Jusefs Saade
03/30/2024

Engineering Notebook

1. 1/11/2024 - Class: Discuss what needs to be accomplished since last semester. Updated the backlog and product vision for our microwave ground tracking station, focusing on ordering parts, meeting with product owner, getting guidelines for design. Also sent out When2Meet for Dr. Rojas meeting. Went over our plan for this semester, and wrote up an email to send to product owner.

2. 1/16/2024 – Class: Update product vision since last meeting but we have been told to add contingency plans in case the project falls through and we cannot order ant parts. Still no contact from product owner. Began completing backlog. Updated github page for this semester. Researched geosynchronous satellites to test SDR, and antenna.

3. 1/18/2024 – Class: Still no contact from product owner. We have begun, thanks to help from Dr. Fan Yang and Dr. Akbas, to compile a contingency plan, to use older parts from previous senior design group. I contacted JT, a TA and fellow research student at WiDE Lab for some advice on the project as he was on the previous senior team. He told me to do documentation on testing his old station as contingency and build new one with his old parts.

4. 1/19/2024 – Finally contact with product owner. He advised us to contact JT… As he is busy. But we are still trying to find meeting time with him.

5. 1/23/2024 - Finalizing product vision and backlog. Ready for turn in tomorrow. Still cannot meet product owner, getting help from JT. On beginning RF block design, link budget analysis, antenna analysis to determine satellite we could receive from. Nevertheless we updated Dr. Rojas by email of our progress and current situation.

6. 1/25/2024 - No luck on antenna, satellite research. Still looking into RF block and budget link analysis since we cannot get transmit power, gain for different satellites. Answer to Dr. Rojas email about his concerns, to better understand his vision. Met with JT to catch him as we did to Dr. Rojas.

7. 1/30/2024 – Micaplex WiDE Lab meeting with JT, divided work up again. Got a lot of insight on RF block, link budget. Step one is to analyze the frequency spectrum of the antennas we have access to. There are 3.

8. 2/1/2024 – Updates to Dr. Rojas. Awaiting Dr. Rojas to get permission to order, update us on contingency plan, and new direction from JT. Some SDR testing.

9. 2/6/2024 – Ian tested SDR and software by using FPGA as AM radio.

10. 2/7/2024 – Prepared my slides and diagrams for sprint 1 demo tomorrow.

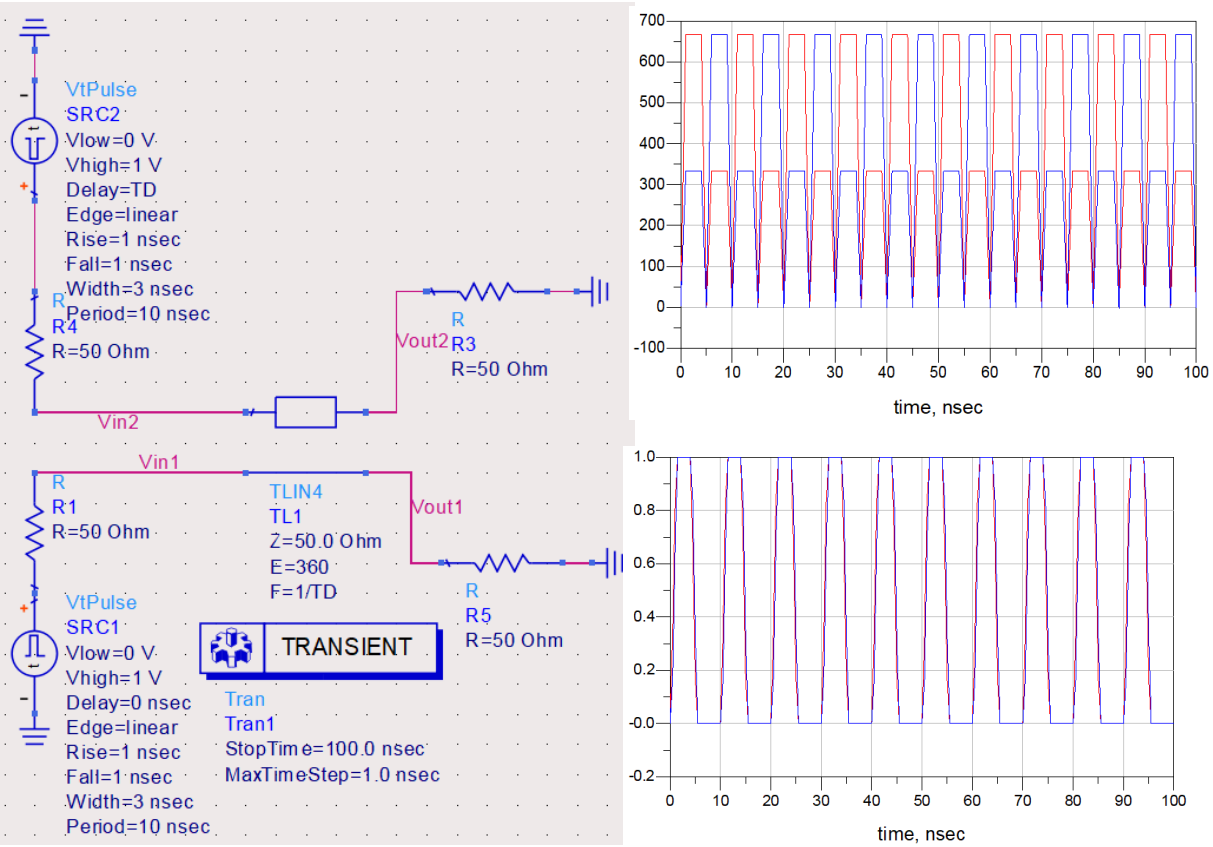
11. 2/8/2024 – Group presentation Sprint 1. Talked about RF block and Link Budget.

