



POST MORTEM SECURE ON-SITE BOX

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1 Introduction

The SOSbox solution is an IoT-enabled secure parcel storage solution designed to benefit both the courier service and end customer by eliminating inefficiencies that exist within the parcel delivery process. Our solution aims to use the power of the Internet and embedded technology to provide real time, remote communication with the end customer. In this way, the user is able to receive parcels without being present on-site when the courier arrives. Additionally, the system will be designed with surveillance and physical theft deterrence capabilities for added peace of mind. Finally, the SOSbox solution will act as a demonstration platform for scaling up the underlying technology to replace the currently deployed community mailboxes with smart SOS Technologies systems.

2 System Overview

The SOSbox solution consists of a secure storage unit with a Wi-Fi enabled embedded platform. The embedded platform (ie. Beaglebone Black, see figure 1) will manage wireless communication, authentication, user feedback, motor control and handle sensor and peripheral data processing. The embedded platform will function as a server allowing remote communication and control by a smartphone app.

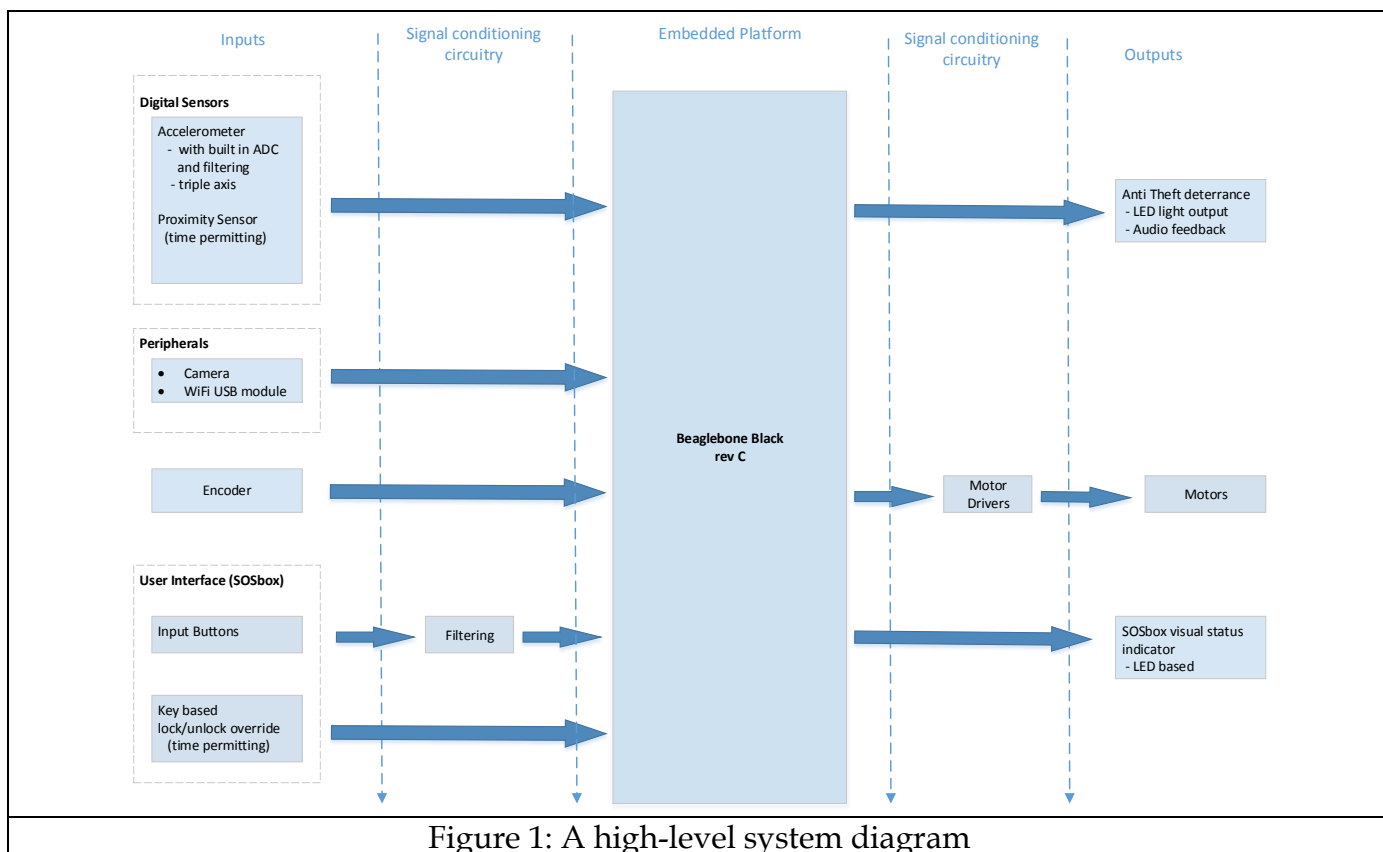


Figure 1: A high-level system diagram

3 Budget

As indicated in table 1, we underspend relative to our estimated costs. We had no funding from ESSEF and funded the project from member contributions. We repurposed many items and eliminated unnecessary costs where possible.

