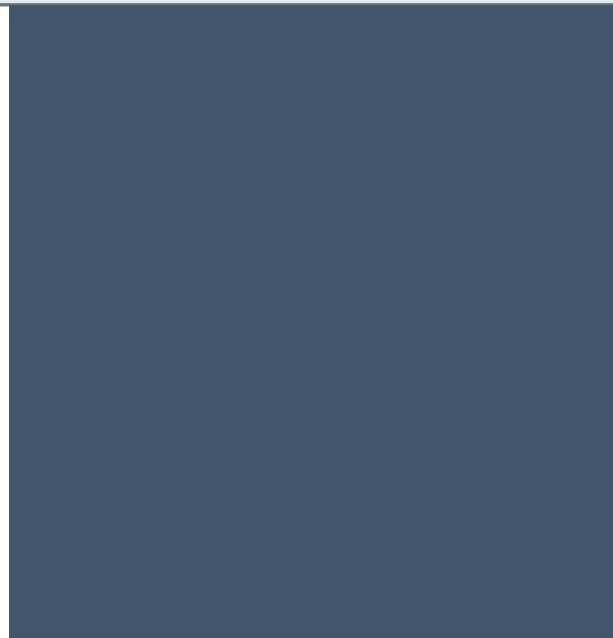




Professional Self- Assessment Report

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ECE 480 – Senior Design

Design Team 2

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Questions

1. How have I satisfied the learning objectives in this course and contributed to team and course outcome?

- Describe various forms of technical communication and the reasons for using them.

Technical communication has been widely used throughout this entire semester. Everything from initial pre-proposal to final proposals, technical lectures, design issues paper, FAST Diagrams, etc. These are all examples of technical communication. Technical communication allows us to show why and how we implemented, or are going to implement hardware/software in a organized format that can be easily presented and understood.

- Write well-organized technical reports.

Writing well-organized technical reports is an extremely important part to being a successful engineer. Creating organized and sorted sections within a technical report allows the reader to easily refer back to a portion without getting lost in mass amounts of text. Well-organized technical reports only increase in importance as the subject matter becomes more complex and length. I believe that every technical report that my team has submitted up until this point is considered a well-organized technical report. As stated, it is organized and information is easy found.

- Write a team proposal for a major design project and obtain approval.

While our situation was unique due to the late start given to us after the US Air Force had cancelled our project, we were still required to submit a formal proposal to Dr. Grotjohn to obtain approval from the ECE department to continue on with the project. This team proposal consisted of technical aspects, a budget, parts justification, and an overview of the project. Due to the complexity of our project we had to be sure that whoever read our proposal overview would be able to comprehend and visualize our design.

- Comprehend appropriate content and style of oral presentations.

There are two different styles of oral presentations that were used in this course, the first being the group presentation and the second being the technical presentation. When using the more general group presentation, it should be used to talk generally to your audience. It is safe to assume that the audience is somewhat educated on the subject. It is important to remember to keep the hard data out of a presentation like this. This type of technical communication should outline a design, show components, and give an overview of how the design should operate. On the other end of the spectrum you have a technical lecture which should include all of the nuts and bolts that were left out in the previous presentation. This type of technical communication should go into depth behind the concepts of a design and

show test results. Our technical presentations specifically focused on one aspect of our design and expanded in depth upon that.

- Access relevant standards and interpret their meaning and application.

Our project's main focus is around developing a test bed. Even though a test bed should have options and should not try and restrict actions or utilities, sometimes standards are important. For instance, some of the standards that we used in design were GPS and WiFi. These are two crucial portions of our design and standards were essential in their use.

- Delineate the principal design criteria and constraints for an electrical or computer engineering design project.

Our project original started out with a budget just shy of \$15,000. Due to some miscommunication with our sponsor, we had to slim our project down to meet the budget of the ECE department. As we were still interested in doing the same project, our design team was able to come up with a similar system that would perform with lower, but reliable performance for under \$1500. This was done through elimination of hardware and selection of other models that supported dual antennas as opposed to just one antenna per radio.

- Describe and understand the overall engineering design process.

The first thing we noticed regarding our project was that it was complex. With a complex design it is important that you follow and understand the overall engineering design process. To do this we established timetables for hardware first so that we could later begin the testing phase and integrate it with the software towards the end of our project. We also partitioned the work to meet the strengths of each member of the group. In further following the overall design process we evaluated our project and how it compared to our timetable, and if needed, move resources from one area to another to meet deadlines.

- Describe and understand contemporary industry practices and trends with respect to electrical and computer engineering.

One of the blatant industry practices that we are learning throughout this senior design course is teamwork. For most of us this is the first time working on a large project with a large group. Another industry practice with regards to software defined radio is that most of the industry uses open source software. Industry practices with software defined radio are limited to purchasing hardware through Ettus Research, as we did, because of the scarce availability of supplier other than Ettus.

