

Certus Engineering

December 17th, 2015

Dr. Andrew Rawicz

School of Engineering Science
Simon Fraser University
Burnaby, BC V5A 1S

Re: Post Mortem for Arca by Certus Engineering

Dear Dr. Rawicz,

Enclosed is the post-mortem for our Automated ID Scanner named Arca. Our proposed design is aimed to be used for Identity verification and attendance tracking.

This post-mortem is intended to give you a final overview and serve as a conclusion for Capstone project. This past semester was a lot work but it also very rewarding thanks to my amazing team members.

Our company consists of four engineering science students with backgrounds in software/hardware, electronics, RT embedded systems and mechanical design bringing their knowledge together to create Certus Engineering. We also have one consultant and two additional members with a background in business, graphic design and media relations.

Should you require any additional information regarding our product, please do not hesitate to contact via phone at (604)349-8182 or via email at ffa8@sfu.ca or farshad@certusengineering.com.

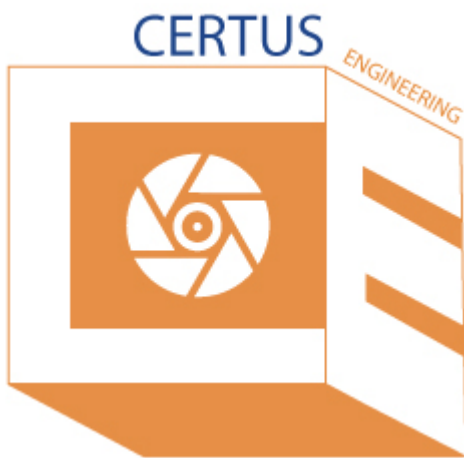
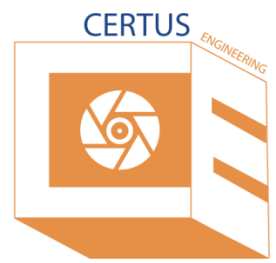
Sincerely,

Farshad Farshadi

Chief Executive Officer

Enclosure: Post Mortem for an Automated ID Scanner, the Certus Engineering.

Phone: 604-349-8182
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Certus Engineering Team:

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Prepared For:

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Mr. Steve Whitmore – ENSC 305

School of Engineering Science

Simon Fraser University

Submission Date:

December 17, 2015

Revision 1.1

Additional Team Members

(Not Enrolled in ENSC 305/440):

Natasha Farshadi

Juri Petrouchtchak

Abstract

Arca is an enclosed system, designed by Certus Engineering, used for personnel verification and attendance tracking for financial or educational institutions. It reads a barcode, an identification number, and the RFID value. Certus engineers have been working on Arca project for the past 15 weeks to release prototype of device in December 2015. This post mortem document outlines the current development state, motivation for the project, overview of system modules, team organization and cost deviation from original estimations.

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List of Acronyms

ABS	Acrylonitrile Butadiene Styrene
GUI	Graphical User Interface
ID	Identification
kHz	Kilohertz
LED	Light Emitting Diodes
MHz	Megahertz
OCR	Optical Character Recognition
PHP	Personal Home Page / Hypertext Preprocessor
RFID	Radio Frequency Identification
SFU	Simon Fraser University
SQL	Structured Query Language
UI	User Interface
UID	User Identification
USB	Universal Serial Bus

1. Introduction

Arca is an electronic authentication system, designed by Certus Engineering. Arca not only provides a solution of verifying personnel, it also captures and generates user information for data analysis. Arca is also, a multi-purpose identification device and provides customers, freedom to choose one or combination of identification methods such as RFID, barcode, picture ID and ID number cards. Main objective for Arca's development is to improve efficiency and accuracy in the authentication process for educational institutions and it's been currently tested in Simon Fraser University.

2. Motivation

Our motivation for this project was to improve the lengthy process of taking attendance and distribution parts in ENSC 220 lab. Most students at SFU have experienced this inefficient and long process in the labs, however we were inspired to create a solution using what we have learned during our studies in SFU and at work.

3. Current State

Prototype version of Arca has been completed in early December 2015 and main functional specification required for prototype has been implemented. These functionalities are listed below:

1. Ability to Authenticate using barcode & ID
2. Ability to Authenticate using RFID
3. Automated photo capture
4. Storage and Web interface

4. System Overview

System's data path can be divided into 3 major subsystems:

1. Input subsystem
2. Data Processing
3. Data Manipulation & Storage

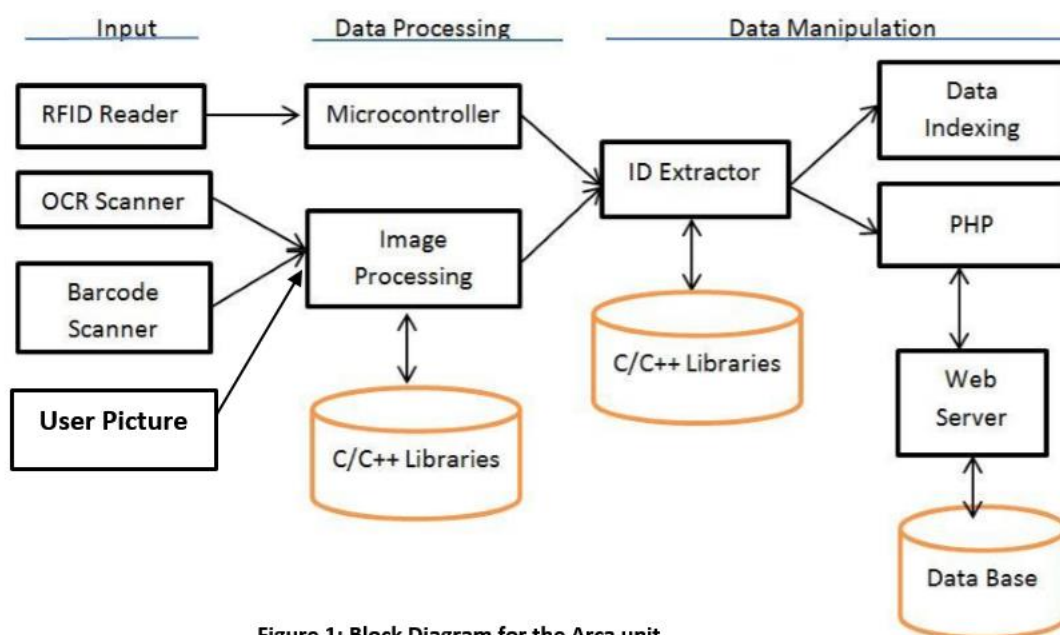


Figure 1: Block Diagram for the Arca unit

Figure 1 shows above subsystems.

