Haptic Feedback Gaming System

Post-Mortem

RealSimTech

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GLOSSARY OF TERMS

HFGS	Haptic Feedback Gaming System
RFID	Radio Frequency Identification
IR	Infrared
FPS	First Person Shooter
360-NS-HS	360 Nexus-Series Haptic-System
CPU	Central Processing Unit
PCB	Printed Circuit Board
LED	Light Emitting Diode

1.INTRODUCTION

The 360° Nexus-Series Haptic-System (360-NS-HS) is an alternative gaming product that promotes active physical activities while capturing the engaging gameplay of a First Person Shooter (FPS). The system will be designed for ruggedness to be able to withstand rapid body movement and will provide a thrilling experience both indoors and outdoors. Our objective is to give the user an immersive experience by utilizing rumbling features to simulate a FPS action. 360-NS-HS consists of three major components. The first component is the RFID module, which includes RFID transponders and readers. The RFID transponders are embedded into the projectiles and the readers are attached into the vest. The second major component is the microcontroller and the supporting board. The third component is the feedback unit. The feedback unit comprises the vibrating motors, LEDs, and the related circuitry. All the mentioned components will be parted together with wirings, and the batteries will be enclosed in casings and placed inside the vest.

2.SYSTEM OVERVIEW

The input of the system is a projectile with an embedded RFID transponder which is used to give a tag to the RFID reader. The reader acts as a buffer that reads the tag and sends the information to the CPU Module containing an Arduino microcontroller via a serial communication. The behavior of the signal processing is dictated by the input from the user interface which determines the game mode. The microcontroller will process this information and outputs the appropriate signals to the output Control. The switching circuit contains multiple switches which activates the vibration motors and control the state of the LEDs, providing the output feedback. The user will have the option to reset the system by pressing an external button, and change the game mode by flipping a toggle switch to a different position. The high-level diagram is provided in Figure 1.
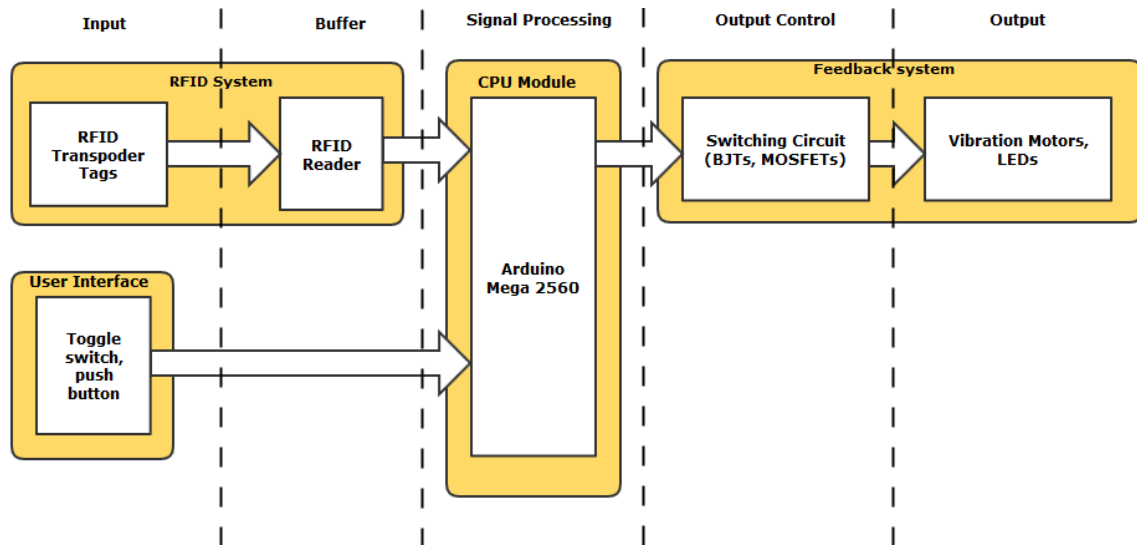
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FIGURE 1: HIGH-LEVEL SYSTEM DIAGRAM

