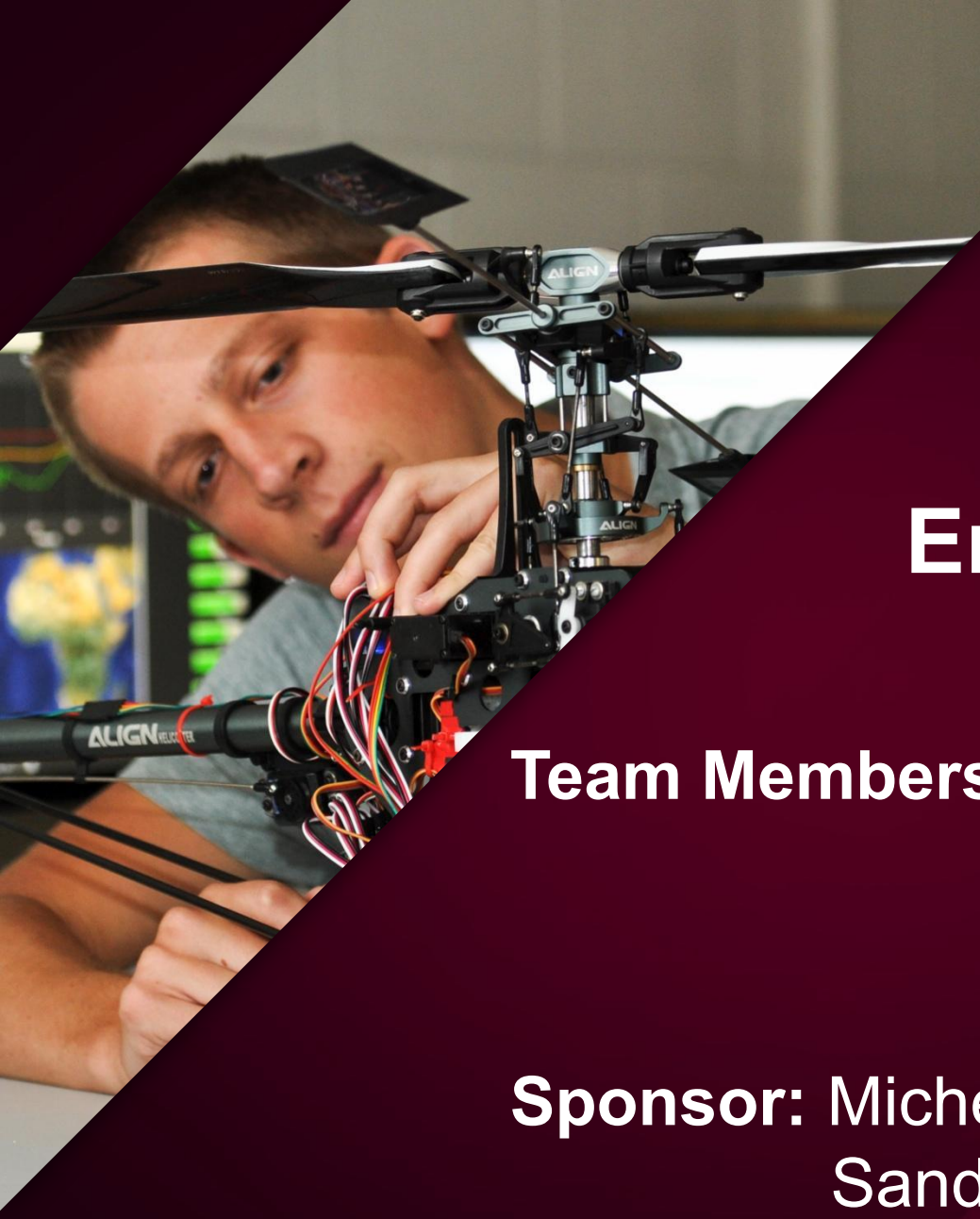


Dwight Look College of ENGINEERING
TEXAS A&M UNIVERSITY

Portable High Energy Experiment (PHEE) DAQ

Team Members: Ethan Barnes
John Sabra
Sang Hoon Chung

Sponsor: Michelle Chatter
Sandia National Laboratories

TA: Logan Smith

Project Summary

Sandia National Laboratories

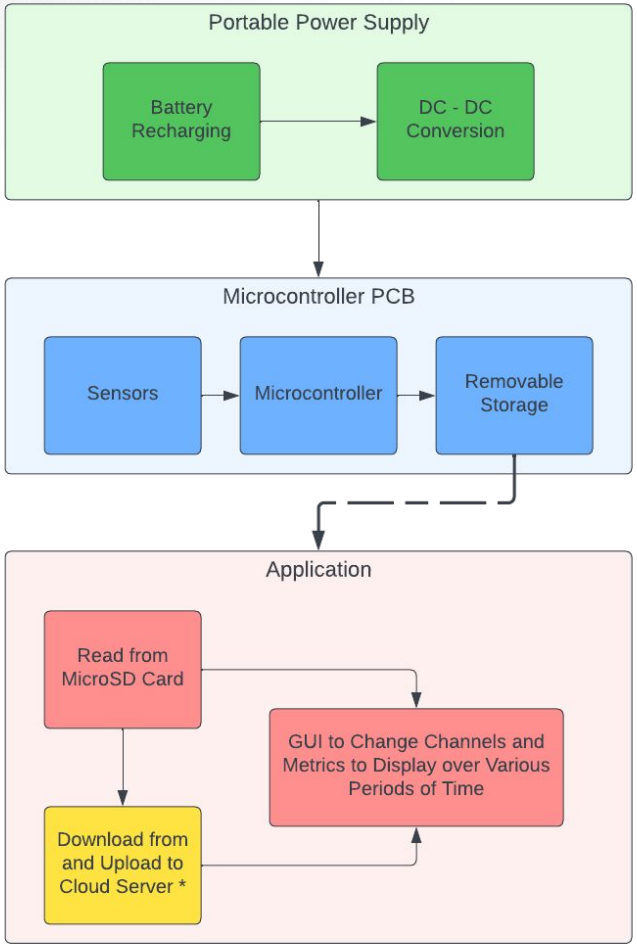
Problem statement:

- The United States military possesses about 5500 nuclear weapons in its stockpile
- The security of these weapons and equipment is paramount when they are transported for storage and testing
- Sandia is interested in detecting explosive-type events in sensitive areas
  - Exact application for DAQ system may not be disclosed

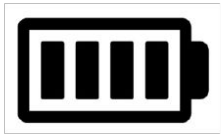
The Portable High Energy DAQ System will:

- Protect government equipment by detecting and identifying explosives within a 100 ft range
  - Utilizes accelerometer and pressure sensor to classify if an explosive event occurred
- Write output to removable storage device
  - User will be able to refer to and perform analysis on past data