TABLE 1: SOSbox Budget (PoC)

Components	Estimated Cost (\$)	Actual Expenditure (\$)
Beaglebone Black kit	150	100
Electronic components (ie sensors, buttons, motors etc..)	100	200
Peripheral & Accessories	50	50
Box Construction	100	100
Miscellaneous Costs (Shipping, import duty etc..)	50	50
Contingency	100	0
Total Cost	550	500

4 Schedule

We ended up having to use our planned extended times to complete the respective tasks in figure 2 below. The integration and debugging time took longer than we had anticipated and required a demo extension by 1 day to complete.

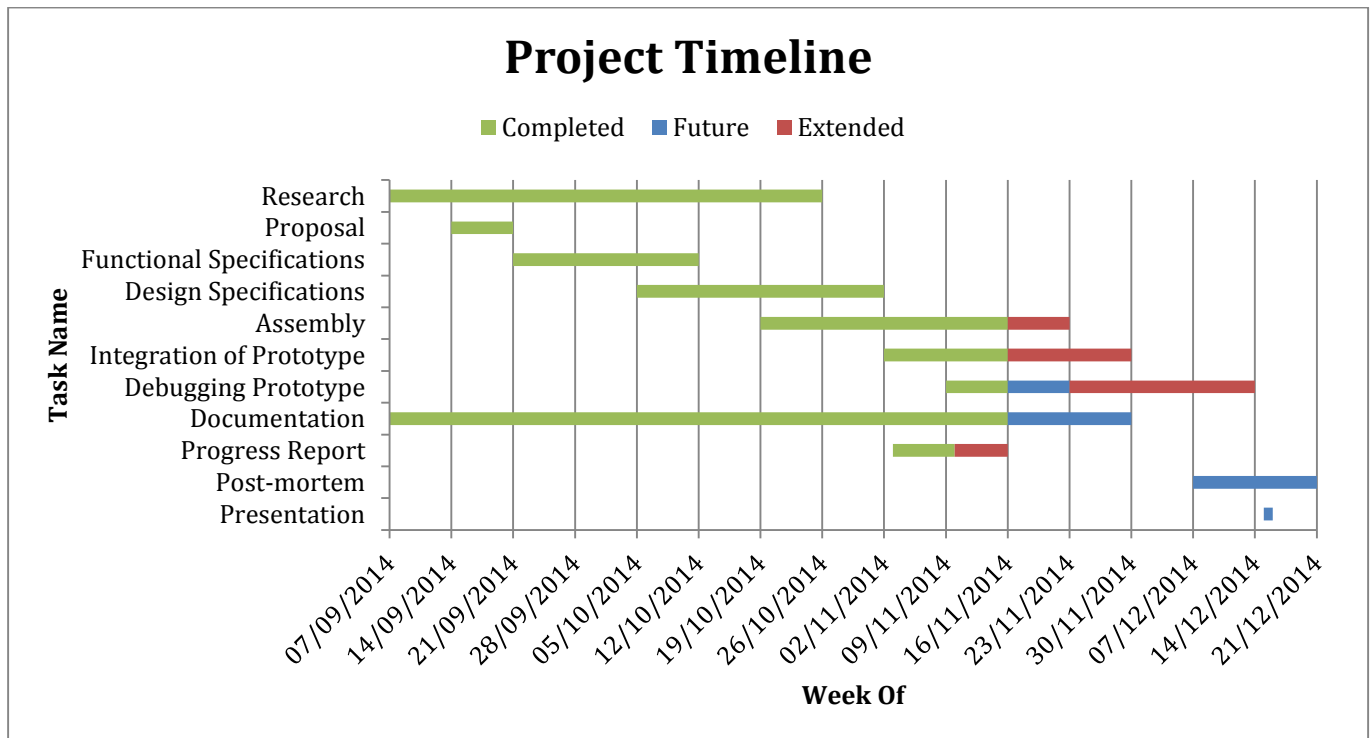


Figure 2: Planned project timeline

5 Challenges

Over the course of the project we faced many challenges from effective design challenges to technical, budgetary and time constraints. Of all the challenges, the most significant is the lack of time available for the implementation, testing and debugging phases in a 1 term course. The most frustrating was the testing and debugging phase. This phase of the project took much longer than we anticipated and made us realize that more time should have been allocated than planned.