4.1 Hardware

The housing for this unit will be made of an ABS thermoplastic material via a 3D printer. The machine used was a fused filament fabrication device enabling layer-by-layer printing. A 3D design of the unit was created using SketchUp and later converted to a stereolithography file format as per the printer's format. Final product requires to be connected to a computer through a USB cable. This will allow all the electronic components, the microcontroller, RFID reader, LEDs and CCD sensors within the unit to fulfill all their necessary requirements such as having a voltage tolerance boundary between 3V to 5V and a current range of 500 mA to 900mA. By connecting the device through USB to the computer and as long as the computer is connected to the internet, data storing can occur. Figure 2 & 3 shows internal wiring of the device and 3D printing.

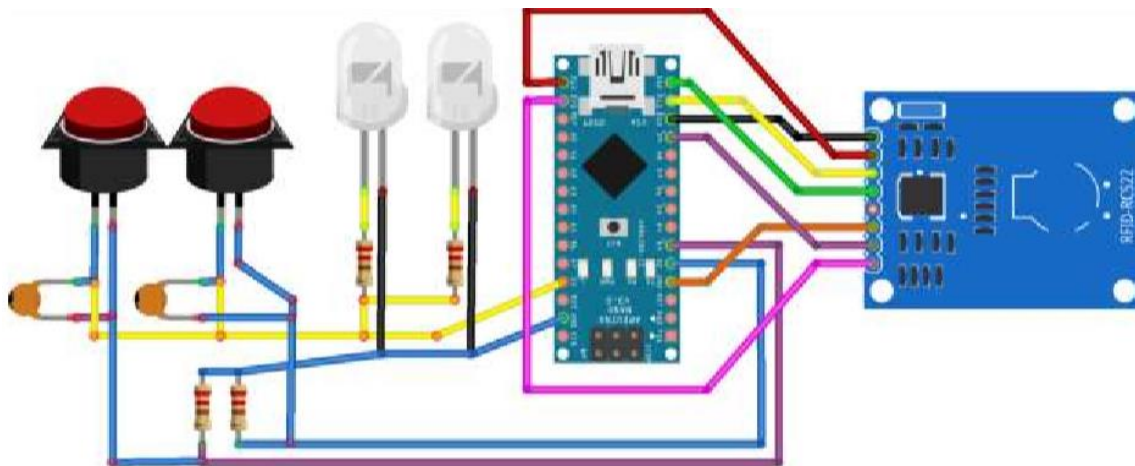


Figure 2: Hardware Unit

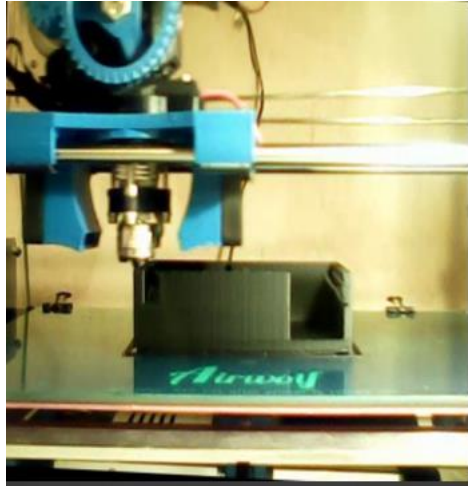


Figure 3: 3D Printing of Housing Unit

4.2 RFID

MFRC522 RFID reader/writer is used for reading RFID tags. Internal transmitter of MFRC522 is able to communicate read tag without any additional circuitry and demodulation, decoding and error detection during read and writes are handled internally by the module itself. Arduino Nano 3.0 board containing an Atmel 328 microcontroller is connected to a PC using a micro USB cable and I2C bus is used for communication between MFRC522 and Arduino board. Received ID from MFRC522 is passed to the host computer using a serial port where, another module sends read ID to a text editor or text field of PHP website, depends on administrator's choice for further manipulation. Figure 4 shows functional block of RFID Unit.



Figure 4: RFID Unit

4.3 Barcode/ID Scanner Unit

An Optical Character Recognition (OCR) engine is used to detect the region of number characters (the SFU ID) and recognize those number characters. Depending on the ambient light, the quality of image will be different depending on lighting of the environment in which the scan is taking place. As a result, the OCR engine may malfunction if the quality of image is poor. To resolve the issue with ambient light, we decided to develop our system in a closed loop system where the lighting and quality of the image is under our control.

Identifying the characters and barcode consists of multiple stages. Once the image is captured using a camera, the software will analyze the region which contains the characters. The ID number consists of 9 digits and barcode values consist of 14 digits. The goal of this software is to read both these number and give an output as a string of 23 digits. Once the coordinates of the image is detected, image is broken down into two regions because the ID and barcode are being read independently and for simplicity, we separate their regions. Figure 5 shows block diagram of this module.

