

sdmay18-12: Pilot Biometrics - ECG waveform captures

Week 6 Report

October 13 - October 20

Team Members

Zachary Glanz — *Driver Design Lead*

Andrew Jones — *Algorithm Design Lead*

David Kirpes — *Circuit Design Lead*

Justin Bader — *PCB Design Lead*

Kory Gray — *Operating Systems Lead*

Ryan Gallus — *Team Lead*

Summary of Progress this Report

This week, our team began developing the embedded algorithm for processing the ECG waveform data. We began exploring methods of software filtering using k-means clustering. We researched storage requirements for 4-5 hours of operation data and decided on using a 500GB micro-SD card with a card holder attachment for the board. We started exploring waveform compression algorithms, which may allow us to use a much smaller SD card. The team also researched and selected a board support package for the microcontroller.

Pending Issues

One challenge we are currently facing is how to best develop the software filter. Our ECG waveform will likely have all sorts of noise from vibrations and electromagnetic interference in the cockpit. We are focusing our filter design on detecting anomalies in the expected waveform. Another challenge is in testing. We are finding a number of our testing techniques may not produce the same kind of stress that a pilot in training would experience.

Plans for Upcoming Reporting Period

For this next week, we will continue development of the algorithm, continue researching the filter design, and finish installing the board support package. We will also look more closely at the data storage issue, specifically what kind of standards we will need to adhere to for security.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Zachary Glanz	Finalized approach for our embedded setup. Finally started working on setting it up.	2	21
Andrew Jones	Looked for common algorithm strategies for determining a pattern efficiently. This will be useful when determining if user is experiencing an issue.	2	21
David Kirpes	Worked on completing design document. Continued filter design research.	3	23

Justin Bader	Continued research on ECG waveform and hardware components.	2	23
Kory Gray	Looked into board support packages, and how to use them. Looked for ones that could be used for micro C linux.	2	21
Ryan Gallus	Researched data storage requirements based on operation time, ECG sensor data rate, and necessary resolution. Explored hardware solutions to meet storage needs. Also looked at security requirements for medical data storage.	3	26