6 Group Dynamics

Our group was composed of 5 dynamic individuals with diverse and complimentary skills. We leveraged this to work effectively both on an individual basis as well as together to address challenges over the course of the project.

The project tasks were assigned according to skill set and individual member's area of interest. We divided tasks mainly into two categories: hardware and software. We had at least 2 individuals in each while additional help was provided when necessary by all members. This approach allowed us to work efficiently by avoiding too many redundancies. Documentation was done by all for their respective parts in the project with two lead individuals handling overall content and formatting responsibilities. Furthermore, at times of disagreement the situation was addressed and resolved in a respectful and considered manner. Individual opinions were respected and debated but final decision was always taken through consensus.

7 Workload Distribution

The workload distribution by team members is outlined in table 2 below. We had many instances of significant cross contribution.

TABLE 2: WORKLOAD DISTRIBUTION

High-Level Task	Sutharsan R.	Brett H.	Jackson C.	Dan K.	Herman S.
Project planning and organization	XX	X	X	X	X
Accelerometer programming & circuitry	XX				
Miscellaneous parts (LED, Button, etc...) circuitry	X	XX	X	X	X
Motor circuitry		XX			X
SOSbox Design	X	X	X	X	XX
SOSbox Construction		XX	X	X	XX
Server/Client Software Development			XX	XX	
Pattern Recognition testing and debugging	X	XX	X		
Pattern Recognition Software integration		X	XX	XX	
Miscellaneous parts(LED, etc..) programming			XX	XX	
Parts Sourcing	XX	XX			XX
Documentation	XX	XX	X	X	XX
Administrative Tasks	XX	X	X		XX

Note:

XX = Primary responsibility

X = Some responsibility

8 Individual Learning/Reflection

Sutharsan Rajaratnam – CEO and President

The inception of the SOSbox took shape from personal experience. I began to do some preliminary preparation (mostly embedded platform research) early this year in anticipation of having to take ENSC 440 for the Fall 2014 term. At the time, I was on my final coop term at BlackBerry (Ottawa). The weather in Ottawa during this time often went below -30C. I would often make purchases online to save myself the hassle of having to bus to a retail location. The more I did this the more I realized just how inconvenient and inefficient the current parcel delivery model was. It wasn't until a few weeks before the start of the Fall 2014 semester that I realized that through Capstone we can provide a solution to this problem. I proposed my idea to our group members and after some convincing everyone rallied around the idea.

The implementation phase of the project was a significant challenge. Personally, I expanded my knowledge and experience working with the Linux operating system and programming in Python. I gained significant skills in finding and incorporating open source projects to simplify and shorten product development times. Additionally, managing various aspects of the project, making critical platform and sourcing choices has enabled me to fine tune my leadership skills. Furthermore, I worked extensively on the Beaglebone platform. I significantly expanded my knowledge on how embedded platforms communicate with sensors and other input/output devices.

Looking back, I am very pleased by how well our team came together to successfully complete the SOSbox project. Everyone contributed to the design of the SOSbox. I was particularly surprised by how skilled many of my team members were at custom building most aspects of the SOSbox. . The enthusiasm and effort put in to the construction of the SOSbox exceeded my expectations and I would like to take this opportunity to acknowledge and thank the efforts of my group members.

In conclusion, I did not expect the documentation aspects of the project to be as extensive. At first, I found the documentation process to be laborious but looking back I realize just how important it has been in fine tuning the project in the end. Finally, what I take away from Capstone is the importance of recognizing and assigning individual team members tasks that take advantage of their strengths, cooperation and mutual respect.

Dan Kikuchi - CFO

The idea of the SOSbox project was relatively simple. It didn't require the preciseness of landing a rocket on the moon nor did it require complex atomic theory. It was a project designed by people who experienced a problem for people who shouldn't have to. The project came out alright in the end, but the journey to that point was definitely filled with many experiences and hurdles.

The documentation was surprisingly effective at wrapping up a concrete idea on what the product should do. It was not only there as a document to reflect back to in times of confusion, but the documentation meetings really put into perspective what the group members' vision was for the project. Since the group worked on the documentation collectively, especially during editing, the reports had the best ideas and compromises in them. It was not surprising, however, when the actual project drifted away from the documentation after a few unaccounted problems. Fortunately, the design remained very close to the original idea and specifications but it really showed the importance of the contingency factor when creating a design.

Luckily for the group, the social atmosphere was all around positive. All group members got along very well. Any disputes were argued respectfully, and compromises were made when no side could agree. Even after the completion of the project, some group members, including myself hold the opinion that some aspects of the project should have been done slightly differently, but I'm confident that all members are satisfied with the final result. Design documentation meetings were especially an occasion for argument, especially where one side would push the modification or the addition of a function and another would debate against it. This happened often but not for long, as members were quick to agree to come to a solution or compromise. Personally, I feel I was lucky to have a group like this because it was not only enjoyable to work in the group, but many problems could be solved quickly due to fast decision making.