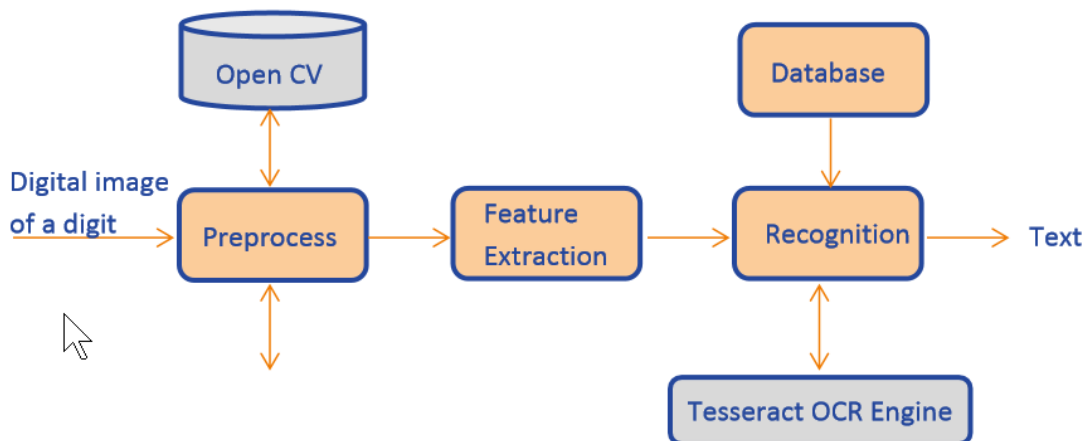


Figure 5: Barcode/ID Scanner Unit

4.4 Photo Unit

This unit was added in late stages of prototype development. User's photo captured by a camera integrated in Arca and can be saved for further authentication purposes. A user interface is developed to automate this process and ties the photo to the most recent ID captured through scanner or RFID unit.

4.5 Web/SQL Unit

This unit includes a PHP website with simple graphic and a SQL database to store and access ID read from RFID and scanner units.

5. Project Management

5.1 Actual and Estimated Budget

Our principal investors were Miller Instruments who expressed an interest in our design early on. Also Dr. Ash Parameswaran was kind enough to let us use his 3D printer, thus cutting our printing cost therefore, we were able to complete our product while staying under budget. Table 1 demonstrates difference in estimated and actual cost of the project.

Table 1: Cost Difference

Item Name	Project Costs	Actual Costs	Difference
RFID Reader Base/Chip (13.56 MHz)	\$25	\$4 x 3	- \$13
Additional RFID Tags (~5)	\$3 / each	\$3	- \$12
Arduino Nano	\$45	\$10 x 3	- \$15
Electrical components	\$10	\$12	+\$2
Housing Unit	\$25	\$9 x 4	+\$11
Contingency (15%)	\$18	\$20	+\$2
Grand Total	\$138	\$113 for 4 units	- \$25

5.2 Actual and Estimated Timelines

Actual development of project was longer than what originally estimated due to late arrival of parts, major bugs in software and errors in mechanical design. However, we were able to meet our final deadline to release the device prototype in early December. Figure 6 shows major deadlines of this project.

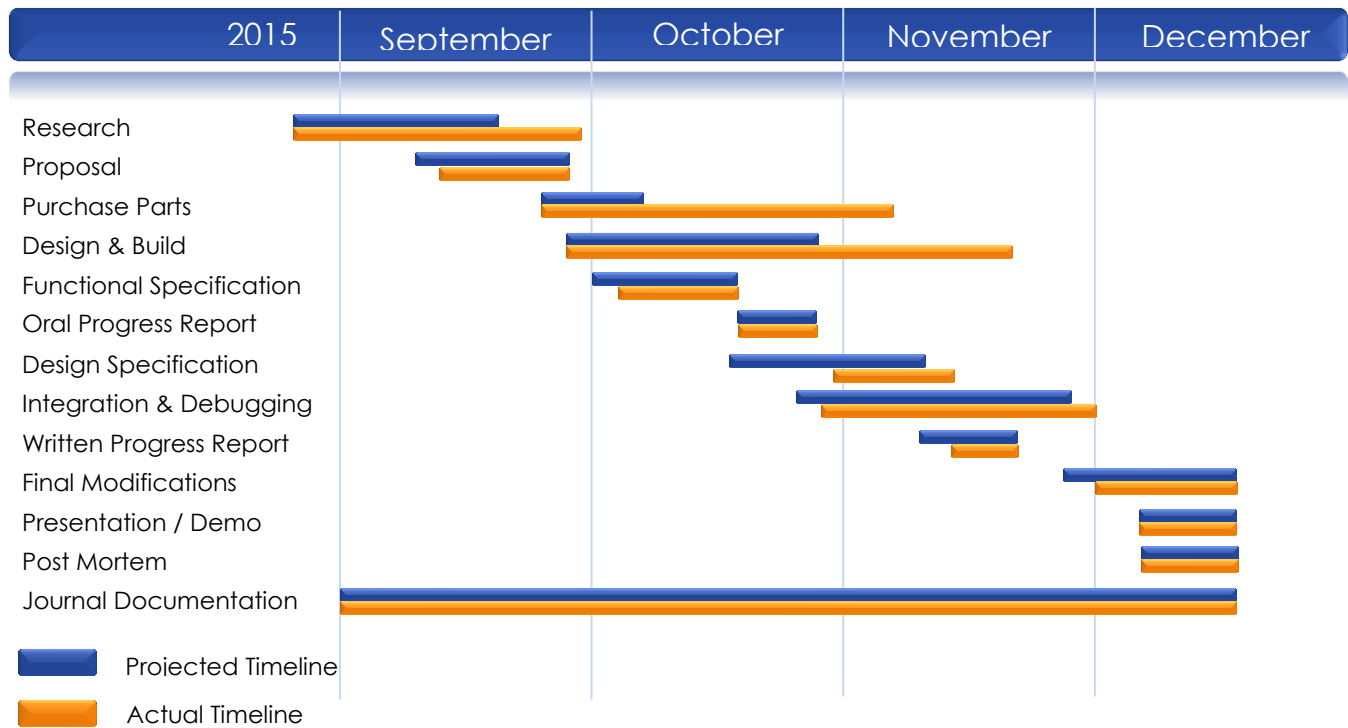


Figure 6: Actual & Estimated Timelines of Project

6. Future Improvements & Plan

At Certus engineering, we are very pleased with functionality of the prototype device. We also, added photo capturing feature to device prototype and we are very excited to take this device to the next level and release the final product in second quarter of 2016. We are planning to improve the appearance and housing of the system by reducing the size of the device and/or develop an app to replace the microcontroller and scanner. Internal hardware can also be improved by purchasing more reliable and durable electronics, RFID sensor and microcontroller or replaced by a tablet/iPod to increase speed, life-time and reliability of the device.

Operation speed of the device can be increased by software improvements to better market the device.