The prototype system is powered on by a 6V power supply that uses 4-AA batteries as well as a 9V battery for the microcontroller. A look at the prototype of the 360-NS-HS is shown in Figure 2.
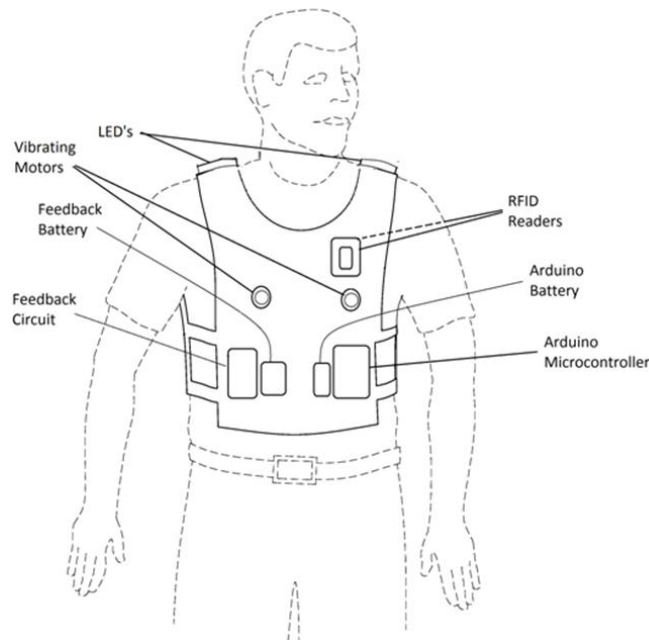

FIGURE 2: FULL PROTOTYPE MODEL OF 360-NS-HS

3.BUDGET

Table 1 below shows the estimated cost and the actual cost for the HFGS. Although there were a few design changes, we managed to stay below our estimated cost by about $80. However, since we only obtained $350 from the Engineering Student Society Endowment Fund, the remaining $80 will be split between each team member to cover.

TABLE 1: ESTIMATED VS ACTUAL COST

Equipment	Estimated Cost	Actual Cost	Comments
Parallax RFID Readers x 2	$120	$105.13	
Parallax RFID Transponder Tags	$30	$37.35	
Arduino Microcontroller	$50	$77.41	Purchased Mega 2560 in place of Uno
Vibration Motors	$50	$28.80	
LED strips	$30	$0	Chose cost effective design
Vest + paddings	$50	$52.49	
Foam blaster + ammunition	$30	$16.79	
Enclosures (LEDs, Arduino, circuit)	$30	$45.33	
Miscellaneous (wires/protoboard, electronic/non electronic components, adapters)	$50	$65.98	
Contingency	$80	-	
Total cost	**$520**	**$429.28**	

4.SCHEDULE

Figure 3 below shows the progression of the project throughout the semester.

