2 Project Plan

2.1 PROJECT MANAGEMENT/TRACKING PROCEDURES

This would allow us to go for an agile project management to continually update project requirements as needed and s
change or design aspects of the project might be different than currently thought. We will also be using GitLab to store

2.2 TASK DECOMPOSITION

In order to solve the problem at hand, it helps to decompose it into multiple tasks and subtasks and to understand inter
linear progression of completed requirements aligned with your sprints for the entire project.

Hardware:

1) Find dimensions of the openings of the anechoic chamber
    a) measure both the width and depth of the chamber openings
2) Using Fusion 360, create a design for a piece to attach to the anechoic chamber
    a) We will need two sides, one side for the stationary horn antenna, and the other will be for the rotating I
3) Using Fusion 360, Create a design for a piece to attach to the previously designed piece
    a) This piece will contain the motors, gears, horn antenna, and the motor controller and raspberry pi
4) Using Cura slicer, create .stl files to be able to 3d print the parts
5) 3D print the parts
    a) We will be using ABS as our filament
6) Test fit assembly
    a) Test fit the assembly on all components, ensuring that all fit and operate as intended
7) Develop firmware for motors to be able to rotate
    a) There will be two motors controlling different angles of measurement of the horn antenna, they will nee
8) Add miscellaneous components
    a) The design will consist of various fasteners, such as heat set threads and radar absorbing foam. Once

Software:

1) simulate dummy data and convert file type to binary file to hold a lot of information
    a) convert file types to binary files
    b) convert binary files back to viable readings to plot
2) start design of desktop application that will allow you to run scripts to run the hardware and have plotting data f
    a) UI design of application with button layouts and formatting
    b) develop applications plotting UI and script running capability
3) use the dummy data and pythons extensive libraries to plot data points on a polar plot
    a) send it dummy data
    b) plot the data with python libraries on a polar plot
4) allow downloadable pdf of plots and data that goes along with the polar grid
    a) develop button on UI
    b) button allows download to host computer's hard drive
5) run multiple tests of multiple sets of dummy data.
6) integrate firmware with software to test real time data plotting

a) test and verify correct data is sent
b) monitor UI for correct plotting of data

2.3 PROJECT PROPOSED MILESTONES, METRICS, AND EVALUATION CRITERIA

What are some key milestones in your proposed project? It may be helpful to develop these milestones for each task a
each task. The milestones should be stated in terms of these metrics: Machine learning algorithm XYZ will classify with
accuracy target might go up to 90% from 80%.

In an agile development process, these milestones can be refined with successive iterations/sprints (perhaps a subset

Hardware:

1) Obtain measurements of anechoic chamber
    a) All measurements obtained should be within $\pm$ 1 mm
2) Create Fusion 3D schematic for mounting assembly
    a) Less than $\pm$ 1 mm of interior dimension of anechoic chamber openings
3) Create Fusion 3D schematic for receive side aft piece
    a) Less than $\pm$ 1 mm of interior dimension of anechoic chamber openings
4) Create Fusion 3D schematic for transmit side aft piece
    a) Less than $\pm$ 1 mm of interior dimension of anechoic chamber openings
5) Mount parts inside of printed pieces ensuring that things are working correctly
    a) Less than $\pm$ 1 mm of exterior dimension of components
    b) Face should be $\pm$ 1 mm flush with interior of chamber
    c) Cables should have $\pm$ 1 mm of clearance into the printed assembly
6) Check compatibility of parts inside of printed assembly
    a) Motors should move gears with a resolution of 1.8$\circ$
    b) Horn antenna should have 60$\circ$ of rotation direction in both rho and phi directions
   c) Response time should be < 1ms

Software:

1) simulate dummy data and convert file type to binary file to hold a lot of information
    a) convert file types to binary files

       -need to be converted within 1 minute

       - needs to include 100% of previous data

2) start design of desktop application that will allow you to run scripts to run the hardware and have plotting data f
    a) UI design of application with button layouts and formatting

       - A user should be able to navigate and understand the layout within first time of use

       - In this sprint client should like and approve of design

    b) develop applications plotting UI and script running capability

       - needs to be able to run a script within 3o seconds of button click

3) use the dummy data and pythons extensive libraries to plot data points on a polar plot
    a) send it dummy data

       -needs to be able to handle 10 mb of binary file size with dummy data

    b) plot the data with python libraries on a polar plot

       -acceptance test the polar plotting of radiation data. This data should be correct and verifiable

       -10 degree of rotation for the antenna should be handled and plotted correctly with data precise to the