7. Group Dynamics/Challenges

All team members were actively participating in developing Arca authentication system. We had a group with diverse skills and interests therefore we were able to divide tasks and achieve our deadlines most of the time. Also all members were participating in group meetings and were working closely to document requirements and design process.

We faced some challenges during development of Arca such as delay in parts' arrival, exams, medical issues and late bug discovery in software. These issues affected some of our deadlines however, team members worked hard and closely to help other members of the group and we all were focused on our final goal to release the prototype in early December.

8. Individual Conclusions

8.1 Paniz Bertsch

I have been working as part of software development team and hardware/software interaction. I have learnt a lot during last 15 weeks and have been involved in all phases of design process such as documentation, design, development and testing. Also, I learned about business aspects of product development, such as marketing and presentation. All group members were working hard to meet deadlines and provide a solid work.

8.2 Kevin Sabau

These 13 weeks were a challenge. Taking 20 credits, of which were all upper division engineering courses this semester along with capstone was not an easy task, because a lot of time had to be invested in each individual course. But since I'm writing this conclusion for the post mortem document, means that I am still "somewhat" functional and was able to successfully complete this along with all my other courses. I would personally like to thank and acknowledge that I couldn't have done all this if I wouldn't have had a good group with great team dynamics and not to mention a great leader.

Throughout the semester I have learned a lot, and a big bulk of that knowledge came from this course. Due to its uniqueness, this course provided me with a great chance to put to use and challenge my theoretical knowledge learned so far during my degree. Through countless hours of hard work, I have developed experience in project management and technical design which involved rigorous amounts of detail and a very keen eye for perfection. Also, I was able to strengthen my analytical and engineering skills by working on a professional project within an amazing team, which allowed me to enhance my time management, communication and teamwork skills.

My main role was dealing with the hardware part of our project. I had to design and assemble a circuit that would properly connect all the appropriate components along with making sure they would all receive the necessary requirements in order to function properly. Also, with a partner I worked on designing the infrastructure of our unit in SketchUp which was later on exported to 3D printable files. Throughout the project we ran into numerous problems. One of the major problem was not having the right brightness. This would hinder the performance of the optical character recognition software therefore making it unreliable since it could not read the proper characters.

The solution to this issue was easily solved once I reassembled our schematic on a breadboard and by using variable resistors I was able to play around and obtain the proper values in order for the software to work properly. Also we encountered many random errors in our framework. One example of such error would be the length of a barcode on a student cards, some had different lengths therefore we had to take into account all possible scenarios. The procedure for solving this problem was to redesign the design the opening of the barcode by making it wider in SketchUp.

In conclusion, I was very happy with the dynamics of our group. Even though we all had a busy schedule this semester, we were able to miraculously manage to pull this project off in time. Even though many times there were a lot of tension between our colleagues, we were able to deal and solve these situations in a professional and respectful manner. In the end of the day, I am one hundred percent certain that we walked away from this project with essential life lessons which will be applied further in our careers.

8.3 Chinmay Desai

The past four months were among the most hectic and chaotic months of my undergraduate degree, yet it was also one the most rewarding semesters I've had here at SFU. I knew that going into this semester with three lab courses and capstone on top of that would be a massive challenge but I had to test my limits to see if I could handle all this coursework and stress. I could have taken a light course load along with ENSC 440/305 but that would be taking the easy way out. I don't think I've ever slept so little in a semester and was stressed so much. Even with all of these difficulties, I feel amazing knowing that I actually created something and didn't exist a few short months ago.

Time management was a major key to success during this semester. Planning each and every day the previous night, ensured that the following day was as productive as possible. My time management skills definitely improved as the semester went on, but the level stress also increased.

As for the technical skills, I learned how to work with and operate a 3D printer, program RFID modules, and learn web development. This course ties all of the hardware and software knowledge from prior courses and applies it in a unique setting. Of course the basic skills such as wiring and soldering were improved and now I excel with that.

Working with a team on a long term project can be a great experience for learning to deal with different personalities and handling group dynamics. This can be a volatile situation when almost all of the members are tired and near insomniacs towards the

end of the semester. During times like these, it is best to take a break and do something non-440 related to calm everyone's nerves. This course isn't just about the technical skills instead the interpersonal skills are just as, if not more important. This course gave me great exposure to handling such normal issues within the group. Overall I was very pleased with our team and the work that we did.

ENSC 440/305 are both great courses, and I am glad that they are mandatory for all engineers. This course gives insight as to what group projects are like in the industry and teaches valuable interpersonal skills. Steve, Andrew, and all of the TAs did a wonderful job in mentoring and guiding us in the right direction. This experience is something that I will always cherish and remember and the countless skills learned here will be applied to all aspects of life not just in engineering.

8.4 Farshad Farshadi

This experience was one the best of my undergraduate career. I really enjoyed working on this project especially with such a great team. As the CEO, I can truly say that I'm immensely proud of what we've accomplished in the past short four months. The key to our success was always communicating and tackling every problem as a team.

I learned technical skills such as programming in PHP and further enhancing my knowledge of circuits and basic electronics. There was a lot individual learning on everyone's part. I had to self-teach many concepts like Python and PHP, which is the case in the real world. Learning on my own broadened my horizons in terms of knowledge. I was genuinely interested in the topics I learned and it is a shame that these topics were not covered in my past programming courses.

As the CEO of the company, I had to lead by example. My actions would dictate how my team would perceive me as a leader. I had to be impartial when making difficult decisions and this was a very good experience to have. I was very fortunate to have group that was so understanding and downright amazing.

Overall ENSC 440/305 is a great course to have and I'm glad that engineers are required to take it. This changed my perspective on group projects and helped me see how group dynamics can affect the final product.



8.5 Amir Bashi

It was a pleasure working with such a diverse group for this course project. It was very rewarding to be part of a process that developed an abstract idea into a physical product that benefited end-users. Putting previous technical knowledge to use and seeing our project manifest from its initial ideation stage to a fully working prototype felt really empowering. I now have confidence and determination to apply the skills and concepts I have learnt during my time at SFU as an undergrad in constructing meaningful systems in the future.

