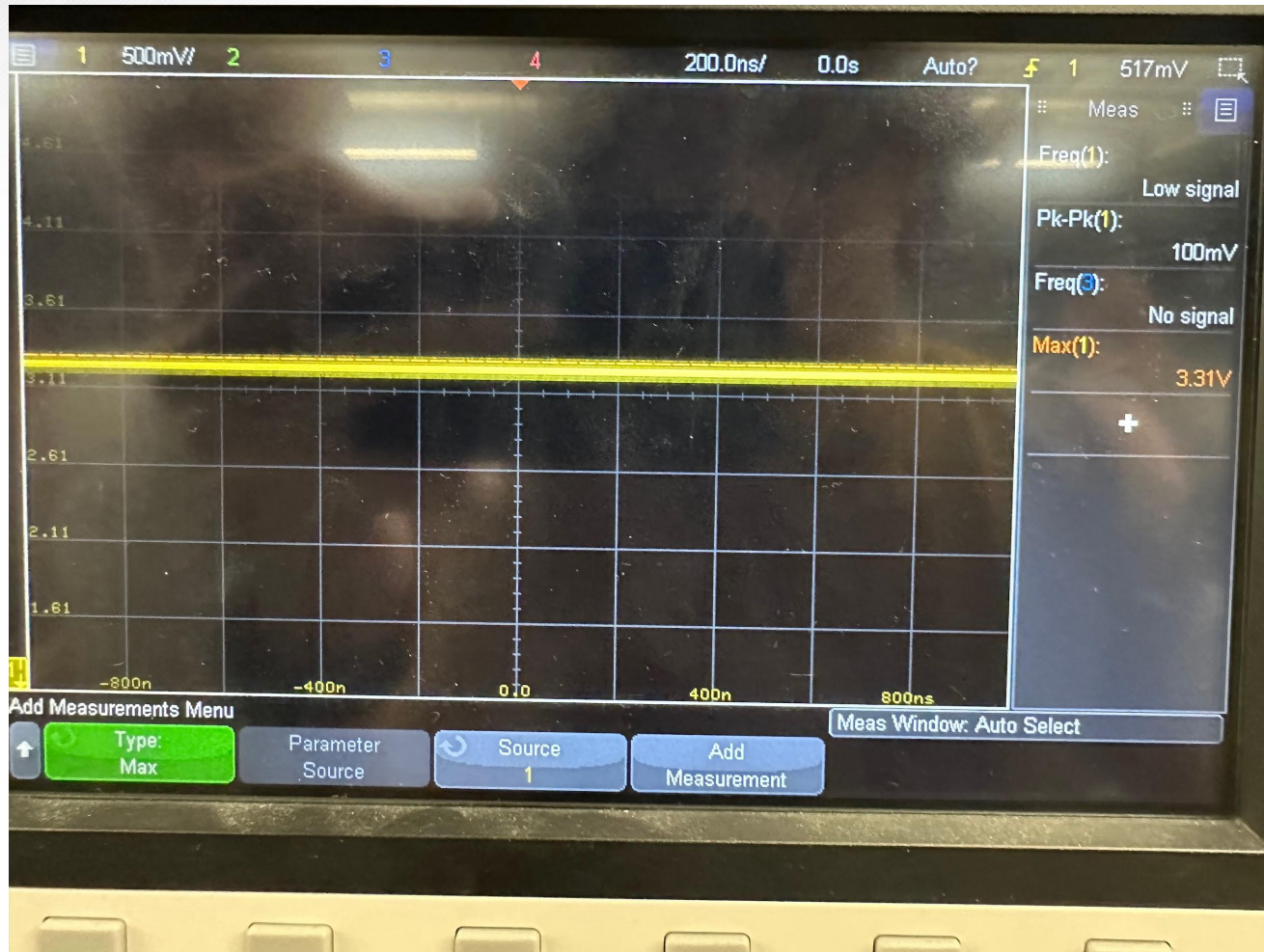
Alex Flores

Accomplishments since last presentation 20 hrs of effort	Ongoing progress/problems and plans until the next presentation
Received parts and PCB boards Completed my part of soldering on all boards Tested New Design	Ensure operation for all boards and finish small fixes Test ESP32 works with arduino code