The areas I was tasked with was mostly software based, however the construction of the box itself was worked on at all times by various members. During an early planning meeting it was agreed that Jackson and I, who were experienced with working with software in a group, work on the software aspects of the project. These included aspects such as box control, wireless and the mobile application. Although we did programming as a pair often, I worked mostly on the UI control, the client side communication, embedded communication, and debugging the pattern recognition code. In terms of box construction, my major contributions are working on precision aspects such as drawing the shape of the routw in the MDF board and creating a gear by hand to match the shape of the motor. Some of my afterthoughts for the technical aspect for the project definitely come from the mobile application development. I wasn't able to help on the app development due to my limited knowledge of Java. It really put into perspective that knowledge of a large amount of coding languages really pays off.

All in all I would consider the project successful. Although due to some poor planning later on, the group had to get an extension, virtually all of the milestones were met at some point due to

hard work. The lessons learnt throughout this Capstone project are applicable to many future projects and I will personally put an effort into putting them to use later on.

Herman Sagoo - COO

Courses continue to be taught and knowledge will always be imparted, but it's projects like these that allow us to freely apply our learned and acquired skill sets with like-minded individuals to design and produce a working system with perhaps some societal benefit. My experience working on the SOSbox has been wondrous, filled with accomplishments, long hours in the lab, some quarrels and intense collaboration.

ENSC440 has certainly allowed me to understand the extent of project and group dynamics associated with an intense project. Being a relatively outspoken person, I have learned to observe and keep quiet when necessary and voice my opinion when justified. I would say that my communication skills have definitely improved. In a group of just 5 individuals, where no one supersedes another, it was vital that we respect each other's opinions and maintain an open mind to new ideas and criticisms. And this the general consensus among most of our members, which allowed us to do a fairly good job at completing this project.

My previous co-op experience had introduced the importance of documentation in a start-up company, but my one report requirement was definitely not enough to cement this. We simply did not allot enough time to complete the documentation for this course.

Proposals, functional specs and design specs are such a vital to any project, that not putting enough time results in several misconceptions and design issues during the assembly and implementation phases.

From a technical aspect, I was in charge of the SOSbox design, construction and electrical circuitry. And although we were initially given specific tasks to complete, the mutual respect between our team members allowed us to work together effectively. We worked closely to achieve an end goal and helped each other when it was needed.

One of the main things I've learned is how to adapt to ever-changing circumstances and how to deal with unexpected events. One such example was that our initial transistors that had been ordered later on had no use in the project. And we had no time to purchase new components before the demo. Luckily we were able to find some circuit boards in the trash and were lucky enough to find a new pair of transistors that could suit our need.

Initially, we sought to complete the project with a week to spare should any technical integration issues arise. But due to poor time management, we actually required a day's extension to complete the project. By far the biggest lesson I have learned from this project is that inadequate documentation will definitely lead to complications later on in the project cycle. And if you are not able to deliver on time (and continue to delay), it certainly hurts one's reliability and credibility. As future engineers, our credibility is of utmost

importance and should be maintained at all costs. This means establishing thorough designs and documentations before anything else. The deliverable should prove the documentation and not vice versa.

Brett Hannigan – CTO

Through the course of our capstone project, we were able to learn a lot about developing a prototype from inception to completion. Being forced to complete the project by a deadline definitely helped us focus on the project and remain persistent solving problems. Although the documentation was at times tedious, it simulated what may be done at an actual startup company and thus was a valuable experience.

A benefit of small group projects is the breadth of responsibilities each group member has. One such responsibility of mine was construction of the enclosure from wood and MDF. We gained hands-on experience working with tools and implementing our designs in the flesh. For example, I was able to use the laser cutter to inscribe the user interface panel. I also focused on mechanizing the door from a discarded treadmill incline motor. We made the drive assembly entirely from discarded parts and even had to carve our own adapter out of wood to connect the pulley to the motor. On the software side, I learned a lot about the Linux command line and python programming. It was a challenge to merge existing libraries with our own code and implement multithreading.

We were able to save costs in many ways. As described above, the motor, roller, and belt drive were repurposed from a discarded treadmill. The MDF siding of the box was from the treadmill's base. We made the door out of a roller shutter panel that the manufacturer was able to give us at cost. When our power transistors that switch the relay coils failed, we used two BJT transistors from a camera flash circuit found in the Lab 1 trash.

Unfortunately, we needed to reduce the scope of the project by removing some features from the proof-of-concept device. These were the accelerometer-based theft detection capability, audio output, integrated payment system, and metal enclosure. The video streaming is functional but requires an extra step of triggering from the command line, which we ran out of time to make part of the app.