I am very grateful for having the opportunity to work with business and design students, as well as professors, in the making of our project. I feel this would give me a good idea of what it would be like working at a company and collaborating with members from different departments. This experience has increased my knowledge of how a real company may operate and provided insight into the business considerations needed for successful engineering endeavours. Effectively communicating with business and design students by simplifying engineering terminology and explanations into every-day language, helped me develop better communication and interpersonal skills.

Overall, I was very pleased with our results and found ENSC 440/305 to be beneficial to my personal growth and understanding of the big picture decisions corporations need to make in designing their products.

9. Conclusion

At Certus Engineering, we are proud of completing our first prototype of Arca authentication system. This achievement has been made by hard work of all team members and generous help of many others. Despite complexity of the project, we are satisfied with what we have learnt and the opportunity to apply the knowledge we acquired during our studies in SFU and co-op work terms. We would like to thank Andrew, Steve, Ash and ENSC 440's TAs for their kind help.

10. Appendix

Certus Engineering

AGENDA

September 11th, 2015

10:45 – 11:30

The Arca

Purpose of Meeting:

Informal introduction of team members and discuss the overview of the project and ENSC 305/440 course requirements

Items for Discussion:

- Welcome the team
- Set a day and time for the meetings
- Discuss documentation required for ENSC 305
- Pick a company name

Phone: 604-349-8182

Email: sales@certusengineering.com

Website: www.certusengineering.com

Certus Engineering

MINUTES #1

September 11th, 2015

TIME

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Amir Bashi

Absent: None

Purpose of Meeting: Informal introduction of team members and discuss the overview of the project and ENSC 305/440 course requirements

Minutes:

Chinmay called the meeting to order at 10:45am.

A. Introduction

Discussion: Welcomed one another to the team and to the next four months of working together. The addition of a possible 5th team member. Having four members would decrease the workload on the current members. All current members are in favor of adding a 4th person.

Action: Chinmay will send an email to the ENSC 305/440 planning mail list informing the students of an open position on our team.

B. Future Meetings

What time and day of the week should the meetings take place?

Discussion: Compared everyone's schedule and determined that the best time and day would be Fridays 10:30am – 12:20pm.

Action: Everyone needs to make a note of this in their respective calendars.

C. ENSC 305 Documentation

What documentations are required?

Discussion: Proposal, functional specification, design specification, post-mortem, written progress report, and journals are all required with the proposal being due in little over two weeks.

Action: Everyone must keep their own journals and should bring them to any future team meetings or any other capstone related meetings.

D. Company Name

What is our company name?

Discussion: A few descent names were brought up, such as: Apex Innovations, The Big Box, and Box Solutions. None were unanimously approved so the topic will be tabled for next week.

Action: Everyone should come up with at least one name for next week's meeting.

E. Next Meeting

The next meeting will take place on September 18th, 2015 from 10:30 – 12:20 in ASB 8807

F. Other Business

NONE

Meeting was adjourned at 11:30am

Certus Engineering

AGENDA

September 18th, 2015

10:30 – 12:20

The Arca

Purpose of Meeting:

The search of a 5th member, the proposal that's due in 10 days, and finalize a company and product name

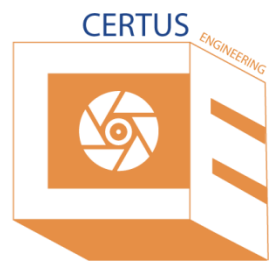
Items for Discussion:

- 4th Member
- Proposal
- Pick a company name

Phone: 604-349-8182

Email: sales@certusengineering.com

Website: www.certusengineering.com



Certus Engineering

MINUTES #2

September 18th, 2015

10:30 – 12:20

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Amir Bashi

Absent: None

Purpose of Meeting: The search of a 5th member, the proposal that's due in 10 days, and finalize a company and product name

Minutes:

Chinmay called the meeting to order at 10:35am.

A. Approval of the agenda and minutes of the September 11th, 2015 meeting

The Minutes were approved without any additional change.

B. 4th Member

Discussion: Chinmay sent an email to the ENSC 305/400 mail list and no one has responded. A 4th member is required as our project would be a bit difficult with only three people.

Action: Farshad and Chinmay will inquire to see if anyone is interested in joining our team.

C. Proposal

What is required and how to split the work?

Discussion: Proposal is an overview of the project and designed to captivate the readers and potential investors to buy/fund our product. A timeline of the deliverables should be provided and that should be done as soon as possible to give ourselves a deadline and schedule to work off of.

Action: Chinmay will make a Gantt Chart and bring a hard copy to the next meeting.

D. Company Name

What is our company name?

Discussion: After a few disappointing names from last week, this week Chinmay came up with Arca Solutions, Farshad brought Certus Technologies, and Kevin came up with Prudent Engineering. We decided to mix all of those names and create Certus Engineering and the product name is The Arca. In Latin Certus means reliable and Arca means box.

Action: Kevin and Amir will think of a logo and Farshad will implement it. A hard copy will be brought next week to officially get it approved by the team.

E. Next Meeting

The next meeting will take place on September 15th, 2015 from 10:30 – 12:20 in ASB 8807

F. Other Business

NONE

Meeting was adjourned early at 11:55am

Certus Engineering

AGENDA

September 25th, 2015

10:30 – 12:20

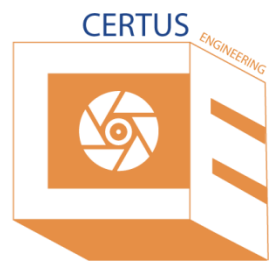
The Arca

Purpose of Meeting:

Introduction of the 5th member, final touches on the proposal, and looking ahead

Items for Discussion:

- Previous Business
- 4th Member
- Proposal
- Company Logo/Letter head
- Website



Certus Engineering

MINUTES #3

September 25th, 2015

10:30 – 12:20

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Juri Petrouchtchak, Amir Bashi, Paniz Bertsch

Absent: None

Purpose of Meeting: Introduction of the 4th member, final touches on the proposal, and looking ahead

Minutes:

Chinmay called the meeting to order at 10:30am.

A. Approval of the agenda and minutes of the September 25th, 2015 meeting

The Minutes were approved without any additional change.