12. 2/13/2024 – Dr. Rojas is sure we will not be granted the new positioner. Our plan is now reverted to original 1st semester capstone I vision we had prior to meeting with Dr. Rojas. Taking over JTs project and making it work. But not even that we have to start from scratch using junk.

13. 2/15/2024 – Tried to analyze frequency spectrum of antenna, failed. Going to request assistance from JT next week. (UPDATE: need to use spectrum analyzer… I was trying to make one using oscilloscope and RF source. Will try again next week to get results for link budget and rf block design.)

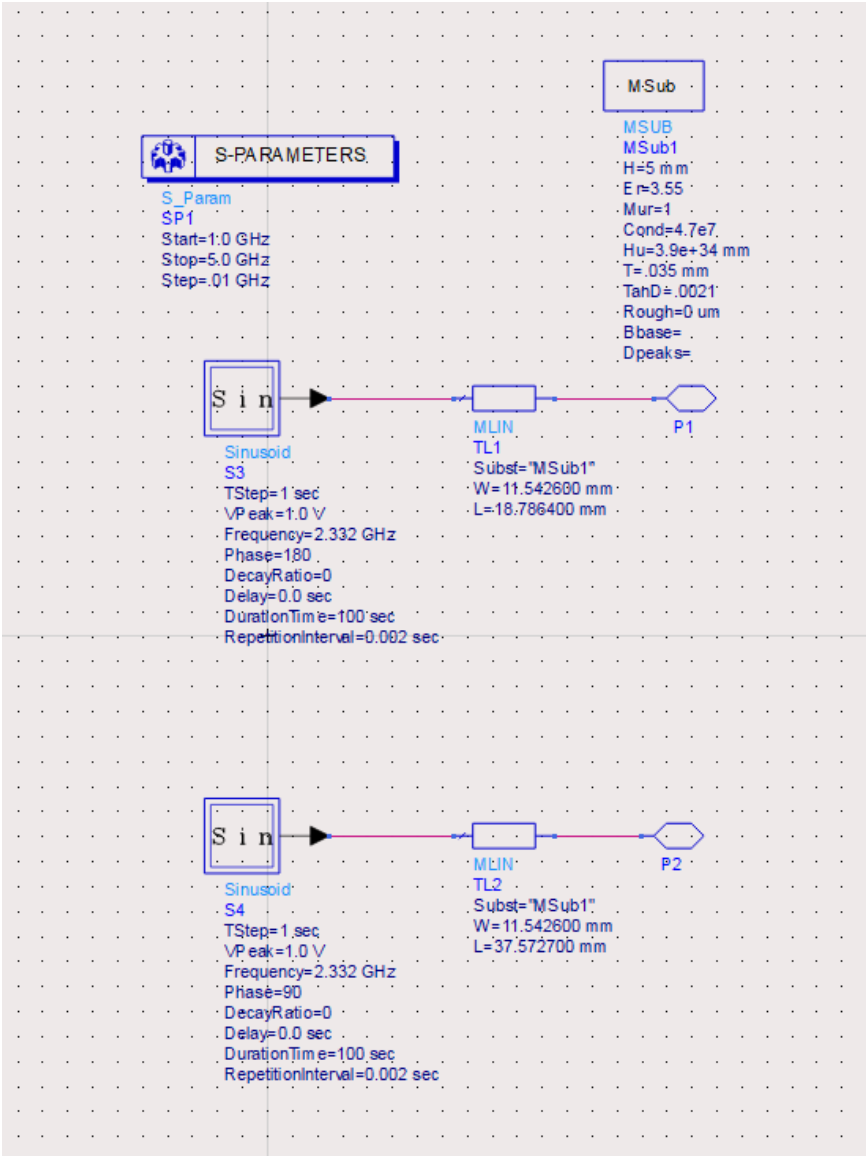
14. 2/20/2024 – Began research on polarizer. Found youtube video on polarizer design.

