EE/CprE/SE 492 Status Report 2

Start Date – End Date: 1/31/2025 - 2/13/2025

Group number: 13

Project title: PTSD Detection Device

Client &/Advisor:

Advisor: Mohammed Selim

Mentors: Bae Systems - Alice Crutcher, Michael Goderre, Jennifer Plakyda, Ryan Littler

Client: America's VetDogs - Cheyenne Whitetree

Team Members/Role:

Justin Scherrman - Design Engineer - Communications and Sensors

Neil Prange - Software Engineer

Aidan Klimczak - Design Engineer - Microcontroller

Justin Jaeckel - Software Engineer - Embedded systems

Ty Decker - Security - Stenographer

Katerina Zubic - Team organizer and sensor engineer

- **Weekly Summary**

From the last report, We met with our faculty advisor and discussed a plan for the rest of the semester and set up a Gantt chart with responsibilities and dates for which items needed to be completed. We also discussed our project with one of the TAs. In this meeting, it was discussed that flexible PCB would be a good option for implementing our current design into a wearable option. We also discussed the current battery life issues one of the suggestions would be to decrease the sampling intervals of the PPG sensor.

- **Past week's accomplishments**
  - Battery testing
  - PCB research
  - Blood pressure research

Neil Prange - Research/Testing

- Research Blood Pressure detection techniques using a PPG
- Begin implementation based on results of research

Aidan Klimczak - Research/Design

- Consulted with BAE about researching PCB design approaches
- Began researching PCBs based on BAE's information

Justin Scherrman - Research/Design

- Began research into iteration 2.0 of the current design.
- PCB implementation research.
- Ran tests on current design battery life.

Justin Jaeckel - Research / Development

- Started research into blood pressure detection using PPG sensor
- Continued research into heart rate data and ptsd triggers

Ty Decker - Research / Security

- Started planning for completion of security checklist
- Looked into a manual blood pressure cuff that would be sufficient for our use.

Katerina Zubic - Research & Testing

- Researching how to use KiCad
- Looking into the specifics of designing the PCB for the handler and dog side
    - Plan to create PCB for the dog side as well as its housing.
        - Size, materials, color, etc.

- **Pending issues**

- Detecting blood pressure using our PPG sensor
- Deciding what tools to use for PCB design(kicad)
    - Breaking down our boards into solderable components
    - Removing unnecessary peripherals (camera, etc…)
- Battery usage for system
    - Testing experimentally
    - Find ways to optimize power consumption

- **Individual contributions**

NAME	Individual Contributions	Hours	HOURS cumulative
Neil Prange	Beginning research on modern blood pressure detection schemes using a PPG sensor. Use this to improve our PTSD detection software, which currently only bases off the users heart rate.	3	5
Justin Scherrman	Met with team and TA to discuss next steps regarding pcb implementation. Flexible PCB was discussed. Ran test for how long the battery will last while maintaining a signal.	6	9
Justin Jaeckel	Began research into blood pressure detection and heart rate readings to trigger a response from the system	8	10
Aidan Klimczak	Reached out to BAE about how to approach PCB design and used their comments to begin PCB design	8	10
Katerina Zubic	Began PCB design for handler side. Looking into specifics for possible solutions to power consumption (voltage regulator), and possible housing designs.	8	11
Ty Decker	Started planning for security testing using a checklist and testing suite.	2	4

- **Plans for the upcoming week**

- PCB design research
- Explore Keycad for implementing the PCB

- Better refine our PTSD detecting algorithm for higher accuracy
- Research PPG based blood pressure detection algorithm; start implementation
- Generate experimental data on battery usage
    - Dog wearable device
        - Housing and PCB
    - Veteran wearable device
        - PCB

- **Summary of biweekly advisor meeting**

    - Talked about the plan for the semester and what improvement goals we want to achieve for our prototype.
    - Chose blood pressure as a major goal we wish to achieve, as well as an algorithm to detect PTSD.