- Describe, understand, and apply key tools used in the overall electrical and computer engineering design process.

Key tools that our design team has used in the overall ECE design process include open source software, oscilloscopes, voltage meters, graphical user interfaces, Linux distributions,

and our design team laptop. All of the tools listed played an instrumental part in our design. While some tools were used strictly for testing, others were used to implement software onto hardware. Specifically, through the use of open source software we were able to customize our design and add an open ended test bed aspect to our project as we had planned to do in the design stage.

- Understand the benefits and potential problems of teaming, describe qualities and processes of effective team, and describe the role of teamwork in system design.

Teaming can be very useful when design complex systems such as ours. There are also potential problems that you can run into if teaming is not properly implemented. Such problems include team members not pulling their weight, or team members objecting to other's ideas due to their own views on the design. Effective teams work as a unit and discuss a design and how to go about that design as opposed to telling. Communication is also a key component in an effective team as it allows the members to understand what the current focus is and what direction the project is headed in. Teamwork overall plays a huge part in system design. Without teamwork a large design can be very hard to accomplish. As the presentation coordinator I specifically am in charge of presentations, but as in any effective team I don't have the final say. The team collaborates on presentations and everyone's input is considered.

- Acquire and understand information contained in contemporary technical literature.

Throughout our design we have needed the resources of technical literature in the form of data sheets, instruction manuals, setup guides, and application notes. We have gathered most of our technical literature directly from the supplier of our hardware. Due to our software being open source, we have had to rely on forums and discussions for our technical literature.

- Browse the web to acquire information about electrical and computer engineering, software, design tools, third-party suppliers, etc.

While technical literature provided much help in assisting our development we also need to consult the web. Many of times we turned to Google to see what other resources were available online. With the BeagleBone we relied upon home projects to understand where to get third-party software and how to install it. More specifically, we used the web to download software for the BeagleBone that was created for other projects. Our open source software also heavily relied upon web forums and how-to guides online to be implemented effectively.

2. What have I learned about the design process from my work on the design project

From my work on our design project I have learned a great deal that I didn't know coming into this course. For starters I have learned a tremendous amount with regards to radio frequencies and phase. Not having taken a RF class before I was mostly blind coming into this project. In terms of the design process, the biggest thing that I have learned is teamwork. Trying to accomplish tasks on your own can be challenging and almost impossible sometimes. In many instances you need the help of your team to complete certain tasks. As stated above I am the presentation coordinator and responsible for all presentation information. For my technical portion of the project I have applied my resources to the user interface, the GPS, and also in assisting with the USRP. I have also played a very important role in developing timetables and monitoring project status. I keep the team informed on due dates and when we are getting behind schedule. I also helped to develop the design of the graphical user interface and the mapping portion of it that we are planning on implementing. Another task that I took on due to work load on other portion of the project was the website. I have assisted Ken, the web admin, in designing and updating the website as needed.

3. What technical communications have I done this semester?

Technical communication is a very important aspect in any design process. The ability to communicate technically can be applied to any industry/job. Over the course of this semester I have actively participated in a lot of technical communication. The first technical communication, being the initial group presentations, would be classified as a more general technical presentation as it was not meant to go into depth regarding technical aspects. I was 1 of 5 speakers for this presentation and was responsible for discussing our antenna in our design and also possible difficulties that we might run into this semester. The second technical communication that I was involved in was our group's technical lecture. My involvement in this communication was the aspect of general phase information, how it is calculated, and how, from phase, our group's design will arrive at an angle of arrival from a radio frequency. I was a speaker for both of these projects and was directly involved in their planning and execution. Being the presentation coordinator for our design group, I instrumented the schedule and topics that we presented. I also worked to ensure that all slides were in correct format and flowed together. I also was involved in all of the technical communication writing.

4. What is the impact of this course on my career objectives and professional goals?

With regards to my career objectives, this course has helped my objectives but has also taught me skills that will assist me in accomplishing my objectives. One aspect in which this course has impacted my career objectives is introducing aspects such as Six Sigma into my

skillset. In terms of what the impact of this course is, I believe that the course has helped me to better analyze and solve problems more efficient. These priceless skills will no doubt help me to meet my career objectives and professional goals.

5. What are my primary strengths and weaknesses?

I believe that my primary strength is my leadership. While I am not the direct leader of my design team I have been assisting and acting as a secondary leader to make sure that our design team is on schedule and accomplishing the tasks that we set forward. This strength is an important skill in business and any professional organization that I will be part of later in life. Another strength of mine is organization. This semester I have worked tirelessly to keep our design team organized, understanding and meeting deadlines, as well as organizing our data and files that have accumulated. This organization has allowed us to work more efficiently and prevent problems. One weakness that I exhibit is my lack of followership. I naturally prefer to take control of a situation and make the decisions. When being on the opposite end, receiving direction, I have a hard time trying not to incorporate myself in making important leadership decisions.