15. 2/22/2024 – Made original design.



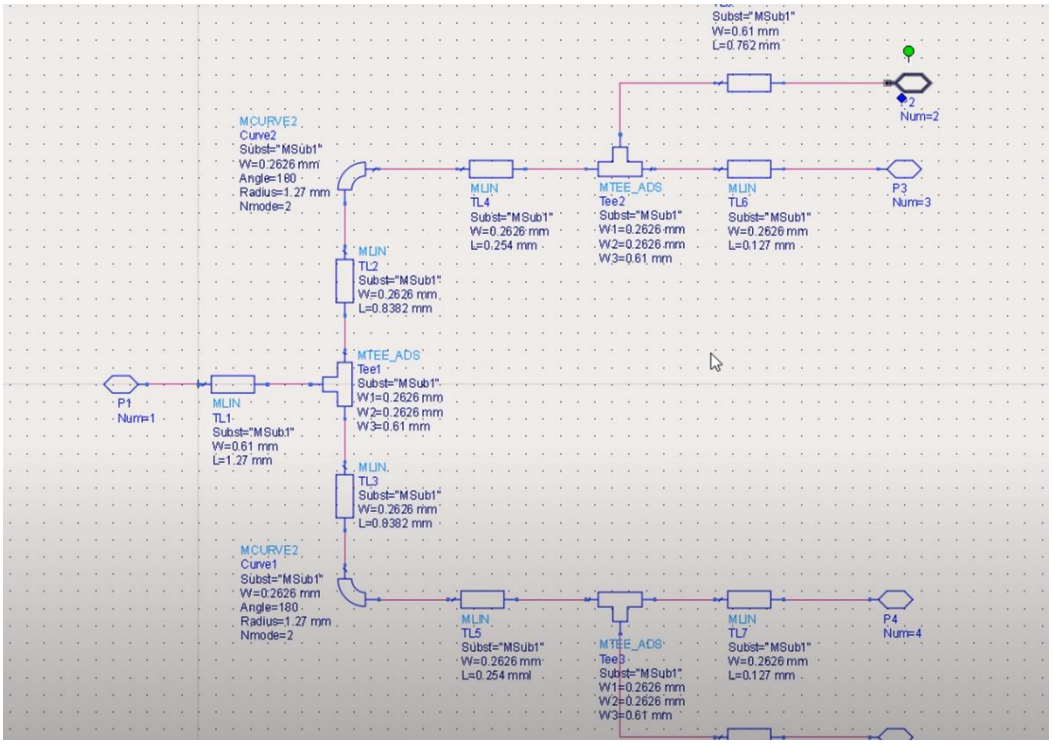
16. Began research on combiner. Specifically, the Wilkinson power divider/combiner. Also had useful notes from EE 430/(L) that helped me figure what how to make design them.