We functioned well as a team because we all contributed to the project relatively equally. We were able to leverage each group member's skills in electronics, software, and building of the chassis. I am pleased that we were able to deliver a functioning prototype on time that was even fairly polished

Jackson Connolly – CIO

Wow, ENSC 440/305W was as much of a challenge as I had heard: and more! I expected all-nighters to be an exaggeration, but lo and behold the final week found me sleeping in the sunny room at least once. I cannot imagine how people take a full course-load along with capstone, as I was swamped with only 12 credits. Despite this, I found that working with this group was generally quite enjoyable and I learned a lot from the other members of the group. This was not limited to just the technologies involved, but also group organization, communication skills and design approach.

Communication is something I have a strange relationship with. On the one hand I'm quite good at communicating ideas and interacting with others, but on the other hand I am very disorganized by nature. I very much have tunnel vision when it comes to course-work, and while that makes me good at focusing on individual tasks and getting them done it means I am somewhat absent-minded. This is an area I always strive to work on and this project, much like co-op terms are a perfect time to hone my skills. I have had a great opportunity to improve over the course of this term and I think I've made the best of it.

Capstone has also taught me a lot about the difficulties of group dynamics, namely when design conflicts arise. I'll admit to losing temper over several topics, which shall remain nameless, and it is definitely humbling to get overruled by the other group members! The critical thing to remember is to communicate your point of view clearly and concisely to at least 2 other group member so you can outvote the others. On the other side of the coin you need to respect the rule of the group when it goes against you as well. Balancing these things can be tricky, however and whatever the decision is you need to accept it and move on. There just isn't enough time to dwell on any specific problem for too long.

This leads me to one of my complaints about this course: the lack of allocated time. It seems the faculty is aware of this (in the new curriculum I believe it is being moved to take place over 2 semesters). Now with excellent management a group can easily complete the project in the semester, however when you have other courses and concerns it can be difficult to take the time to organize properly. One of the problems our group faced was differences in schedule. Arranging meetings was challenging and many times they would be pushed back or cancelled due to scheduling conflicts. Our group was only able to meet reliably near the end of the semester and we were quite behind schedule by then.

I don't want this to sound as though I did not enjoy this process though. I am genuinely pleased with how the project turned out and I think myself the group should feel proud of this accomplishment. It was very satisfying working with the team and I have gained a lot of respect for them and their skills

9 Conclusion

Through this project we gained significant experience and knowledge in product planning and development. We implemented a custom solution from concept to working product in under 4 months. We stayed within budget and met all of our proof of concept design goals. In the future, we intend to explore the commercial prospects of the SOSbox and possibly expand the project to design and build a proof of concept SOShub solution to manage community parcel boxes.

Appendix

Meeting Minutes

14.09.02

Present: ALL

Next meeting: TBA

I. Announcements

- First official meeting of the 305W/440 Project group
- Initial concept, a secure parcel delivery system

II. Discussion

- Introduction and exchanges between all group members
- System concept overview
- Possible streaming software library (GNU) needs to be verified
- Need to determine a group name and/or product name

III. Roundtable

- Sutharsan will try and fix problems with the Beaglebone Wifi Driver
- Dan will put forth a funding application for the ESSEF
- Brett and Herman will order their development kits

Meeting Minutes

14.09.08

Present: ALL

Next meeting: TBA

I. Announcements

- Get all group members on board, make sure everyone is on the same page and everyone has a unified sense of what needs to be accomplished by the end of the semester, 14.12.02.
- Name Change: Secure Overwatch System box is now Secure On-Site box
- Have a close look at the ESSEF (funding) application prepared
- Other sources of funds

II. Discussion

- There seem to be some problems and inconsistencies in the ESSEF funding application put forward by Dan. The social aspect has to be clearly stated in the beginning. And the solution should follow the problem statement. This should be fixed and submitted accordingly.
- An application for the Wighton Fund also needs to be put forth.
- The budget has been discussed to great lengths today and \$1000 is more than enough. Asking for \$1000 and receiving around \$600-700 is ideal.

III. Roundtable

- Herman will be working on an interim logo for the SOSbox. Should try to incorporate some Morse code.
- We need to schedule a meeting this week to get more organized and begin working on the proposal document.
- Discussed that a google document might be a good option because it's hard to keep track of multiple emails and multiple changes to any document amongst a group.
- A schedule/timetable/calendar also needs to be prepared that outlines when tasks should be completed or completed by.