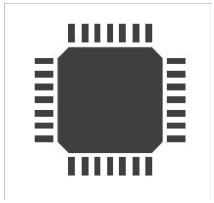
Project/Subsystem Overview



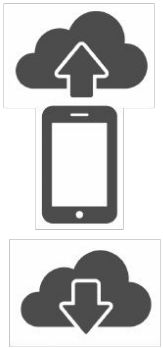
Johnny Sabra



Ethan Barnes



Sang Hoon Chung



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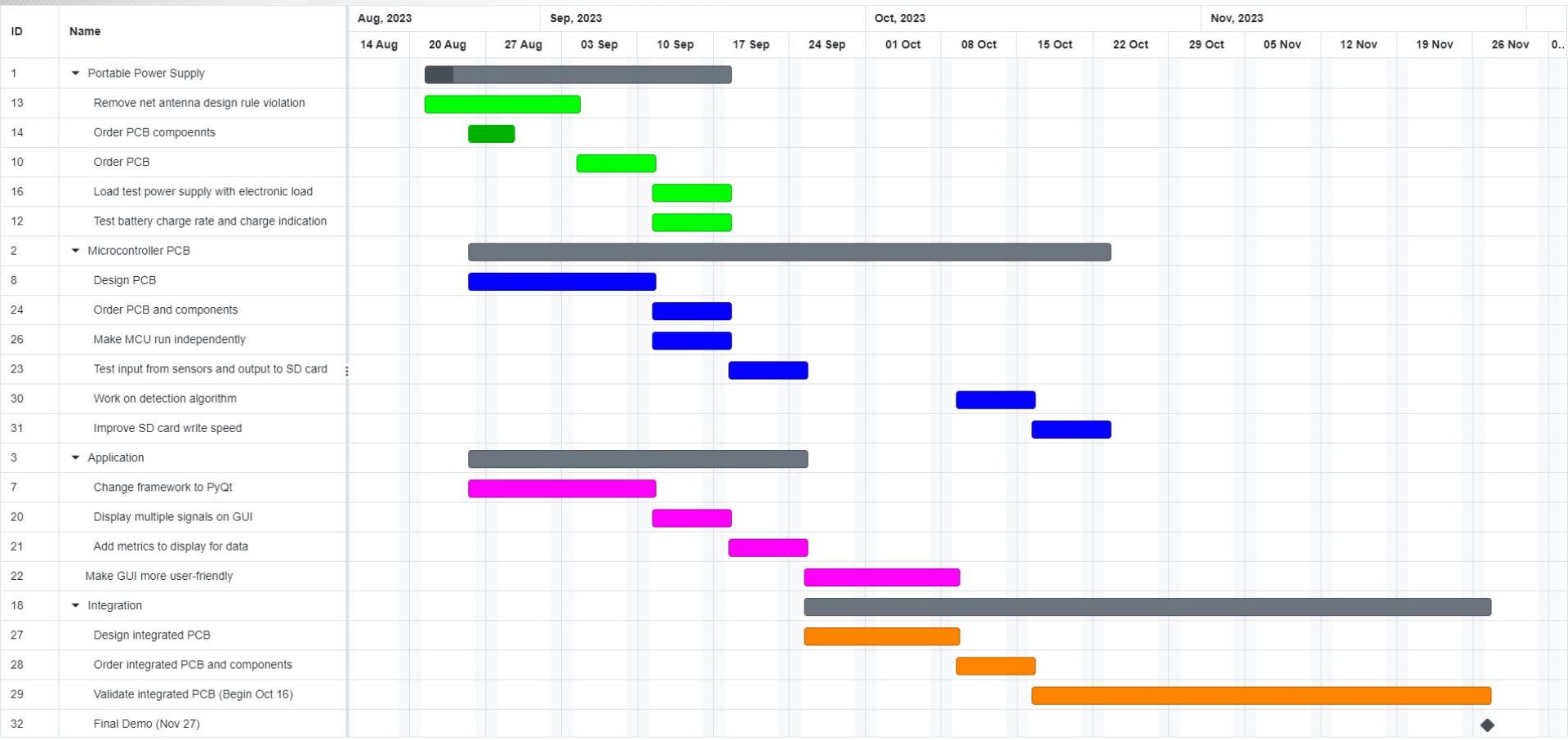
Team: PHEE DAQ (Sandia)