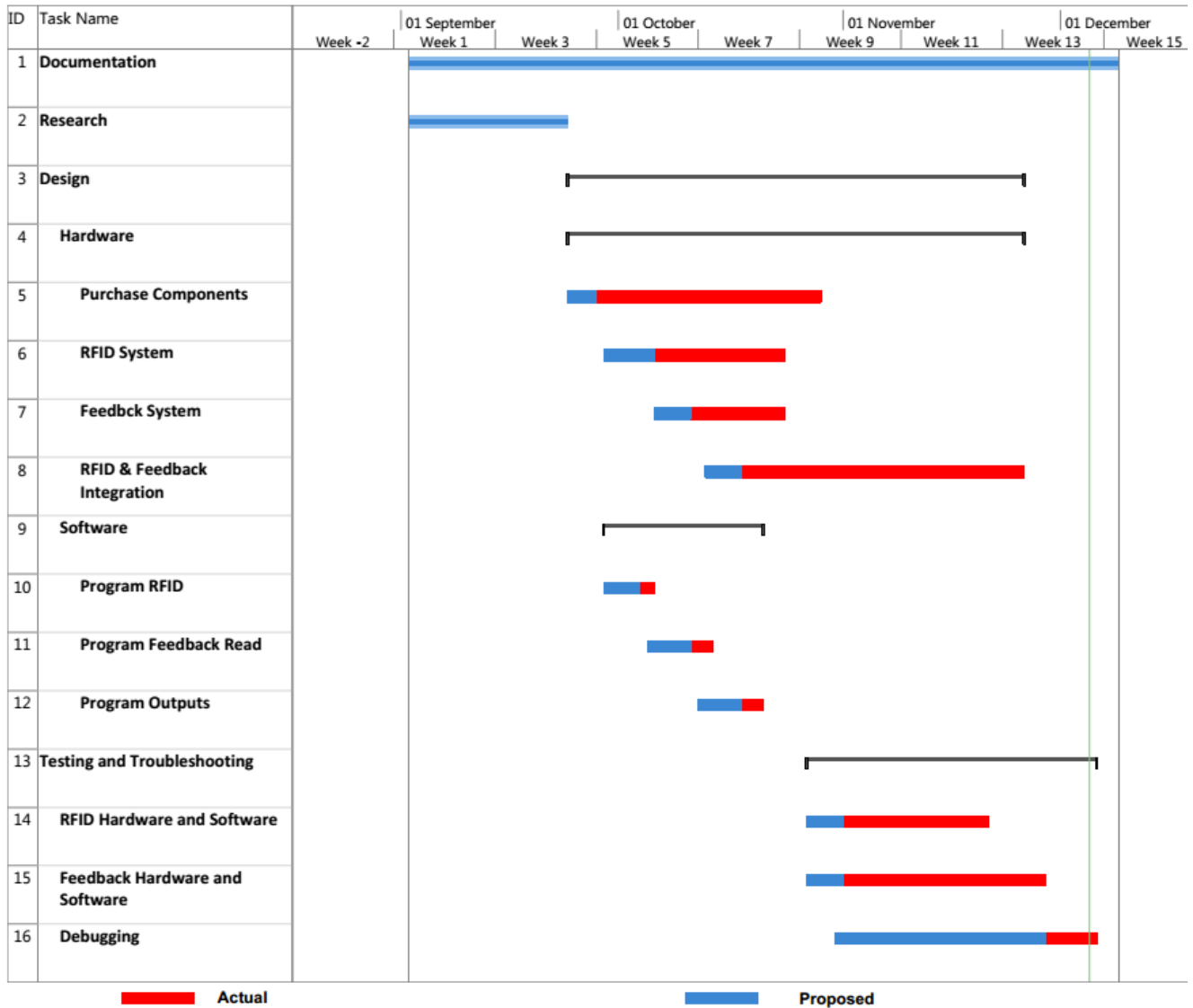| ID	Task Name
1	Documentation
2	Research
3	Design
4	Hardware
5	Purchase Components
6	RFID System
7	Feedbck System
8	RFID & Feedback Integration
9	Software
10	Program RFID
11	Program Feedback Read
12	Program Outputs
13	Testing and Troubleshooting
14	RFID Hardware and Software
15	Feedback Hardware and Software
16	Debugging

FIGURE 3: PROJECTED AND ACTUAL SCHEDULE

5.CHALLENGES

The main challenge for our project involves developing using the RFID reader.

Reading Speed:

After we purchased the RFID reader, we began testing it with a RFID tag embedded dart. We quickly realized that the reader will not read a tag-embedded dart no matter how much speed we use to direct the dart to it. After further research, we found out that our reader's speed was insufficient to our initial design. To give the reader enough time to read the tag, we had to implement Velcro onto our darts and RFID reader so that it will stay on the reader when it hits. With this solution, we were able to ensure the dart will be read by our reader. Ideally a high frequency reader is more suitable for our product [2].

Reader Collision:

One of the limitations of RFID readers is that multiple readers placed in close proximity will interfere with each other [1]. When this case happens, the readers will not read any tags. We came up with two different solutions to this problem. The first is to use an aluminum foil placed between the readers which will block one scanning direction of each reader. The downside to this solution is that it may affect the tag reading. The second solution is to alternate the active enable states of the two readers. This method will prevent each reader from scanning each other. The downside to this solution is that it may slow down the tag reading and thus lower the performance of the product. After weighing the disadvantages of each solution, we decide to use the alternating active state method.

6.GROUP DYNAMICS

The four members of RealSimTech worked on the project together throughout the semester. Every member was able to communicate clearly and efficiently with each other and perform exceptionally according to their roles.

The team was organized based on the skillsets each person was most familiar with. Each system had a primary member working on the tasks and also a secondary member as support. Since there was one software developer and three hardware developer in the group, the hardware developers were mostly in charge of circuitry and enclosure implementation while the software developer focused on software algorithm design. Every member was treated fairly and tasks were distributed evenly. No major disagreements arose and minors ones such as lack of communication was settled quickly during the weekly meetings.

