

2/24/24 - 3/30/24

Group Number: 15

Project Title: PTSD Detection Device

Client &/Advisor: BAE Systems / Rachel Shannon

Team Members: Casey Halbmaier, Caden Backen, Coby Konkell, Ben Gardner, Andres Cebellos, Nihaal Zaheer

Weekly Summary:

Over the past few weeks, the team has made steady progress in both the software-side and the hardware-side of the project. For software, the team has been working on flashing the project code to the breadboard devices provided to us by BAE Systems. The goal for software at this time is to combine all parts of the system, meaning the SD Card component, MAX Sensor component, and the main function component. Once these parts are combined the team can focus on debugging the system to work on the physical device. For hardware, the team ran into issues regarding the PCB board that was designed. The board was not able to receive power, meaning it was unable to be used. Since then, the hardware members have been working to find solutions to this issue so that a new board could be ordered as soon as possible.

Past Week+ Accomplishments:

- **Hardware:**
 - Began research into RF communication between the wearable device and feedback device.
 - The first PCB was ordered, arrived, had parts soldered onto it, and tested for functionality.

- **Software:**
 - Most software-side members have successfully flashed to the breadboard devices provided by BAE Systems.
 - Header files for the ESP device have been fixed to be pointed to the correct directory.
 - Code for the SD Card, MAX Sensor and Main function have continued development.

Pending Issues:

- **Hardware:**
 - A new PCB that can receive power needs to be ordered.
 - A new BOM for parts needs to be ordered through the ETG.

- **Software:**

- Software needs to be flashed onto the team's PCB board.
- All components of the software-side of development (SD Card, MAX Sensor and Main function code) need to be combined and debugged.

Individual Contributions:

Name	Contributions	Hours (This week)	Hours (Total)
Casey Halbmaier	Worked on the SD Card code, assisted with GitLab organization, worked with the breadboard device provided by BAE Systems	9	30
Caden Backen	Worked on researching implementation methods for the MAX sensor code. Installed Docker and Arduino IDEs and practiced utilizing both. Utilized breadboard device to communicate using Arduino.	10	20
Coby Konkel	Ordered PCB, automated code builds, soldered some breakout boards, started 3d print modeling, fixed issues with software, helped with SD card, reading about max sensor, documented building steps, helped find driver's for RF stuff	15	35
Andres Ceballos	Researched RF communication between the wearable device and dog device. Determined a set of receivers and transmitters. Assisted with PCB debugging.	10	25
Ben Gardener	PCB debugging and repairs. PCB design updates and fixes	10	25
Nihaal Zaheer	Fixed Git issue on my PC. Started working on the implementation of Timer on ESP32. Read Espressif and FreeRTOS documentation. Setup meeting with a design student for product sketch.	5	20

Plans for Upcoming Week:

- **Hardware:**
 - Debug PCB issues - find cause of short
 - Review and order updated PCB
- **Software:**
 - Have every member of the team (software-side) successfully flash the project to the ESP device that BAE Systems provided for us.
 - Combine the SD Card, MAX Sensor and Main function code together.
 - Debug the combined SD Card, MAX Sensor and Main function code.
 - Flash the combined SD Card, MAX Sensor and Main function code onto the team's PCB.
- **Overall:**
 - Work with Bhavesh Sharma (Nihaal's Industrial Design friend) to create sketches of our wearable device for future presentations.

Summary of Weekly (x2) Advisor Meeting:

The team's meeting with Rachel Shannon these past two times were productive and helped point us in the right direction as a team. Our meeting on 2/26/24 was based around refocusing the team's efforts on the project, establishing a clear-cut goal for how the team wants this project to come together, and action steps for how the team will accomplish this turnaround. Rachel Shannon also mentioned penalties to the team if we continue to miss deadlines put forth by the team itself. The team's most recent meeting with Rachel Shannon on 3/25/24 helped to solidify for the team that deadlines are fast approaching, and that the semester is nearly over. We discussed future presentations that need to be taken care of, and proposed deadlines for presentation run-throughs for practice. Since Rachel Shannon teaches Senior Design in the Spring to Fall semesters, she is a great asset for the team in terms of knowledge on what to expect.

Midterm Feedback:

1. Feedback summarization:

In terms of the positives, each member of the reviewing team said that we had detailed and well-documented designs for our project. Our scope was said to be well-defined and our team-organization was a major strength for us. The team's workflow was complimented several times because of the way we divide up the work and make each part a component that can be individually worked on. For the negatives, a major issue that was pointed out was the lack of communication between team members. Our team had mentioned in the presentation that we had

communication issues frequently, and it seems the reviewers thought it was the most notable issue. Other negatives include the lack of a prototype by this point in the project, but some reviewers also noted that the lack of data was a contributor to the lack of a working prototype.

2. New insights based on feedback:

Several of the reviewers noted that the implementation seems flawed for what the team is trying to accomplish, and questioned the potential for such a device to fully function and both accurately measure vitals for a PTSD-induced attacks and alert the service animal of the attack. Given this feedback, the team is considering looking back at our plans and making changes according to what we believe is best. Given that this feedback is so late into the design and prototyping phase, we're not able to guarantee that any real changes will be made in the remaining semester.

3. Steps being taken based on feedback:

Based on the feedback regarding team communication, it's clear that the team needs to establish a more clear way to communicate with one another to ensure that the remaining time for the project is spent efficiently and that what work remains is done in time. With this in mind, the team plans on utilizing GitLab's 'issues' feature more. Through the issues board the team is able to assign tasks to themselves with a given due date. The team has used the issues board in the past, but without as much accountability. Due dates have always been lacking for our issues, so one big step the team is making is to add due dates and enforce them amongst the team. With this change, we are hoping to increase productivity and add a sense of accountability to one another.