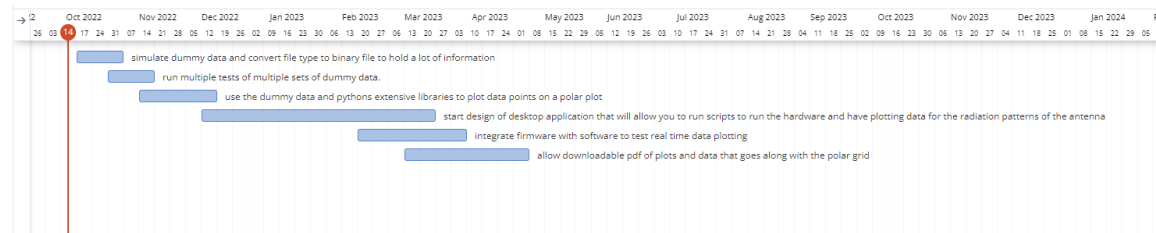4) allow downloadable pdf of plots and data that goes along with the polar grid

a) button allows download to host computer's hard drive

-This file needs to download to host computer within 1 minute of pressing button

2.4 Project Timeline/Schedule

Hardware:
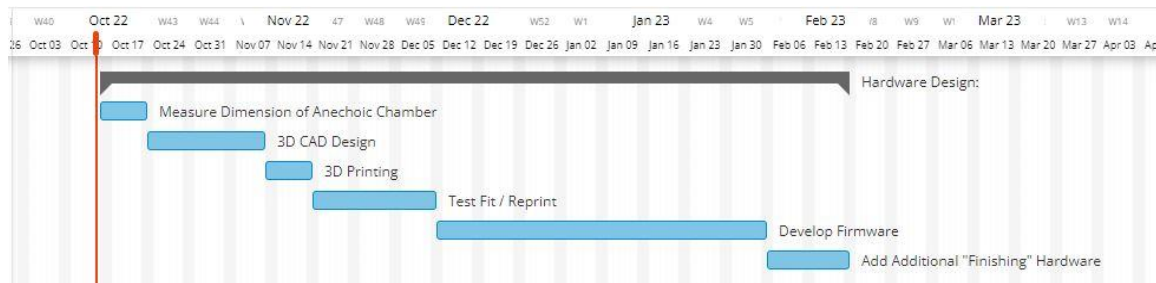
Software:

2.5 Risks And Risk Management/Mitigation

Consider for each task what risks exist (certain performance target may not be met; certain tool may not work as expe
mitigation plan. Can you eliminate that task and add another task or set of tasks that might cost more? Can you buy so

Hardware:

9) Find dimensions of the openings of the anechoic chamber

risk - .1

10) Using Fusion 360, create a design for a piece to attach to the anechoic chamber

risk -.4

11) Using Fusion 360, Create a design for a piece to attach to the previously designed piece

risk -.3

12) Using Cura slicer, create .stl files to be able to 3d print the parts

risk - .1

13) 3D print the parts

    risk -.3

14) Test fit assembly

risk - .3

15) Develop firmware for motors to be able to rotate

risk -.6

Firmware must be compatible with software for the system to provide usable results. This risk can not be mitigated, thu

16) Add miscellaneous components

risk -.2

Software:

1) simulate dummy data and convert file type to binary file to hold a lot of information

risk - .2

2) start design of desktop application that will allow you to run scripts to run the hardware and have plotting data f

risk - .3

3) use the dummy data and pythons extensive libraries to plot data points on a polar plot

risk -.1

4) allow downloadable pdf of plots and data that goes along with the polar grid

risk -.1

5) run multiple tests of multiple sets of dummy data.

risk -.1

6) integrate firmware with software to test real time data plotting

risk-.6

This can not be mitigated by another technology or off the shelf item. The hardware must interface with firmware and g

2.6 PERSONNEL EFFORT REQUIREMENTS

Include a detailed estimate in the form of a table accompanied by a textual reference and explanation. This estimate sh

Hardware:

Task 1 hours: 3
Task 2 hours: 10
Task 3 hours: 20

Task 4 hours: 4	
Task 5 hours: 10	
Task 6 hours: 15	
Task 7 hours: 50	
Task 8 hours: 5	

Software:

hours: 20	task 1: 20	task 1a: 15	task 1b: 5
hours: 20	task 2: 20	task 2a: 10	task 2b: 10
hours: 16	task 3: 16	task 3a: 1	task 3b: 15
hours: 4	task 4: 4	task 4a: 2	task 4b: 2
hours: 2	task 5: 2		
hours: 30	task 6: 40	task 6a: 15	task 6b: 15

2.7 OTHER RESOURCE REQUIREMENTS

Identify the other resources aside from financial (such as parts and materials) required to complete the project.

We will need and have access to a 3d printer to build components to stabilize and mount certain parts that we need to application if we want to store the results of the scan. Also, we will need access to a VNA or signal generator to be able

This would allow us to go for an agile project management to continually update project

requirements as needed and show bits of the project to our client to make sure he accepts the

design. We chose this because we anticipate that requirements might change or design aspects of

the project might be different than currently thought. We will also be using GitLab to store any

code for the application and Discord for any communication we need to do outside of class.