6. Where would I like to be professionally five years after graduation?

As I am pursuing a career in the United States Air Force, five years after graduation I would like to be the rank of Captain. While not difficult to attain in terms of competitiveness, achieving the rank of Captain within the first 5 years is looked highly upon. At the 5 year mark I would be ahead of the normal timetable for the rank of Captain. By achieving this, I would no doubt set myself up for success in further promotion and a longer career in the US Air Force. Furthermore, five years after graduation I would like to hold some type of management position. While engineering is truly my interest professionally, I would like to merge into an engineering management role rather than direct hands on work. I believe that this would help me with further promotions and would make me more marketable to the civilian industry.

7. What lifelong-learning steps must I plan to undertake in order to achieve this five-year professional goal?

The main lifelong-learning step that I plan to undertake in order to achieve this five-year professional goal is to receive my master's in business administration as soon as I am able to. By getting my M.B.A. as quickly as possible I am only increasing my value to employers and opening up opportunities to my career. A master's degree is looked highly upon in the military and can help in early promotions. An M.B.A. will directly affect my career and the rate in which

I am given more responsibility. Another step I plan to undertake that can be applied to any industry or career field is developing a mentor. A mentor can immensely help in giving you advice and helping to make you successful. A mentor can also help to make the transition to working full time much smoother. The quicker you can hit the ground running they better off you will be.

Appendix

Resume

See next page for resume.

Matthew D. Roach

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EXECUTIVE SUMMARY

Currently seeking internship or other full time summer opportunity where I can make a contribution and simultaneously continue my personal and professional development. Currently I am a scholarship Air Force ROTC Cadet at Michigan State University completing my Computer Engineering degree and will be commissioned as an active duty officer following graduation.

EDUCATION

Michigan State University

B.S. Computer Engineering, College of Engineering, Cadet - Air Force ROTC

East Lansing, MI
Expected Graduation - May 2014

- Cumulative GPA: 3.0/4.0
- Coursework: Electronic Circuits, Digital Logic, Algorithms, Data Structures, VLSI Design, Signal Processing
- Other Coursework: USAF Leadership Studies

PROFESSIONAL EXPERIENCE

CONTINENTAL AG

Summer Sales Analyst

Auburn Hills, MI
Summer 2010 / Summer 2011

- Worked with Ford Key Account Management team, JKOEM Key Account Management team, and various business units
- Created industry, company, and economic reports which were included in final project deliverables
- Assisted in sales and marketing research
- Presented to senior level management of Continental AG as well as Ford Motor Company
- Identified areas of sales where potential business is available
- Analyzed sales data and future production data to better understand future sales and business opportunities
- Constructed presentations and excel files used to plan sales and production for Continental employees in the United States, Europe and Asia
- Coordinated events and meetings that include both Continental AG and Ford Motor Company employees
- Worked with business units leaders to understand products that Continental offers to better demonstrate the efficiency and benefits
- Worked collaboratively with employees from Europe and Asia to effectively complete projects and tasks

LEADERSHIP AND EXTRACURRICULAR ACTIVITIES

UNITED STATES AIR FORCE RESERVE OFFICER TRAINING CORPS

Cadet Major

East Lansing, MI
Fall 2010-Present

- Currently charged with leading squad of 18 cadets
- Teach and lead Cadet Leadership Lab class once a week instructing cadets on Air Force history and leadership skills
- Manage detachment responsibilities in support of creating a successful and efficient cadet corps
- Participate in Cadet detachment administrative activities as needed
- Manage and schedule activities including Veteran's Day Ceremony and other AFROTC related events

COMPLETED AFROTC FIELD TRAINING

Montgomery, AL / Hattiesburg, MS
Summer 2012

- Completed month long basic training to develop skills as both a leader and team member
- Passed both physical and mental tests to analyze performance under pressure and time constraints
- Participated in activities to further grow confidence, human relations, and leader skills.
- Increased skills of organization, time management, delegation, and concentration to effectively complete requirements to graduate
- Learned to manage completion of unachievable tasks to evaluate performance and challenge of encountering failure
- Taught effective communication, planning, and organizational skill

COMMUNITY & OUTREACH ACTIVITIES

CHRISTIAN YOUTH MISSION TRIP

Logan, WV
Summer 2008

- Spent a week in severe poverty area working with local charity organization to prepare and deliver meals to home bound people
- Assisted with home improvements for residents unable to afford renovations

ADDITIONAL

- Interests include golf, technology, hardware, electronics, and military history.