B. Previous Business

Discussion: Chinmay brought a hard copy of the Gantt Chart and table of deliverables. With a few minor mistakes were brought up during the group discussion.

Action: Chinmay will make the necessary changes as per the request of the group.

C. Additional Members

We have two new members. Paniz is a computer engineering student, who is graduating very soon. Juri is a 4th year business student with concentration in finance/accounting. He is not enrolled in ENSC 305/440 but has agreed to be part of this team as the CFO.

Discussion: This is the official Certus Engineering team and will work on developing the Arca this semester. With the exception of Juri, who will be dealing this the team's business and financial work/documentation, everyone else will be working on the technical side. The team has acknowledged that Juri may not be able to make all of the

meetings, due to prior commitments from his business courses. Since Chinmay is the COO, he will be delegating tasks and any questions can be directed towards him.

Action: Chinmay will serve as a liaison between the business and engineering aspects of this project and will be in contact with Juri throughout.

D. Proposal

Where are we with the proposal?

Discussion: We are nearly done with the writing. Juri will look over the business section of the report and after proofreading the entire document, we will be ready to submit it.

Action: Juri finish up the business section. Everyone proofread it to catch any mistakes in the document and submit it on Monday September 28th.

E. Company Logo

What is our company logo?

Discussion: Kevin came up with the logo and Farshad's wife, Natasha who will serve as the team's VP of Design, made it using photoshop. Both did a great job, and the logo will now be adopted. Natasha also created a letter head. Both the logo and the letterhead were unanimously approved by the team.

Action: Edit the previous meeting/agendas to include the new logo and letterhead.

F. Company Website

Should we make a website?

Discussion: We should make website and make our product seem legitimate and officially become a company. Paniz has some web development experience and will spearhead this project with input from Natasha. Kevin has shown interest in helping to develop the website and can be contacted if additional help is required.

Action: Farshad will look into the domain name, server, and hosting.

G. Next Meeting

The next week will be a short and relatively informal meeting scheduled for October 2nd, 2015 from 11:00 – 11:45 in ASB 8807

H. Other Business

NONE

Meeting was adjourned early at 12:15pm

Certus Engineering

AGENDA

October 2nd, 2015

11:00 – 11:45

The Arca

Purpose of Meeting:

Informal meeting after a hard week of work, catch up on old business and talk about new ones

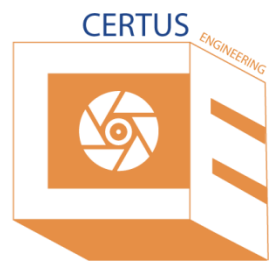
Items for Discussion:

- Proposal
- Website
- Future Business

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Email: sales@certusengineering.com

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Certus Engineering

MINUTES #4

October 2nd, 2015

11:00 – 11:45

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Juri Petrouchtchak, Amir Bashi, Paniz Bertsch

Absent: None

Purpose of Meeting: Informal meeting after a hard week of work, catch up on old business and talk about new ones

Minutes:

Chinmay called the meeting to order at 11:00am.

A. Approval of the agenda and minutes of the September 25th, 2015 meeting

The Minutes were approved as amended:

Minutes #1 – #3 were updated to include the company name/logo/letterhead

B. Previous Business

Discussion: Farshad has looked into the web domains and purchased certusengineering.com

Action: Paniz will begin working on the website.

C. Closing remarks on the Proposal

Discussion: The proposal turned out great, everyone worked well together and delivered the first of the three main documents.

D. Future Business

What major tasks need to be completed?

Discussion: The unit must be designed in 3D modelling software. The circuitry components must be bought and soldered. The RFID and OCR software must be implemented.

Action: Chinmay and Kevin will be in charge of all hardware components, while Paniz and Farshad will handle all software related tasks. Juri will continue to handle the team's finances. Any general questions can be directed to the COO, Chinmay.

E. Next Meeting

The next meeting will take place on October 9th, 2015 from 10:30 – 12:20 in ASB 8807

F. Other Business

NONE

Meeting was adjourned early at 11:40am

Certus Engineering

AGENDA

October 9th, 2015

10:30 – 12:20

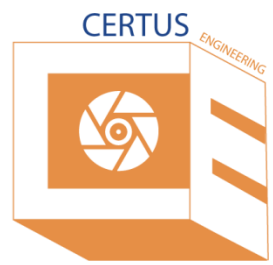
The Arca

Purpose of Meeting:

Back to work after a relatively calm week, functional specifications, and touch base with all the members

Items for Discussion:

- Functional Specification
- Hardware
- Software



Certus Engineering

MINUTES #5

October 9th, 2015

10:30 – 12:20

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Amir Bashi, Paniz Bertsch

Absent: Juri Petrouchtchak (Regrets)

Purpose of Meeting: Back to work after a relatively calm week, functional specifications, and touch base with all the members

Minutes:

Chinmay called the meeting to order at 10:35am.

A. Approval of the agenda and minutes of the October 2nd, 2015 meeting

The Minutes were approved without any additional change.

B. Previous Business

Discussion: Everyone is eager to receive some feedback from the proposal but it may not happen due to the TA strike.

Action: Kevin will visit one of the TAs next Tuesday to get some more information on the matter.

C. Functional Specification

How are we to approach this document?

Discussion: The functional specification is due in 10 days. It makes sense that everyone writes specifications for their own section and then meets and collaborates as a team. Kevin and Chinmay will do hardware and Farshad and Paniz will do the software. Be sure to cite references even for any images/graphs.

Action: Everyone knows what their section is, write specifications for it by next week.

D. Hardware

What major tasks need to be completed?

Discussion: Kevin has completed the 3D model with Chinmay's help and is ready for 3D printing. The parts have arrived and soldering and circuitry should take place very soon.

Action: Continue working on their individual parts and report to Chinmay

E. Software

What major tasks need to be completed?

Discussion: Farshad and Paniz have been working on software. They have further split up the section by having Farshad work on the OCR while Paniz is handling RFID.