Meeting Minutes

14.09.15

Present:

ALL

Next meeting:

TBA

I. Announcements

- Sutharsan has taken the liberty of assigning company positions to team members. No objections from anyone
- An interim logo needs to be prepared
- Project Proposal is due on 14.09.22 and major sections needs to be distributed amongst team members, also a meeting needs to be schedule to integrate all these sections together

II. Discussion

- Jackson has begun a High-Level System Diagram on Google docs, which could potentially be included in the project proposal, if not the functional specifications document.
- There is a consensus among the group regarding requiring only one beaglebone for the SOSbox
- Beaglebone for the physical box is a requirement and a beaglebone for the buzzer to allow wireless communication between a buzzer and the box can be added at a later time (not a priority)
- Construction of the actual SOSbox has been put off till all the circuitry is functional, this includes the lock and potential sensors we wish to add. It is easier to build a box around circuitry.

III. Roundtable

- Need to contact Fred regarding 50\$ reimbursement of electronic components
- Project Proposal has been broken up into major sections, which should be done by Sept 22nd. There will be a working meeting on Sept 22nd dealing with integration of the various parts into one awesome document.

Meeting Minutes

14.09.22

Present: ALL

Next meeting: 14.10.01

I. Announcements

- The following changes have been made and approved to company positions occupied by team members. They are as follows:
 - Sutharsan Rajaratnam: Chief Executive Officer & President
 - Dan Kikuchi: Chief Financial Officer
 - Brett Hannigan: Chief Technology Officer
 - Herman Sagoo: Chief Operating Officer
 - Jackson Connolly: Chief Informative Officer
- All team members agree on a formatting scheme for official documentation to be submitted Steve Whitmore and Andrew Rawicz (proposal, functional specs etc.) and a company logo has also been finalized for this semester

II. Discussion

- Project Proposal integration of various parts
 - Sections on future market sense have been omitted as they are not deemed fit for the proposal documentation
 - Redundancy of the problem we are trying to solve has also been omitted from the project proposal
 - A clear company profile has also been established. Perhaps we need to look into a social cause for our product as well. i.e. some portion of revenue goes towards helping kids in Africa etc.
 - Everyone has approved the content in the proposal and all team members have voiced their opinions on the document. A final format is required which Brett will do tonight prior to submitting to Steve Whitmore by 11.59pm tonight.

III. Roundtable

- Very productive meeting, where the project proposal has been finished (content-wise)
- All team members came together on a solid document and stand by it
- Need to schedule another meeting to create a calendar/timetable and establish deadlines for when certain tasks for the SOSbox need to be completed.

Meeting Minutes

14.10.01

Present: ALL

Next meeting: 14.10.07

I. Announcements

- The project is far too behind and at this rate we may not have a completed project by the end of the semester
- Need to create a timetable and calendar for the project which allows us to demo a completed SOSbox a week prior to the official deadline of 14.12.02
- Functional Specifications document is due on 14.10.14, and needs to be split into parts. Taking into account midterms and/or major assignments that may also be due during this time period.

II. Discussion

- According to Functional Specifications (FS) rubric on the ensc305w website, there seem to be five major sections that are major contributing factors to the overall grade
 - Sustainability: Dan (he has experience with this topic)
 - Standards: Brett
 - Hi-level Overview Chart: Sutharsan
 - Process Details: Sutharsan (Herman and Jackson will also pitch in)
 - Technical Details: Herman (for hardware), Jackson (for software)
- Because it is a long weekend before this document is due, perhaps we should have this done by Thursday, October 10th.
- A calendar/timetable has been created indicating when important parts of the project should be completed. We are due to have the project completed a week before the demo date, such that if there are any difficulties we can hopefully resolve them. This calendar also factors in time that will be spent working on the functional spec document, design spec document, post-mortem etc.
- Jackson will create a Google calendar to which everyone should have access

III. Roundtable

- A tentative deadline has been agreed upon
- A meeting is to be set for 14.10.07, where everyone should come somewhat prepared and be ready to discuss what they will be writing for their outlined sections for the functional specifications document. Another meeting is to be set for 14.10.09, where we will integrate all parts and produce a finished FS document.

Meeting Minutes

14.09.07

Present:

ALL

Next meeting:

14.09.10

I. Announcements

- Functional Spec (FS) document review and go over distribution of major sections
- Need to ask Steve Whitmore for Project Proposal marks to see what can be improved on for the Functional Spec document
- Re-evaluate existing design of the SOSbox

II. Discussion

- Since the technical details is a major section of the FS document, Brett has volunteered to add to the technical details (hardware section) in addition to Herman's hardware section.
- Members of the group have put forth several re-designs of the SOSbox.
- No longer are we implanting a hinged door, the team has decided on a garage door replica.
- Also the SOSbox is no longer top-loading or side-loading, but a combination of the both
- The operation has also been re-evaluated, before the courier would come the front door and you would grant him access to the SOSbox remotely (by locking and unlocking via mobile phone), now the package comes with a qr code, which the delivery man scans via the camera on the SOSbox.
- The SOSbox opens automatically. This needs to be looked at in much more detail.
- Various ideas have been put forth for the SOShub, but are not in the scope for this capstone project