17. 2/27/2024 - JT advised me to revise my polarizer design, told me that it was wrong. I redid it using linecalc and MLIN on ADS.



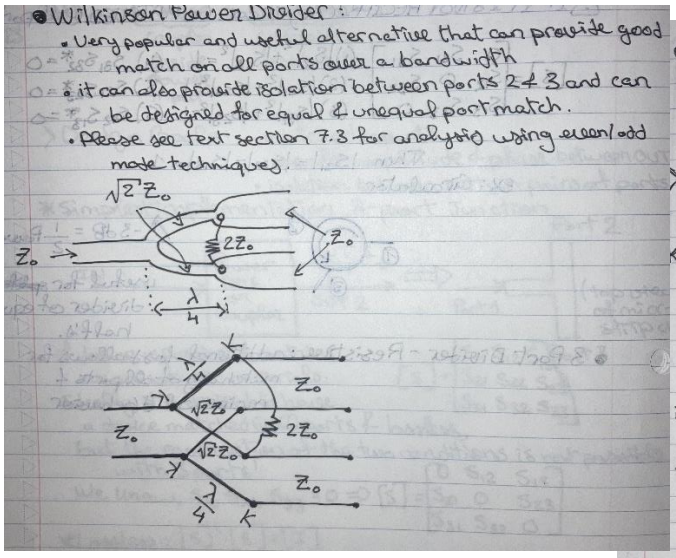
18. 2/29/2024 – Helped get equipment from lab, including two COAX connectors, we were missing power and communication cable for Positioner controller.

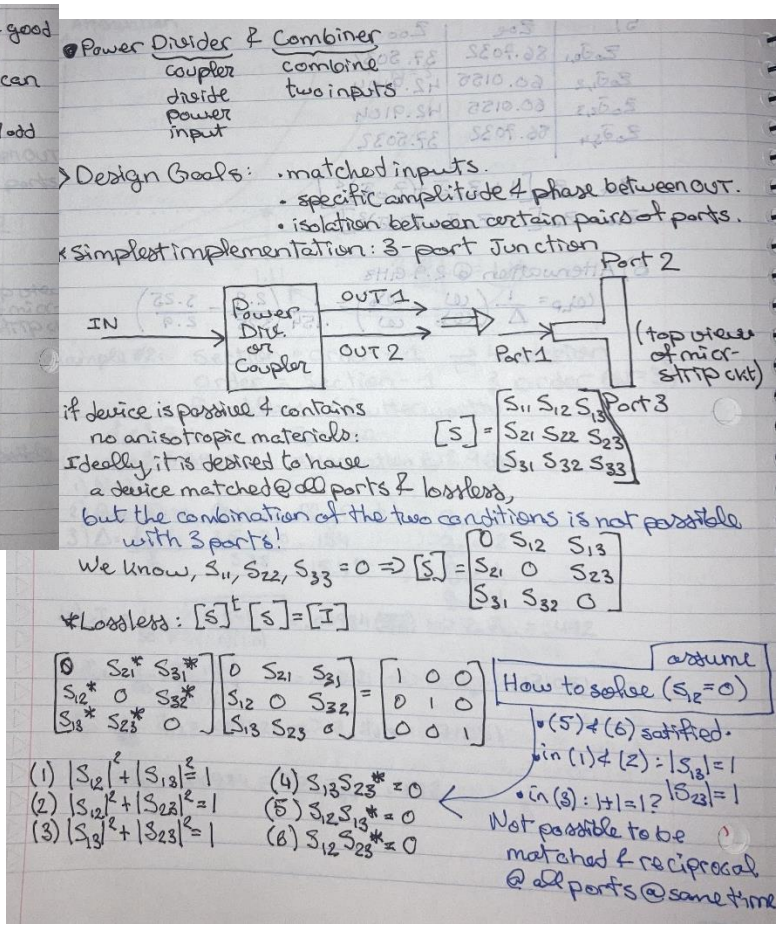
19. 3/05/2024 – Meeting with JT, told me to start designing combiner on ADS. So I began and made a preliminary design. Found this design online later after meeting with JT.