Action: Continue working on their individual parts and report to Chinmay

F. Next Meeting

The next meeting will take place on October 16th, 2015 from 10:30 – 12:20 in ASB 8807

G. Other Business

NONE

Meeting was adjourned at 12:20pm

Certus Engineering

AGENDA

October 16th, 2015

10:30 – 12:20

The Arca

Purpose of Meeting:

Functional specification is due in 2 days and touch base with all the members

Items for Discussion:

- Previous Business
- Functional Specification
- Team debriefing

Certus Engineering

MINUTES #6

October 16th, 2015

10:30 – 12:20

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Amir Bashi, Paniz Bertsch

Absent: Juri Petrouchtchak (Regrets)

Purpose of Meeting: Functional specification is due in 2 days and touch base with all the members

Minutes:

Chinmay called the meeting to order at 10:30am.

A. Approval of the agenda and minutes of the October 11th, 2015 meeting

The Minutes were approved without any additional change.

B. Previous Business

Discussion: Kevin did not need to talk to the TA since the marked proposal was emailed to us over the weekend. We only got 76% and we can do much much better than that. The team is disappointed and will need to work harder on the remaining documents, starting with this functional specification.

Action: Everyone has agreed to work harder and put more effort to catch any silly/grammatical mistakes which is where a good majority of our marks were deducted.

C. Functional Specification

Report on the completion of this document?

Discussion: The functional specification is due in 3 days and it is still not fully done. Add more tables and graphs to the document to make it look less boring.

Action: Everyone knows what to do, send your written parts to Chinmay for assembly.

D. Team Debrief

What major tasks need to be completed?

Discussion: The unit has been 3D printed and Farshad has an OCR software up and running. The RFID module requires a bit more work and Paniz is working on it.

Action: Continue working on their individual parts and report to Chinmay

E. Next Meeting

The next meeting will take place on October 23rd, 2015 from 10:30 – 12:20 in ASB 8807

F. Other Business

NONE

Meeting was adjourned early at 12:05pm.

Certus Engineering

AGENDA

October 23rd, 2015

10:30 – 12:20

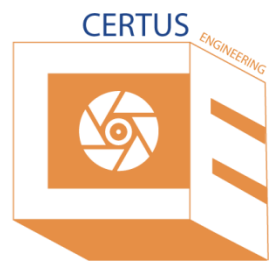
The Arca

Purpose of Meeting:

Oral Progress Report and touch base with all the members

Items for Discussion:

- Previous Business
- Oral Progress Report
- Team debriefing



Certus Engineering

MINUTES #7

October 23rd, 2015

10:30 – 12:20

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Juri Petrouchtchak, Amir Bashi, Paniz Bertsch

Absent: None

Purpose of Meeting: Oral Progress Report and touch base with all the members

Minutes:

Chinmay called the meeting to order at 10:35am.

A. Approval of the agenda and minutes of the October 16th, 2015 meeting

The Minutes were approved without any additional change.

B. Previous Business

Discussion: The team seems happy with the effort put into the functional specification and expects to earn a higher grade than the proposal.

C. Oral Progress Report

Final Thoughts on the oral progress report?

Discussion: The team met with Lukas on October 20th to give an overview of our project. Unfortunately Paniz could not make it due to a medical emergency but we did have Andrew in attendance. Lukas gave a great idea of developing an app for Android phones since they have RFID readers built into them.

Action: Kevin has taken the initiative on this app along with help from Chinmay. He will have more information next week after doing some research on the topic.

D. Team Debrief

What major tasks need to be completed?

Discussion: Circuitry has been soldered and the unit is ready and all systems are ready to be integrated. This will take place next week. We will have a version of the prototype ready soon hopefully.

Action: Integrate the unit and get ready for testing and debugging.

E. Next Meeting

Next Friday is Halloween, so there will be no meeting next week. Have a fun and safe Halloween everyone.

The next meeting will take place on November 6th, 2015 from 10:30 – 12:20 in ASB 8807

F. Other Business

NONE

Meeting was adjourned early at 12:00pm.

Certus Engineering

AGENDA

November 6th, 2015

10:30 – 12:20

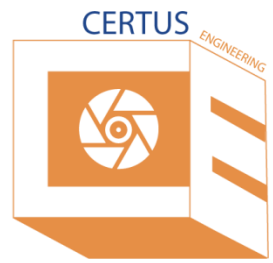
The Arca

Purpose of Meeting:

Design specification and touch base with all the members

Items for Discussion:

- Previous Business
- Design specification
- Team debriefing



Certus Engineering

MINUTES #8

November 6th, 2015

10:30 – 12:20

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Amir Bashi, Paniz Bertsch

Absent: Juri Petrouchtchak (Regrets)

Purpose of Meeting: Design specification and touch base with all the members

Minutes:

Chinmay called the meeting to order at 10:30am.

A. Approval of the agenda and minutes of the October 23rd, 2015 meeting

The Minutes were approved without any additional change.

B. Previous Business

Discussion: The team enjoyed not having a meeting on Halloween and is ready to get back to work.

C. Design specification

How should we approach this document?

Discussion: This is our last major document and we should really go hard on it. This document is a direct continuation of the functional specification and should split in the same way. This document will outline “how” we will build our product. Give lots of detail, graphs, images, and tables. Refer to the course website for ideas and rubric

Action: Send your parts to Chinmay, who will assemble everyone’s parts.

D. Team Debrief

What major tasks need to be completed?

Discussion: Integration is coming along nicely, we have some bugs in the software and few mechanical issues which need to be fixed.

Action: Chinmay and Kevin will modify the 3D model and re-print the unit. Farshad and Paniz will try to fix their bugs in their respective codes.

E. Next Meeting

Next week the formal team meeting will be from 10:30 – 11:15 and the remaining one hour will be used to work on the actual project instead of just a discussion. The meeting will be held in ASB 8807.

F. Other Business

NONE

Meeting was adjourned at 12:20pm.

Certus Engineering

AGENDA

November 13th, 2015

10:30 – 12:20

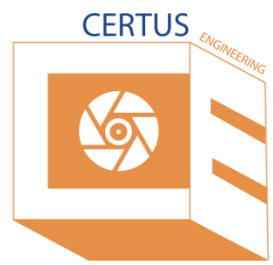
The Arca

Purpose of Meeting:

Debugging/Testing and touch base with all the members

Items for Discussion:

- Previous Business
- Team debriefing



Certus Engineering

MINUTES #9

November 13th, 2015

10:30 – 12:20

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Amir Bashi, Paniz Bertsch

Absent: Juri Petrouchtchak (Regrets)

Purpose of Meeting: Design specification and touch base with all the members

Minutes:

Chinmay called the meeting to order at 10:30am.