III. Roundtable

- Because we have very much deviated from the initial design of the SOSbox, we need to revise our existing calendar/timetable for an appropriate timeline to when various tasks need to be completed.
- Sensors, capes etc... need to be decided on quickly
- A parts list needs to be created and parts need to be ordered asap!
- A meeting needs to be scheduled for the integration of major sections of the FS document
- A meeting needs to be scheduled for the creation of a parts list; members need to be come prepared to this meeting
- A meeting needs to be scheduled for recreating a practical timetable taking into account all of the proposed changed. This meeting should also clearly define how the SOSbox will function. From the ordering of a package to the delivery.

Meeting Minutes

14.10.10

Present: ALL

Next meeting: 14.10.14

I. Announcements

- The BCIT visits were of some help and perhaps we should consider gaining access to the CARI lab for the construction of our SOSbox enclosure. Should time in the lab be free, we will definitely make use of it.

II. Discussion

- Functional Specs arranged in a suitable manner
- All requirements are under system requirements
- A separate section for software requirements has been created
- Have decided to use APA referencing instead of previously used IEEE referencing (for project proposal) because Word has a built in APA generator. Steve Whitmore has already stated that the use of either APA or IEEE citations is acceptable should they be accurate.
- Due to several enhancements and design upgrades to the SOSbox, the hardware associated deadlines have been pushed back 5-6 days
- Software dates remain unchanged
- Further discussion of the SOSbox enclosure design ensues, sloped vs. box, garage-door opening vs hinged, climate control vs no climate control

III. Roundtable

- Functional Spec document should be completed by next meeting, 14.10.14 (official due date)

Meeting Minutes

14.10.14

Present:

ALL

Next meeting:

14.10.17 – Hardware-Parts Meeting

I. Announcements

- Parts list meeting has been set for Friday after the ensc440 lecture
- The hardware team should have a good idea on what components/parts need to be incorporated in our SOSbox design

II. Discussion

- Functional specification requirements are finalized and several revisions have made to the original document, all of which will be tracked
- An ingenious priority scheme has been created to label and categorize requirements based on their respective system orientation and priority based on overall functionality
- Herman has sketched out a preliminary visual of what the SOSbox may look like
- Some electrical and physical requirements have been left out of the latest revision and are to be added before the document is finalized for submission

III. Roundtable

- Any last minute changes group members come across should be sent to Brett as soon as possible for synthesis
- Review marks deducted on proposal document and ensure those marks are not deducted again
- Parts Meeting set for 14.10.17

Meeting Minutes

14.10.17

Present:

Hardware Team: Brett, Herman, Sutharsan

Next meeting:

14.10.22 – SOSbox Construction Discussion

I. Announcements

- Need to contact that Industrial Design Engineer from BCIT and clarify whether the use of the CARI lab is free of cost, if so we should really consider some cool designs
- If not, is it worth it to access the mech labs at the Surrey campus

II. Discussion

- Should start looking into parts and creating a parts list
- Need to contact Fred about the 50\$ parts bag and what it includes
- Andrew mentioned that the Wighton Fund is usually generous with funding parts as long as we keep the receipts
- The timetable should perhaps be pushed back because of the updated changes to the box
- Verified Features
 - 3d accelerometer
 - LEDs on box to provide feedback to the courier delivery person regarding whether the QR code has been verified or not
 - Stepper motor to automate the garage door opener
- Materials
 - Need to contact BCIT regarding lab access
 - How will we make the garage door roll up
 - Perhaps a wood frame may suffice
 - Need to have preliminary drawings made by the next meeting, including how we will construct the enclosure

III. Roundtable

- A parts list should be ready soon and parts need to be ordered asap
- Need to check on the software side to see if they are on schedule
- Everyone think of possible design changes and methods of construction for the SOSbox by the next meeting.

Meeting Minutes

14.10.22

Present: ALL

Next meeting: TBA

I. Announcements

- Software is on track and the test apps are in progress
- Looks like everybody is ready to discuss proposed design and construction changes to the SOSbox
- Everyone is satisfied with the previous functional spec discussion
- Perhaps an extension will be needed for the design spec document (due Nov 3); worth 20%

II. Discussion

- The latest design proposed in the functional spec document will be quite difficult to construct out of wood, let alone metal
- Certain changes need to be addressed regarding the sloped curved design.
- The automatic aluminum garage door needs to be looked up. Brett will look into this and any associated costs. The group has agreed that should the cost be less than \$100 we will consider it, otherwise a simplified design has been created
- Herman will begin building the simplified design this weekend and keep the group updated on any encountered problems
- Dan has provided us with the camera that will be used for the qr code detection. Brett will be testing this. If it does not suffice, we will need to purchase another one.
- Parts list has been created and Sutharsan will be placing the order tonight or at the latest tomorrow
- The power supply for the lock and the motor for the new door design also needs to be figured out and/or purchased
- Software apps are in excellent progress

III. Roundtable

- We will wait till Monday (14.10.26) on updates from software, hardware and mechanical and will progress thereof.