7.INDIVIDUAL LEARNING/WORKLOAD DISTRIBUTION

Table 2 shows the distribution of the tasks and workload for each team member.

TABLE 2: WORKLOAD DISTRIBUTION

High-Level Tasks	Kamyar	Anthony	Nielven	James
Feedback Design		xx	x	
Feedback Implementation	x	xx	x	
RFID programming				xx
RFID implementation			xx	xx
Enclosure Design	x	x	x	
Enclosure Implementation	x	x	xx	
Software Programming				xx
System testing	x	x	x	xx
Packaging	x	xx	x	
Integration		x	xx	x
Part Sourcing	x	xx	x	x
Documentation	xx	x	x	x
Administrative	xx			x

Kamyar Javanmardi – CEO

When this semester began, I knew only one of the group members. I was lucky enough to be partnered up to other people I did not know and they turned out to be some of the most competent engineering student I have ever met. I am very pleased with how this project turned out and the results we obtained. However, the limited project time put a lot of constraints on the project development and testing. Although we started early and we were well on top of the entire milestone during this project, we started to face many challenges keeping up with the scheduled timelines.

One of the most important lessons I took away from this project is the team work. There is never enough credit given to team work, but after doing this project, I realized how valuable it is that the members in a group all put enough afford to share tasks. Having hardworking, knowledgeable, patience, and respectful project partners make a world of difference on how much stressful and time consuming a project is.

The amount of knowledge and experience I obtained from this project is great. I knew very little about RFID systems, but now I know a lot more. In our project we met a real world example of reader collision and we had the chance to try different solutions and see their effects on the situation. I wish I had more time to learn more. I also learned the importance of sufficient research. We encountered some problems using the 125 KHz RFID readers mostly due to the fact that the reader has very limited reading speed and range. Moreover, I had the chance to work closely with Arduino microprocessor and learn more about its capabilities in a real project. From practical viewpoint, I learned more about hardware than I did from software and programming.

I enjoyed being a part of this project and I feel this has made me a better engineer. I had the chance to put the theory into work. I am glad that I took this class and I am very fortunate to have met such great colleagues. I look forward to share the experience with my other fellow engineering friends. If I were to do this project again, I would definitely not take six courses and would dedicate a lot more time to it.

Overall I am very happy with our group dynamics. Everyone treated each other with outmost respect and everyone's opinions were appreciated. We had the regular group meeting every week and we communicated efficiently and effectively through emails and text messaging. All the members communicated well with each other and we hardly ever had any disputes.

Anthony Nguyen – CFO

This capstone project has provided one of the most challenging, yet fun experience for me in my undergraduate career, as I considered this to be the final exam for the Engineering Science program before obtaining the degree. Everything I've learned from all the core engineering courses and electives that were taken, as well as the skills and experience gained from co-op, was put to the test in this course. From brainstorming an idea with my teammates, to creating the design, and finally testing and building the design, the plethora of knowledge and skills gained while working on the project over the last 13 weeks was invaluable to working my way up in becoming a true engineer.

With previous co-ops in hardware design, my role in this project was the hardware aspect of the LED health system and the vibration motor feedback. I have never used vibration motors in any of my circuit design, let alone ordinary motors, so my knowledge in them were minimal apart from theories and application learned in class. Thus during this semester, I learned the mechanics and physics of the vibration motors and how to incorporate them into our design. I have also gained technical experience with using the Arduino Microcontroller. Working closely together with my teammate and software engineer James Fong, I was able to learn both the hardware and software aspect of the microcontroller, ranging from the serial communication and digital pins to its software interrupt. Finally, I learned the capabilities of RFID, for it was the main part of our design.

The biggest takeaway I had while working on this project is not the designing and building of the project, as it was expected, but the importance of good documentation and team communication. Documentation was usually the least favorable part to work on during the course but it was the one thing that helped

straighten out any confusion that came up. I would refer to my journal logs in September to dispel doubts that I had while working on the motor circuit as I have already researched and jotted down everything I needed to know about the motor and its circuit that day. Team communication was also critical in successfully completing the project. There were times where our team was confused about how the game mode would work and all of us had different ideas about how to go about it. We made sure to notify each member regarding changes that were made to the project or any updates in general and record it, regardless of how little it may be. Many problems were resolve by effective communication between members.