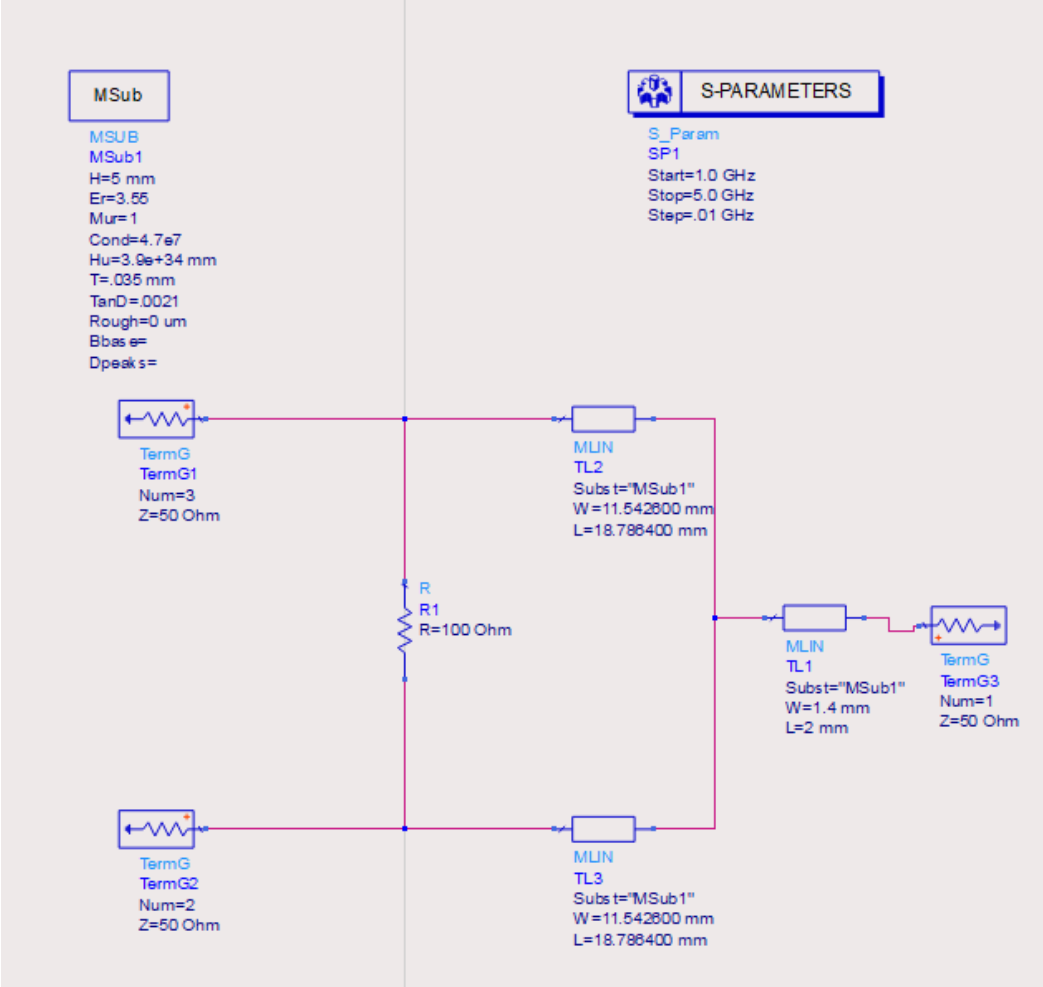
20. 3/07/2024 – JT said this was not the correct setup to keep looking.

21. 3/12/2024 – Kept researching combiner design guides with no luck, excedpt for class notes.





22. 3/14/2024 – Made new design for combiner.



JT still does not approve.

23. 3/18/2024 – Reviewing polarizer design and trying to incorporate combiner.

24. 3/21/2024 – Career Fair – tried to incorporate filter to polarizer and combiner.

25. 3/26/2024 - Ordered power cable and com cable for tracking/positioning and SDR.

26. 3/28/2024 – Received cables and dropped of at lab. Team review of progress. I did not figure out Wilkinson power combiner yet and it seems that based on my polarizer design we would not receive anything. Have to re-design.