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# Goals

Waveform reconstruction continued, test hardware, and focus on the simulation aspect in particular

# Problem

Part of the simulation is to simulate the RF signal and the AOA calculation. Therefore, it’s important to simulate the hardware of the system. The entire simulation process will generate RF sine waves, down converts them to IF, quantizes the signals to simulate the ADC stage, and then uses the DF algorithm to calculate the AOA.

# General approach

The signal generation code I have right now just sets frequency as an user input parameter so that once we’ve decided on a frequency value, I can easily set it. I also add a plotting function to it so that the signal generated can be visualized. Matlab provides a very detailed explanation and tootlbox on implementing a Digital Down Converter. For the quantizer, I have used a partition length of 12 intervals since it is a 12-bit quantizer that I will be using. For the past week, I checked the source code on Sam Whiting’s Github and they have source code for the cross-correlation as well as the MUSIC algorithm (MUSIC stands for Multiple Signal Classfication, which is an algorithm used for direction-of-arrival estimation). I tried to integrate their code with what I have written so far. However, I’m having a lot of bugs while doing the integration. I have fixed some, but as for now, I’m having issues with generating the correct inputs to the auto-correlate algorithm. The MEng team also submitted the poster to Blackboard and prepared for the poster session on 5/8. I was planning to start doing the documentation but the debugging took longer than I thought and I will do that in the coming week).

# Planned Course of Action

# Finish integrating the code and resolve bugs? (May need the multiple-antenna setup to test this)

# Work with the team to do trial-and-error testing after the cross-correlation and MUSIC algorithm.

# Start to document the materials for this semester and write detailed annotation

# Start to work on the end-of-semester progress report

# Question to group: Anyone having experiences with speeding up Matlab on laptop? I have used school computers but they are a little inconvenient to access sometimes and working on laptop is easier but it keeps breaking the laptop. Couldn’t find satisfactory answer online.

# Resources and relevant Forum Posts

# Sam Whiting’s github source code:

# <https://github.com/EttusResearch/gr-doa/tree/master/lib>

# How to speed up Matlab:

# <https://www.mathworks.com/matlabcentral/answers/258792-matlab-2015b-on-mac-running-very-slowly>