I would like to thank my teammates for all their time and effort they put in this project. Working with them has been a great experience for me and I am proud at what we accomplished. What I've learned from taking ENSC 305/440 is that even when there are mistakes made, problem popping up everywhere, and the project essentially becoming a time crunch, good team dynamic is essential in overcoming those hurdles.

Nielven Jay Olis – CTO

Being a video gamer since childhood, I am quite content in how the capstone project turned out. It was a fun project overall in both concept and development. The project itself was relatable to fellow colleagues of similar interest in first-person shooting games. The idea of being able to shoot a professor (for demo purposes of course) was made even more intriguing as our proposed plan would involve a physical feedback system. I do admit that I would have rather shot at a more specific professor that caused more misery than Andrew could have ever caused upon the 440 class. He was a brilliant instructor that gave off an easy-going-employer vibe that is much needed to branch away with a similar energy working on the project. Being the last major class of my undergraduate career, the group TAs, various guest lecturers and instructors were extremely helpful in preparation of my future career.

As the project was my proposal during brainstorming for projects, I mainly sought a project with workloads that fit our group dynamics. I was able to plan the various systems that compose the HFGS and distribute amongst the group members. With me mainly working on the use of an RFID system and integration afterwards, the other working on circuitry that was related to previous classes and CO-OP work, another using their expertise on programming the microcontroller, and one last person meant to work on extra parts of the project, the members were given a line-of-work that compliments their strengths. This distribution of work was extended into the documentation as well with each member having free reign for the write-up of their work. The development of the HFGS was mostly stress-free; I attribute this to the well separated tasks of each individual in the project. Since the HFGS concept was my idea, I helped in coordinating any details needed to be addressed in our project. It was a great privilege to have realized the HFGS in its prototype form. As an engineer, it was a delight to focus on using a technology of my interest in a way that has not been thought of being used before to the best of my knowledge.

Taking into account all that has been learned from various courses in the SFU Engineering curriculum, this project may well have been done individually. However, this is a project that employs multiple

systems with each having specific details. I don't believe this would have been a manageable solo project. This is further established with the realization of the unmet requirements of using multiple RFID reader for a microcontroller one month into the semester, the limitations of the RFID systems two months into the semester, and the man-hours needed to assemble the component into the vest during the last few weeks before the demo. Since the tasks were separated individually, each system can be tested separately and any problems can be flushed out and addressed before the integration. Essentially, a good group of people with similar interest and are self-motivated in their line-of-work was the overlying key to the success of the HFGS.

James Fong – COO

This capstone project provided many memorable experiences for my engineering undergraduate career. I was able to apply many of the skills I attained these past 4 years. With my background and Co-op experiences mostly being on the software side, my teammates have provided me great learning experience with the hardware side. Being able to do testing and debugging with a physical hardware component was very engaging and I would definitely classify this course as one of my favorites in the engineering program. The collaboration experience I received is a great stepping stone for my engineering career.

In my previous Co-op experiences, I mostly worked on software development and testing. This project provided me a first time experience working with Arduino and how engaging it is to learn new technology. During my Co-op, I worked with developing a project management tool for Radio Frequency Engineers and it provided me the business knowledge in that field. This project provided me in-depth knowledge on the technical aspect of Radio Frequency and it was very valuable. I mostly worked with my teammate Anthony Nguyen during the integration phase since he was in charge of the hardware circuitry part of the project. We were able to provide each other with enough understanding of each of our parts and the testing between the two systems was fairly seamless.

One of the things we can improve on for further projects is to spend extra time on researching new technologies. If we spent more time researching on RFID readers, perhaps we would have purchased a reader with better performance. The documentation portion of the project was very tedious and stressful. However, I can now understand a little better of what the standards are in terms of documentation for the future. The weekly meetings we conducted kept each team member in the loop so that everyone is on the same page. We spent a lot of time working together so that we were able to catch mistakes a lot earlier than expected. Each member was able to share their ideas and we came to a quick consensus most of the time. This was very valuable in the growth of our team dynamic.

 It was a very fun semester working on this capstone project with my teammates. Our goal from day 1 was to build something we are interested in and I believe we have achieved that goal. I am very thankful for each of their support and ideas which will be beneficial to helping me achieve a great career.