	9/10	9/24	10/8	10/22	11/5
Johnny	PCB Ordered	Power supply PCB validated	Charging feature validated	Integrated PCB design complete	Integrated PCB is functional
	Zero design violations in Altium	Regulates 3.3 V under 40mA load and 5 V under 120 mA load (estimated load current of MCU)	Can charge a 3-cell lipo battery at 1C rate		
Ethan	PCB design complete	MCU runs independently	PCB is functional	Zero design violations in Altium	Can be powered with 3.3V source and can read from sensors and write to SD card at more than 2 kHz Integrated PCB is portable with power supply regulating battery voltage to 3.3 and 5V under load
	Zero design violations in Altium	Program will start and stop from GPIO outside of debug mode	Powered with 3.3 V source, can write to SD card at ~2 kHz Pressure sensors test pending		
Sang Hoon	Change Framework to PyQt and Design multiple signals on GUI	Add more metrics to display for data	Make GUI more user-friendly	Finalizing the program and adopting the software	Validate and test communication between subsystems
	Check the application shows whole sensors data	Add more metrics and check availability of the result Display via the application at next column	Ask opinions to other people about the design of GUI	Check the software works when we download the software itself as .exe file	Application can read data from SD card in desired format (time, explosion, pressure, acceleration)

Execution


ID
Name
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14 Aug
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03 Sep
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01 Oct
08 Oct
15 Oct
22 Oct
29 Oct
05 Nov
12 Nov
19 Nov
26 Nov
1 Portable Power Supply
13 Remove net antenna design rule violation
14 Order PCB compoennts
10 Order PCB
16 Load test power supply with electronic load
12 Test battery charge rate and charge indication
2 Microcontroller PCB
8 Design PCB
24 Order PCB and components
26 Make MCU run independently
23 Test input from sensors and output to SD card
30 Work on detection algorithm
31 Improve SD card write speed
3 Application
7 Change framework to PyQt
20 Display multiple signals on GUI
21 Add metrics to display for data
22 Make GUI more user-friendly
18 Integration
27 Design integrated PCB
28 Order integrated PCB and components
29 Validate integrated PCB (Begin Oct 16)
32 Final Demo (Nov 27)