Hardware Design Data and Photos



Hardware Design Data and Photos



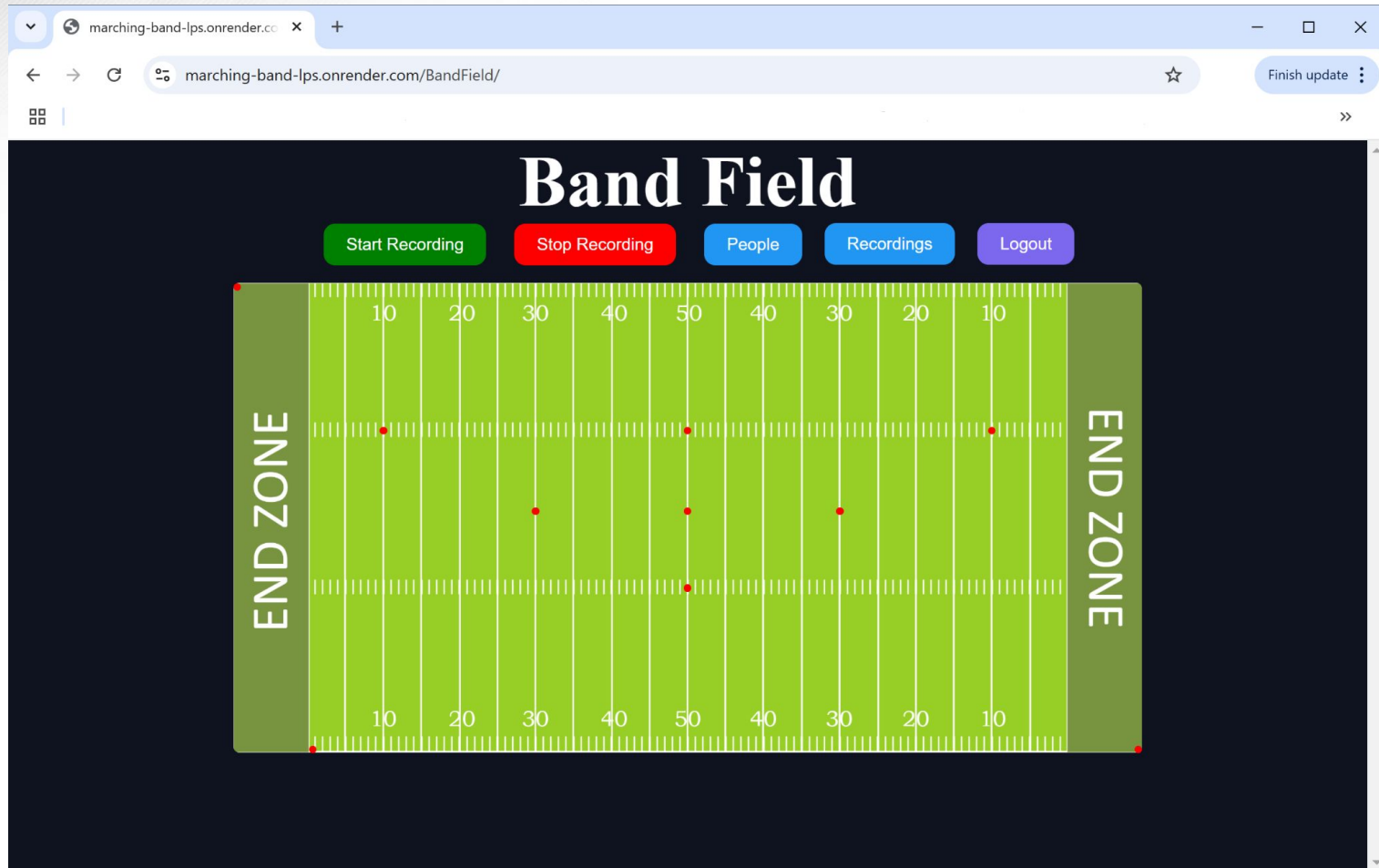
Website Subsystem

Vlad Lebedev

Accomplishments since last presentation 12 hrs of effort	Ongoing progress/problems and plans until the next presentation
<ul style="list-style-type: none"> • Merge two python scripts into one website design • Run the website through a host (Render) • Migrate SQLite database into PostgreSQL 	<ul style="list-style-type: none"> • Debug code for compatibility with global host Render • Debug watchdog for live data changes • Adjust CSS code for different screen sizes • Connect the website to the receivers and review data



Hosting Website Through Render



Firmware Subsystem

Vlad Lebedev

Accomplishments since last presentation 7 hrs of effort	Ongoing progress/problems and plans until the next presentation
<ul style="list-style-type: none"> ● Finished Arduino code <ul style="list-style-type: none"> - Add tags to network - Remove tags from network - Send location data to website backend - Set up tags and receivers 	<ul style="list-style-type: none"> ● Hand over code to Alex for testing & adjustments to code if needed



Execution Plan

[illegible]



Validation Plan

Paragraph #	Test Name	Success Criteria	Methodology	Status	Owner(s)
3.2.1.1	Location Precision	The Marching Band LPS will be able to provide the location of each marcher with an accuracy of +/- 1 meter.	Establish reference points with known positions and compare LPS data to calculate the precision error.	UNTESTED	Full Team
3.2.1.2	Range of Detection	The Marching Band LPS will be able to detect marchers within a football field with the dimensions of 100 meters by 50 meters.	Move around a transmitter at the edges of the football field to ensure stable connection.	UNTESTED	Full Team
3.2.1.3	Website Data Process Time	Location data will be processed and displayed on the website associated with the Marching Band LPS in one second or less.	Add a timer on the display and count the time it takes to process 50 location coordinates.	UNTESTED	Full Team