8.CONCLUSION

We were able to realize the Haptic Feedback Gaming System by integrating the RFID, Microcontroller, and Feedback System to create a realistic tactical experience. We were able to overcome the limitations of the RFID technology to develop our working prototype 360-NS-HS. For future plans, we hope to address the performance limitations of the HFGS as well as implement addition features such as a custom helmet, more targets, and a 3-D haptic feedback. Overall, we were pleased with the design and implementation of our product.

9.REFERENCES

[1]   "How to Set Up Multiple RFID Readers in Close Range," phidgets, 5 8 2014. [Online]. Available: http://phidgets.wordpress.com/2014/08/05/how-to-set-up-multiple-rfid-readers-in-close-range/. [Accessed 2 11 2014].

[2]   "OptRFiD ILT Reader," Optys Corporation, 2014. [Online]. Available: http://optrfid.com/images/files/the%20optrfid%20ilt%20reader.pdf. [Accessed 1 11 2014].

APPENDIX

AGENDA

September 2, 2014

10:30 AM - 11:30 AM

Purpose of Meeting: Brainstorm project ideas and to find out what each person`s skillsets are.

Items for discussion:

- Discuss each of our skillsets
- Discuss our interests
- Discuss project ideas

AGENDA

September 2, 2014

10:30 AM - 11:30 AM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Brainstorm project ideas and to find out what each person`s skillsets are.

Minutes:

Skillsets: Anthony, Nielven, and Kamyar are all in electronics option and they all have experience with hardware design and analog/digital circuits in the past Co-op terms. James has mostly done software testing and implementation with C# coding.

Interests: We discussed our interests outside of engineering and perhaps creating something related to it. Some of our interests include sports and gaming.

Ideas:

- Key tag notification system:
  - Useful for identifying lost items
- Rumble pack vest
  - For virtual gaming
  - Pack attaches to body
- Line monitoring sensor
  - Useful for determining sports situation
  - Sense whether an object cross a certain line
- Server cooling system
- Backpack sensor to detect strangers from approaching

Action:

Research ideas to see if they are feasible.

AGENDA

September 9, 2014

11:30 AM - 12:30 PM

Purpose of Meeting: Discuss the components we need for our project and individual tasks.

Items for discussion:

- List of components
- Name of company
- Product Name

AGENDA

September 9, 2014

11:30 AM - 12:30 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Discuss the components we need for our project and individual tasks.

Minutes:

Components:

- Projectile
- RFID glass tags
- RFID/NFC reader
- Arduino/Raspberry Pi
- Battery
- Motor
- Buzzer/LED
- Vest

Company Name:

- Tactical Gaming
- FPTG (First Person Tactical Gaming)
- ACE
- RealSim (decided on RealSimTech)
- Recon

Product Name:

- TagTic
- TagTech
- PnP

Action:

Anthony: research motor, buzzer, LED, and ESSS endowment fund
James: research Arduino/Raspberry Pi
Nielven: research RFID
Kam: research vest

AGENDA

September 16, 2014

11:30 AM - 12:30 PM

Purpose of Meeting: Discuss project proposal and status update on research.

Items for discussion:

- Project Proposal
- Research Status Update
- Team Organization
- Logo

AGENDA

September 16, 2014

11:30 AM - 12:30 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Discuss project proposal and status update on research.

Minutes:

Team Organization:

- **CEO:** Kam
- **CFO:** Anthony
- **COO:** James
- **CTO:** Nielven

Logo: Logo was designed but the feedback was to add "T" along with the "RS". Use the name RealSimTech underneath the logo.

Research Status:
- **RFID:** decided to use the Parallax RFID low frequency reader. Relatively cheap and works with Arduino.
- **Arduino:** decided to use Arduino Uno. Open source platform and works with Parallax RFID reader.
- **Motor:** 3-6V Motor.
- **LED:** proposed to use LED strip.
- **Projectile:** May use bow and foam tip arrows or bigger darts

Action:

Proposal:

- **James:** Possible and Proposed design solution, team organization, sources of info.
- **Anthony:** Executive summary, team organization, and budget
- **Nielven:** System Overview, team organization.
- **Kam:** Introduction, Conclusion, team organization.

AGENDA

September 22, 2014

11:30 AM - 12:30 PM

Purpose of Meeting: Status update and ESSS funding presentation.