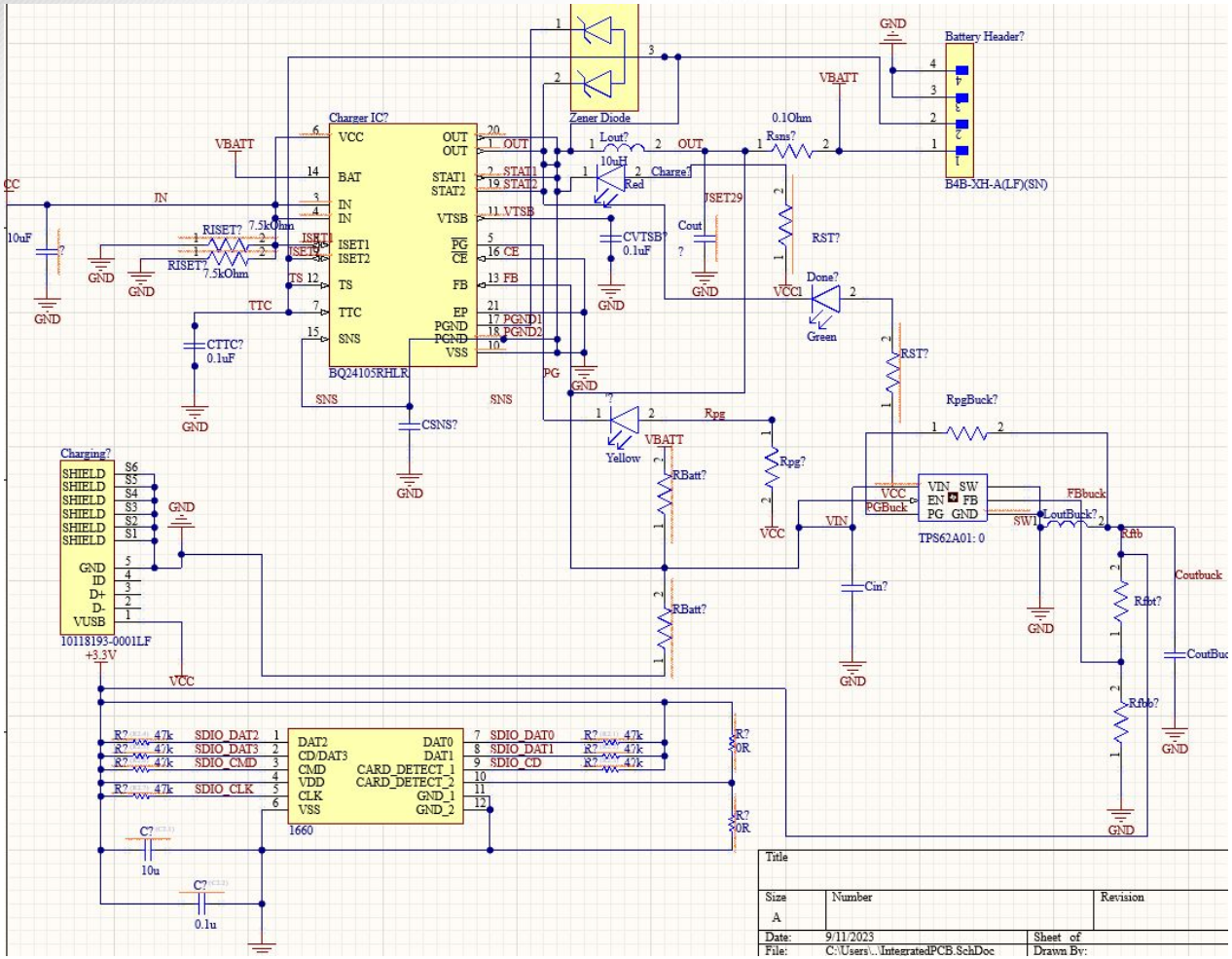
Portable Power Supply

Johnny Sabra

Accomplishments since the last presentation <10> hrs	Ongoing progress/problems and plans until the next presentation
• Removed all design violations from PCB designs • PCB components have arrived and are in hand • PCB layout ordered with expected arrival this week	• Solder components onto to PCB • Begin layout and routing for integrated PCB design between power supply and MCU

Silk to Silk (Clearance=10mil) (All),(All)	0
Net Antennae (Tolerance=0mil) (All)	0
Height Constraint (Min=0mil) (Max=1000mil) (Prefered=500mil) (All)	0
Total	**0**