A. Approval of the agenda and minutes of the November 6th, 2015 meeting

The Minutes were approved without any additional change.

B. Previous Business

Discussion: We received 84% on the functional specification which is a huge step up from the proposal. We have used all three of our allotted “late days” on the design specifications. The extra days were used to ensure everything was near perfect before the submission.

C. Team Debrief

What major tasks need to be completed?

Discussion: The issues from last week have been fixed for the most part. A new unit has been printed and is ready for integration with the updated software.

Action: The 2nd hour of the meeting will be used for integration of the new unit.

D. Next Meeting

Next week will be very short meeting as well, and the remaining time will be used to work on the project. The meeting will take place on November 20th, 2015 from 10:30 – 12:20 in ASB 8807

E. Other Business

NONE

Meeting was adjourned early at 11:10am. Remaining time was used to work on the project.

Certus Engineering

AGENDA

November 20th, 2015

10:30 – 12:20

The Arca

Purpose of Meeting:

Debugging/Testing, written progress report, and touch base with all the members

Items for Discussion:

- Previous Business
- Written Progress Report
- Team debriefing

Certus Engineering

MINUTES #10

November 20th, 2015

10:30 – 12:20

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Juri Petrouchtchak, Amir Bashi, Paniz Bertsch

Absent: None

Purpose of Meeting: Debugging/Testing, written progress report, and touch base with all the members

Minutes:

Chinmay called the meeting to order at 10:30am.

A. Approval of the agenda and minutes of the November 13th, 2015 meeting

The Minutes were approved without any additional change.

B. Previous Business

Discussion: This short meeting followed by group collaboration time seems to work great for everyone. The same format will be used for this meeting and future meetings.

C. Written Progress Report

What is there to do?

Discussion: Written progress report is a 2-3 page document giving an update to the TAs on our project. It is due on the November 29th not on the 23rd as previously stated on the website. A rubric can be found there and all team members should take a look.

Action: Everyone needs to look the requirements for this document. It looks like an easy document compared to the prior ones but nonetheless it must be completed, and the sooner we get it done, the better off we'll be.

D. Team Debrief

What major tasks need to be completed?

Discussion: Some issues still remain in the OCR and the containment of the components. The RFID seems like it's doing great. The team would like to recognize Paniz on a job well done.

Action: The 2nd hour of the meeting will be used for integration of the new unit.

E. Next Meeting

Next week will be very short meeting as well, and the remaining time will be used to work on the project. The meeting will take place on November 27th, 2015 from 10:30 – 12:20 in ASB 8807

F. Other Business

NONE

Meeting was adjourned early at 11:15am. Remaining time was used to work on the project.

Certus Engineering

AGENDA

November 27th, 2015

10:30 – 12:20

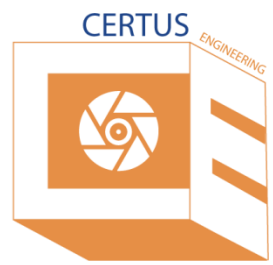
The Arca

Purpose of Meeting:

Debugging/Testing and touch base with all the members

Items for Discussion:

- Previous Business
- Team debriefing



Certus Engineering

MINUTES #11

November 27th, 2015

10:30 – 12:20

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Amir Bashi, Paniz Bertsch

Absent: Juri Petrouchtchak (Regrets)

Purpose of Meeting: Debugging/Testing and touch base with all the members

Minutes:

Chinmay called the meeting to order at 10:35am.

A. Approval of the agenda and minutes of the November 20th, 2015 meeting

The Minutes were approved without any additional change.

B. Previous Business

Discussion: This short meeting followed by group collaboration time seems to work great for everyone. The same format will be used for this meeting and future meetings. The website is coming along nicely and everyone is helping Paniz with this task.

C. Team Debrief

What major tasks need to be completed?

Discussion: The overall design of the unit seems to be finalized. System testing is underway. After talking with Andrew we have decided to preview our box to him, Steve, and the TA, in private, prior to the demo date. This was done to protect our intellectual property from becoming public and to keep confidentiality of the project

Action: Set a date and time with them to privately showcase our product. There is a possibility we will draft an NDA get it signed by anyone looking at our unit's specification.

D. Next Meeting

Next week will be very short meeting as well, and the remaining time will be used to work on the project. The meeting will take place on December 4th, 2015 from 10:30 – 12:20 in ASB 8807

E. Other Business

NONE

Meeting was adjourned early at 11:05am. Remaining time was used to work on the project.

Certus Engineering

AGENDA

December 4th, 2015

10:30 – 12:20

The Arca

Purpose of Meeting:

Debugging/Testing and touch base with all the members

Items for Discussion:

- Demo
- Post mortem

Certus Engineering

MINUTES #12

December 4th, 2015

10:30 – 12:20

The Arca

Present: Chinmay Desai, Farshad Farshadi, Kevin Sabau, Paniz Bertsch, Juri Petrouchtchak, Amir Bashi

Absent: None

Purpose of Meeting: Discuss the demo and touch base with all the members

Minutes:

Chinmay called the meeting to order at 10:45am.

A. Approval of the agenda and minutes of the November 27th, 2015 meeting

The Minutes were approved without any additional change.

B. Previous Business

Discussion: This is one of the last meetings and we need to discuss the demo and post mortem both happening on December 17th.

C. Team Debrief

What else is left?

Discussion: The overall project is winding down but there are still minor tasks that need to be done. We should start the demo and the post mortem soon. We still have two weeks and we're not that pressed for time for this project. We all have exams starting next so realistically everyone will be focusing on that for now.

Action: Chinmay will start a draft of the powerpoint once his exams are over. We will work on the post-mortem after exams.

D. Next Meeting

There will not be next meeting, today was the last one. It's been a great semester, great job everyone!

E. Other Business

NONE

Meeting was adjourned early at 11:30am.