Items for discussion:

- Parts to Purchase
- Finalizing Product Name
- ESSS presentation

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AGENDA

September 22, 2014

11:30 AM - 12:30 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Status update and ESSS funding presentation.

Minutes:

Parts to Purchase:

- 2 Parallax RFID readers
- RFID tags 12.4mm
- motors
- Arduino Uno

Product Name:

- Counter Tag Battle System
- Strike Tag Battle System
- 360 NS HS (360 Nexus Series Haptic System) (decided on this)

ESSS Presentation:

- What is it?
- Cost breakdown
- RFID reader and tags
- Arduino Uno
- Motors and LED
- Vest
- Misc
- Conclusion
- Question?

Action:
Continue to research individual portion for everyone.

AGENDA

October 2, 2014

2:30 PM - 3:30 PM

Purpose of Meeting: Discuss potential problems for powering the systems and functional spec.

Items for discussion:

- Battery
- Functional Spec

AGENDA

October 2, 2014

2:30 PM - 3:30 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Discuss potential problems for powering the systems and functional spec.

Minutes:

Battery:

- 2 Options for motor
  - o Power by Arduino
  - o Power separately
- LED non-programmable (on-off only)
- Arduino Power by 9V battery with a switch

Action:

Functional Spec

- **Anthony:** Motor and LED requirements
- **Nielven:** RFID requirements
- **James:** Arduino requirements
- **Kam:** Enclosure requirements

AGENDA

October 7, 2014

11:30 AM - 12:30 PM

Purpose of Meeting: BCIT site visit discussion and individual system testing.

Items for discussion:

- BCIT site visit
- System testing
- Battery options

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AGENDA

October 7, 2014

11:30 AM - 12:30 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: BCIT site visit discussion and individual system testing.

Minutes:

BCIT Site visit:

Met with one of the staff and discussed about our project. He recommends us to pay close attention to the battery component and to start testing right away. He also told us to keep the weight of the vest light and the vest should be adjustable to various sizes.

System Testing:

- **RFID system:** simple code written to flash an LED for a tag reading. Testing to be done today.

Battery Option:
- 9V square battery for Arduino
- 6V battery for motor (3 options)
    o Voltage amplifier for LED strip
    o Use lead acid battery
    o Build own LED strip and power using motor supply

Action:

- Begin to test individual system.
- Continue to work on functional spec.

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AGENDA

October 17, 2014

4:30 PM - 5:30 PM

Purpose of Meeting: Discuss problems encountered, solutions and individual components.

Items for discussion:

- RFID reader problem
- Design
- Testing

AGENDA

October 17, 2014

4:30 PM - 5:30 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Discuss problems encountered, solutions and individual components.

Minutes:

RFID Reader Problem:

The RFID reader we bought is a low cost low frequency reader and cannot handle reading of tag at the speed of an incoming projectile.

Solutions:

- Use Velcro to keep the dart on the vest
- Use dampener to lower the ricochet of the dart

Design:

- Motor Placement/Power:
    - 1 transistor per 2 motor (need to test)
    - 1 transistor per LED colour (need to test)
    - Research suitable areas of body to place motor
- LED health system
    - 4 Green LED (full health)
    - 3 Yellow LED (non-full health)
    - 4 Red LED (dead)

Testing:

- Test 2 RFID readers together
- LED circuit + motor circuit
- Velcro + dampener

Action:
Continue to test each systems and components.

AGENDA

October 23, 2014

2:30 PM - 3:30 PM

Purpose of Meeting: Discuss problems encountered, solutions and individual components.

Items for discussion:

- Arduino Uno
- Velcro
- Power Supply
- LED circuit
- Motor

AGENDA

October 23, 2014

2:30 PM - 3:30 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Discuss problems encountered, solutions and individual components.

Minutes:

Arduino Uno:
The Arduino Uno only has one serial port which only allows 1 reader to be connected. The solution for this is to look into the possibility of exchanging the Uno with the Arduino Mega which has multiple serial ports.

Velcro:
We decided that using Velcro is the best option for allowing the reader enough time to read tags. Dampeners, although does slow down the darts, still does not give the reader enough time to read.

Power Supply:
Power supply obtained for both the Arduino and LED/motor.

LED circuit:
Circuit design complete. Next step is to figure out the topology/placement of the LEDs and transistors before buying PCBs.