Integrated PCB

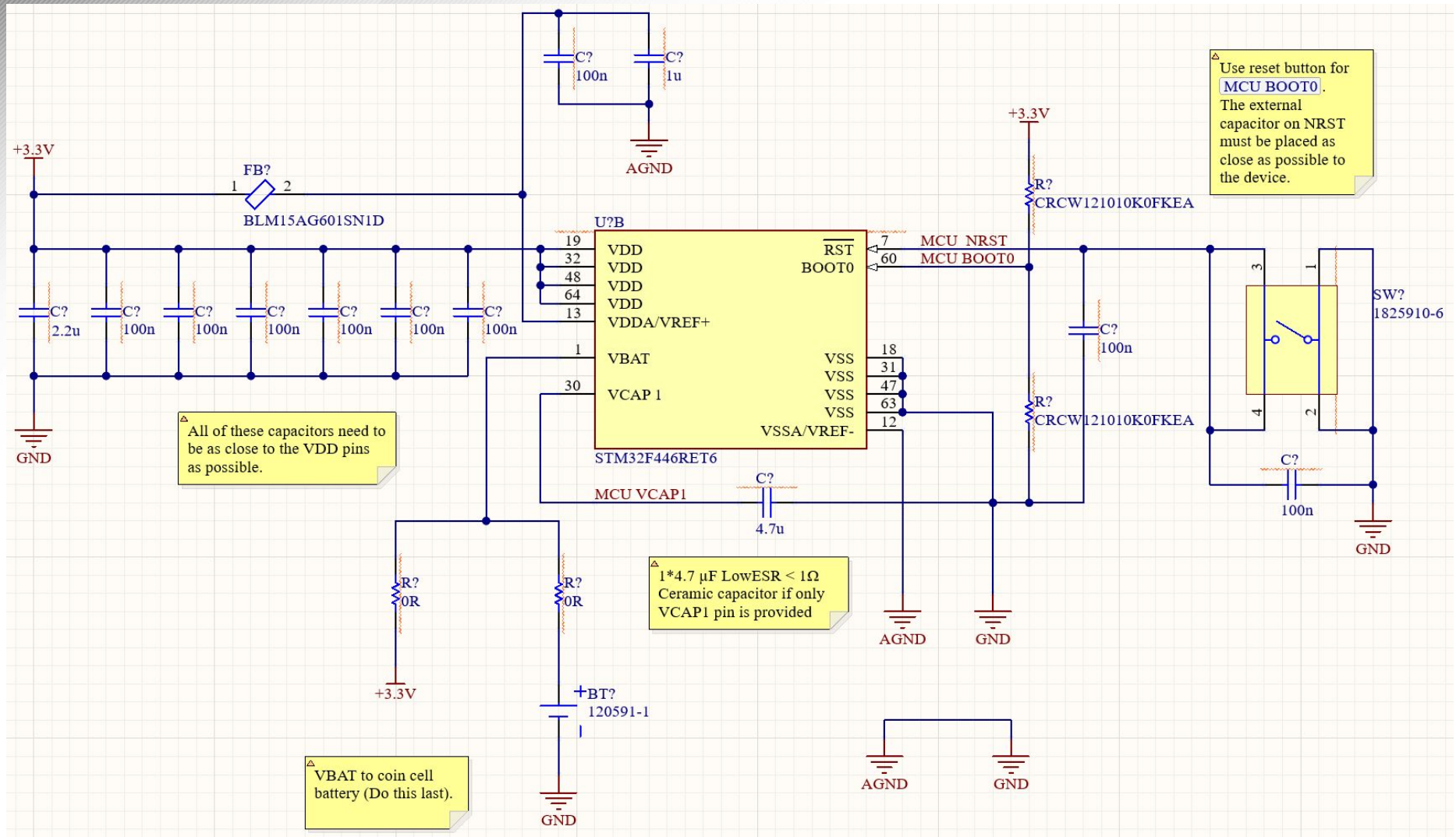


- Schematic for power supply and micro SD card reader
- Schematic symbols include footprints for PCB layout

Microcontroller PCB

Ethan Barnes

Accomplishments since the last presentation <20> hrs	Ongoing progress/problems and plans until the next presentation
• microSD reader, power, and sensor input schematics are complete	• MCU GPIO schematic in progress and then PCB layout will begin