Meeting Minutes

14.11.05

Present: ALL

Next meeting: 14.11.06

I. Announcements

- Will be prepping for the oral progress reports, this Friday at 1230. Sutharsan will join us when he is free from his prior commitments.
- Someone should contact another person also in ensc440 to get a gist of the oral progress reports

II. Discussion

- Design Spec (DS) document extension had been approved. Now due on Nov 6th.
- Dan's part is in and he will be editing his part again, because he is busy on the due date of the DS doc.
- Sutharsan's part has already been included in the DS document.
- Jackson will be completing his software analysis and break down of the server side for the DS doc and will be emailing it out to everyone. He may also be adding another diagram
- Herman will be finishing his CAD drawing of the proof of concept design and perhaps even prototype design if necessary. For a production design, the pencil drawing made for the functional spec should be more than sufficient
- Brett's part is done well.

III. Roundtable

- We need to ask Steve, when he want us to deliver the demo.
- Depending on the date, we could appropriately schedule time that we will need to go to BCIT should we want a metal enclosure or go the surrey campus for laser cutting
- Brett will be bringing the lock so Herman can incorporate it in the box
- The box construction should be done by this weekend (if not next weekend)
- Brett is in contact with the door supplier, and completion of the physical box will be dependent on when the supplier gets in contact with Brett

Meeting Minutes (Skype)

14.11.06

Present: ALL

Next meeting: Tomorrow

I. Announcements

- Need to work on a final edit today
- Everybody's part is submitted into the document
- SOShub (scaled SOSbox) continues to make a return into the documents; what to do

II. Discussion

- A couple of run-on sentences in the executive summary fixed
- "dumb boxes" in the introduction should just be referred community mailboxes, or internet disabled
- Technical details should be ordered as follows
 - system, physical, mechanical, electronics, software design
- A glossary to be compiled as we go through the document. Need to limit "buzz" words and/or "buzz" words should to be explained
 - IoT, PWM, TCP, UDP, I2C, GPIO ARM, etc
- Measurements for the SOSbox enclosure should be kept in inches for the sake of purchasing materials and fluidity
- Equations should be numbered
- This time, the figures are well explained in the document.
- Also figures are placed post explanation
- Proof of Concept, prototype and production sections have been taken out and included into the content. That is, PoC, PROTO, PROD have been removed

III. Roundtable

- Redo revision numbering scheme to match the previous functional spec and proposal documents
- A fair chunk of the document revolved around the SOShub, however because the design spec is for the SOSbox anything other should be removed (voted)
- The SOShub (as important as it is to the reality of this product) should either be included in the post mortem or if we were to write some sort of market/business plan.
- Perhaps it should have been in the proposal (it was voted to be removed from the proposal)
- Sutharsan has sent out an email to Steve, regarding the demo date

Meeting Minutes

14.11.07

Present: ALL

Next meeting: TBA

I. Announcements

- The submitted design specs document looked good
- Two identified errors, page 8 and 10 regarding referencing figures to the table of contents
- Brett will fix this and submit it again to Steve
- Get ready for oral progress later on today
- Steve has replied stating that he will put up a online sign-up sheet this weekend for the demo date

II. Discussion

- Oral Progress Report needs to be broken down against the rubric
- Sutharsan was initially responsible of introducing the project, however Jackson wants to introduce the project. Jackson will introduce the project.
- Herman will talk about the schedule, when it was initially made and how we currently stand today with respect to that initial schedule. Talk about Audio streaming being scrapped from the project and justifications
- Brett will talk about the hardware circuitry and parts orders and the overall progress on the streaming camera. The camera is streaming to a PC environment (via beagle bone black) now and mobile is the next step
- Sutharsan will talk about the financial situation. The team has decided not to talk about the ESSEF funding debacle. Should the question arise, we should be willing to explain it. Need to sell them on the fact that the SOSbox is relatively cheap and is further evidence of the scalability of this product.
- Dan and Jackson will talk more about the software (client, server) side and explain if and where they are behind and how they will compensate for it

III. Roundtable

- Have enough confidence in the oral progress reports and do not get defensive should the markers ask an irrelevant, stupid or raise a point, which we may not have considered.
- Should a plan a time where some of us can go to a scrap yard and look around for some sheet metal
- Brett or Sutharsan should also contact BCIT or SFU surrey for access to the labs (more on this next meeting, TBA)