

Senior Design Weekly Status Report

sdmay19-15: Capacitor Gun

Week 9 Report

November 3 - November 9

Client: Max Balzer

Faculty Advisor: Mani Mina

Team Members

Grant Larson — *Test and Report Engineer*

Max Balzer — *Meeting Facilitator and Production Engineer*

Bret Tomoson — *Projectile and Power System Designer*

Brett Nelson — *Safety Engineer*

Mark Fowler — *Test Engineer, scribe*

Zachee Saleng — *Engineer designer*

Summary of Progress this Report

We finished the parts list and got it to Lee to order. The parts should be here by Friday. We have started a Solidworks design to send to Mike for him to understand what we think the project will look like. The Solidworks design took up most of the week but we are splitting up into teams soon so that we can have enough time to complete the design and build the charging circuit when the parts come in. Max talked with Mike and set up a meeting time to go to his shop to start building the project.

Past Week Accomplishments

- SolidWorks Model- Mark
 - Began to work in SolidWorks to get familiar with the program, so we can collaborate on our design for the first test railgun.
 - Create a design for the railgun for discussion with the rest of the group.
- Power losses and metal machining- Max
 - I created a Solidworks design to be given to Mike so that he has an idea of what we are thinking in terms of a design.
 - I got the parts list to Lee in ETG so that they can get ordered. Lee said the materials should be here by Friday which would be good because we can start building the project.
 - I got in touch with Mike to set up a time to go back and build the project. I set up the time for the 17th so hopefully, he can still meet on that date.
 - I am still talking with my dad about finding a conductive grease to use and he should have that grease by the 17th for sure if not sooner.
- Small Scale design - Brett
 - Continue to work with SolidWorks to become more comfortable.

- Create a design on how I thought the overall design of the small-scale railgun was going to look like.
 - Discussed with the team and went over everyone's design and tried to figure out what we all liked and what we didn't.

 - Finished the parts list, went over SolidWorks, - Bret
 - Discussed the SolidWorks designs and ideas with the team members that finished on time.
 - Helped develop a plan that will allow us to finish our circuit build and SolidWorks test model by next Friday.
 - Developed a Solidworks model for the small-scale railgun that can be adapted to a final version next week.

 - Worked on a SolidWorks model for our railgun -Grant
 - Learned the basics of SolidWorks
 - Created parts to be assembled
 - Assembled a design based off my imagination/understanding

 - Worked on the design parts. - Zachee.
 - Worked on the parts list, looking for different characteristics such as charge circuit and wires
 - Had meeting on area of professional responsibility.
 - Navigate through install solidWorks for exploration
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Pending Issues

- The test projectile design must be rectangular or square so that it doesn't tumble in the barrel. This basically rules out a bullet unless we fit it with fins which will be left as a 2nd-semester goal.
 - Mike underestimates the amount of current and heat we think our project will output. The plastic he recommended looks as if it will melt at a temperature we think we will reach.
 - Build a SolidWorks model of test-design.
 - Build a charging and discharging circuit.
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Plans for Upcoming Reporting Period

Wait until the parts get in so we are able to build and test the charging and discharging circuit. Use SolidWorks to model what we want the overall design of the small-scale model to be. Once that is obtain, then start building the small scale model.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Grant Larson	Worked on my SolidWorks design for a majority of the week. The design, once compared to other group members designs, will give us insight on what we all think the final product will look like. This was mainly practice for when the group makes an official design to send to Mike for implementation	7	57
Max Balzer	I worked on the Solidworks design most of the week so that I could have that done by our meeting time. We need a perfect drawing on Solidworks on how we think it will look like so that we can send it to Mike for him to understand what we are thinking. I also got the parts list to Lee and talked with Mike to set up a time for us to come down to his shop to start building the project. Lastly, I am still actively finding a grease for us to use for the barrel of the project.	15	77
Bret Tomoson	I created a Solidworks design of the small-scale railgun with what I view the design as. I discussed with team members the differences in our designs to examine what will work best for the final design.	10	78

Brett Nelson	I was using SolidWorks to become more comfortable with it. This has allowed me to come up with a version one of a small scale design for our model.	10	61
Mark Fowler	Worked with SolidWorks. Learned the basics of the program and began work on my individual design of the railgun enclosure.	8	58
Zachee Saleng	Watched video to learn how to use SolidWorks to become more comfortable with it. Designed a prototype of the schematic design, It wasn't really easy for me. I never used solidworks. I am still working on it.	14	68

Plans for the Upcoming Week

- In the coming weeks, we will be working on: - Zachee
 - .I will finish my design on solidworks.
 - I will start work design document.
 - If all the parts arrive, I will start working on whatever section will be assigned.
- Solidworks design - Mark
 - Finalize design, begin and finish work on charging circuit depending on which group I am in.
 - Send our design to Mike, prepare for work day at the shop
- Finalizing my design and solidifying a building date - Max
 - I am going to finish my Solidworks design so that we have a good idea on how it is supposed to look from our end so we can send it to Mike for review.
 - Call Mike later to make sure the 17th still works for him to have us come down and start the building process. If not we will have to find time during the week to head down there and work on it.
 - I will get the materials from Lee whenever they come in. He said by Friday so I hope that's right. That way we can split up into teams to work on the Solidworks design and building the charging circuit.
 - I will keep on my dad for that conductive grease. It isn't the most important

thing at this point but it is something we will definitely need.

- I will go with Bret to talk with the Ames Police for the safety of bringing our project to campus for demo. We won't fire it on campus but we will need approval to bring the actual model onto campus for our demo.
 - Continue to work on designing a small scale model - Brett
 - Start adding more to my current design in Solidworks
 - Connect the capacitor bank to the rails
 - Make a block for the charging circuit and place it on the overall design
 - Do the same for the discharging circuit
 - Overall, clean it up, make it look it but keep it simple
 - Charging circuit build - Bret
 - Make sure the group has a common idea of the final physical design before splitting up into separate groups.
 - I will be working on the charging circuit team to put the parts together and test if the capacitors can be charged and discharged in a safe and reliable manner.
 - Create a complete formula sheet for all calculations to do with the Railgun - Grant
 - Write down how to easily find energy, current, and other variables given design dimensions
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Gitlab Activity Summary

Nothing to report.