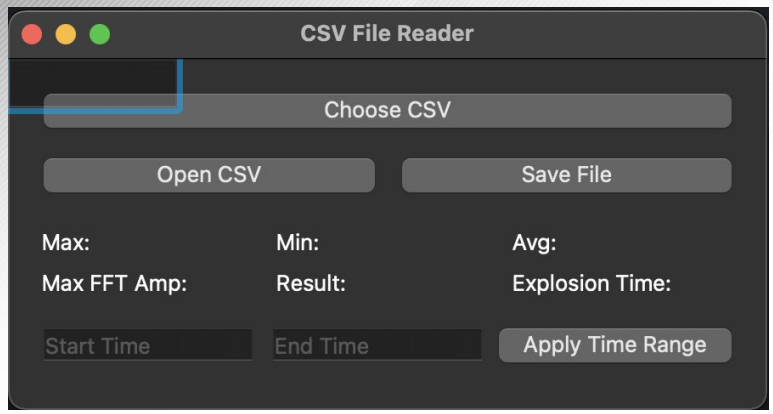


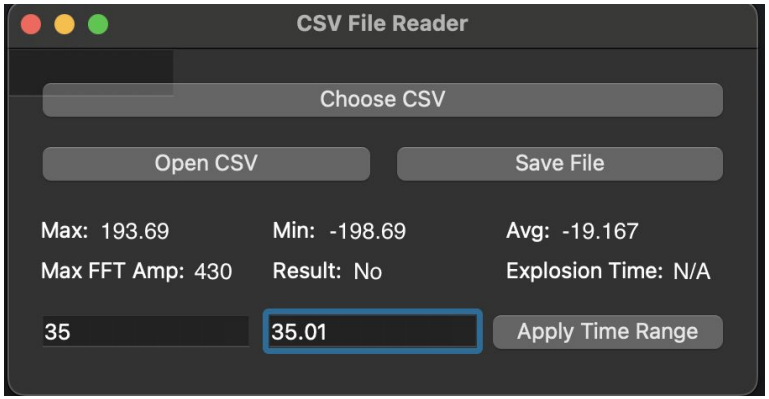
Microcontroller PCB Power Schematic

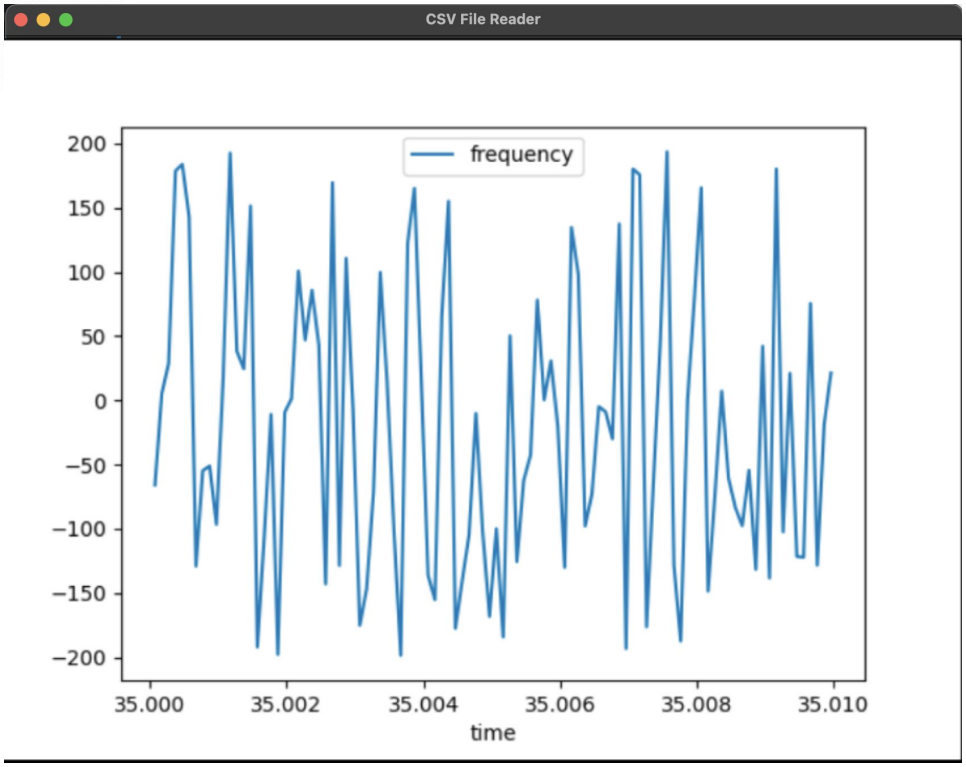
Application

Sang Hoon Chung

Accomplishments since the last presentation <20> hrs	Ongoing progress/problems and plans until the next presentation
• Change the Framework from Kivy to PyQt which can be used to create desktop applications.	• Link to Google Drive with using Google API • Read multiple signals from sensors







When we run the app, a small window will appear. When you select the file you want to view and open it, a graph will appear in a pop-up window.

Thank you!

Questions?