3.2.1.4	Website Connection	The website will connect through WiFi to the receivers.	Be able to network through a local connection like a hotspot from one device on the python project.	UNTESTED	Vlad Lebedev
3.2.2.1	Mass	The total mass of the PCB and additional hardware will not exceed 1kg.	Measure mass of the hardware with a digital scale.	Partially Tested: Board is small, which leads me to assume casing will be compact enough to meet mass requirement	Alex Flores
3.2.2.2	Volume Envelope	The housing unit for the PCB will not exceed the dimensions of 80 x 80 x 160 mm.	Perform measurements on the hardware to ensure it fits into specified dimensions	Partially Tested: Board is small, which leads me to assume casing will be compact enough to meet volume requirement	Full Team
3.2.2.3	Receiver Mounting	The receiver can be mounted onto a pole similar in scale to that of a speaker stand. The transmitter can be mounted comfortable onto a person	The receiver will be mounted onto a stand and shaken lightly to ensure stability. The transmitter will be worn by and individual who will move to test comfortability	UNTESTED	Full Team
3.2.3.1.1	Power Consumption	The maximum peak power of the system shall not exceed 2 watt hours	Use multimeter to validate watt hours for the device	Tested: Success. Totally draw required is 0.78 Wh when adding up current draw from various parts	Alex Flores
3.2.3.1.2	Input Voltage Level	The input voltage level for the Marching Band LPS shall be within 3.0V-3.5V.	Use multimeter to validate input voltage levels	Tested: Success. Output is 3.25V	Alex Flores
3.2.4.2	Thermal	The system should be operational in environments that have temperatures within the range of 10°F and 120°F	System will be placed in a heating device and cooling device and be monitored to guarantee operation in the respective conditions.	UNTESTED	Alex Flores



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Thank You!