Motors:
Motor testing is on hold. Motors will need to be enclosed before further testing can be conducted.

Action:

Design Specs
- Nielven: RFID system
- James: Arduino hardware and software
- Anthony: Feedback System (motor and LED)
- Kam: Intro, Conclusion, Executive Summary, Vest/Enclosure

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AGENDA

October 28, 2014

11:30 AM - 12:30 PM

Purpose of Meeting: Discuss status update and oral progress presentation.

Items for discussion:

- Arduino Mega
- Velcro
- Motor enclosure
- Oral

AGENDA

October 28, 2014

11:30 AM - 12:30 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Discuss status update and oral progress presentation.

Minutes:

Arduino Mega:

Exchanged the Arduino Uno with the Arduino Mega at RP electronics. James will test the Mega with 2 RFID readers.

Velcro:

Nielven bought the Velcro for the darts. He will piece together the darts, RFID tags , and Velcro.

Motor Enclosure:

Anthony found suitable piping and rubber for motor enclosure at Canadian Tire. He will compare prices with Home Depot.

Oral Presentation:

- Overview – Kam
- Schedule – Anthony
  - On track with testing
- Finance – Anthony
  - Projected: $510
  - Current spending: $290
- Progress – James and Nielven
  - Weekly Meetings
  - Research
  - Individual Systems
- Problems

Action:
Continue to work on design specs, testing, and practice oral presentation

AGENDA

November 7, 2014

4:30 PM - 5:00 PM

Purpose of Meeting: Status Update.

Items for discussion:

- Part Purchased

AGENDA

November 7, 2014

4:30 PM - 5:00 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Status Update.

Minutes:

Part Purchased:

- Mosfets for motors
- Diodes for motors
- Capacitors for motors
- Push button for Arduino reset
- Toggle switch for game mode switching
- Extension jumper cables

AGENDA

November 13, 2014

3:30 PM - 4:30 PM

Purpose of Meeting: Status Update and individual system testing.

Items for discussion:

- What is completed
- Things left to do

AGENDA

November 13, 2014

3:30 PM - 4:30 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Status Update and individual system testing.

Minutes:

Completed:

- Tested reset switch with Arduino
- Tested motor enclosure and vibration without Arduino
- Tested RFID readers with Arduino and LED circuit.
- Game Mode 1
- Tested toggle Switch without Arduino

To Do:

- Cut LED PCB in half to make two should LED strips
- Game Mode 2
- Buy nylon screws for RFID reader
- Test RFID reader with Arduino and motor
- Buy vest
- Buy switching circuit enclosure

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AGENDA

November 18, 2014

11:30 AM - 12:30 PM

Purpose of Meeting: Status Update and integrated system testing.

Items for discussion:

- What is complete
- Things left to do

AGENDA

November 18, 2014

11:30 AM - 12:30 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Status Update and integrated system testing.

Minutes:

Completed:

- LED circuit soldered onto PCB. Works with Arduino and RFID readers.
- Motor tested with Arduino and RFID readers.
- Game Mode 1
- RFID enclosure built for 1 reader

To Do:

- Test LED and motor circuit together with 6V battery pack
- Test Arduino with 2 RFID readers together with 9V battery pack
- Test both RFID readers with aluminum foil to block reader collision
- Test both RFID readers using switching enable states to prevent reader collision
- Buy vest

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AGENDA

November 28, 2014

4:30 PM - 5:30 PM

Purpose of Meeting: Status Update and assembly. Also discuss post-mortem and demo.

Items for discussion:

- What is completed
- Vest
- Things to do
- Post-Mortem
- Demo

AGENDA

November 28, 2014

4:30 PM - 5:30 PM

Present: James Fong, Anthony Nguyen, Nielven Jay Olis, Kamyar Javanmardi

Purpose of Meeting: Status Update and assembly. Also discuss post-mortem and demo.

Minutes:

Completed:

- RFID system, CPU Module(Arduino), Feedback System all integrated and tested.
- System Test Plan completed

Vest:

Vest is bought and currently being modified. Nielven removed inner foam and began shoulder LED placement.

To Do:

- Assemble rest of the vest
- James will update code to implement new motor feedback feature(vibration front to back and back to front)

Action:

Continue to assemble the complete product and begin to look into Post-Mortem document and Demo PowerPoint presentation.