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**4/17/2018**

**AMRUPT, Spring 2018**

# Goals

Waveform reconstruction continued, test hardware, learn GNU radio 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. Last week, I mainly focused on setting up the SDR-RTL Hardware Support Package, which failed in the end without the actual hardware, and I also wrote untested code for signal generation.

# General approach

Last week, I first tried to install the SDR-RTL Hardware Support Package with Matlab. However, I did it without the actual SDR-RTL hardware. I’m not sure if this is the problem, but after it failed to install the package for a few times, my laptop just went dead and wouldn’t turn on. I had to send it back to Mac repair center to get it fixed (according to tracking info, I should get it back this Thursday). Therefore, I switched gear to code. 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. Matlab also provides a very detailed explanation on implementing a Digital Down Converter (link is provided below), which is really helpful for this week’s work).

# Code-level problems and solutions, and empirical testing

Signal Generation Untested Code, could add GUI to make it visual and more clear

function test = FirstTestScript(fs,T,edge,f);

%fs sampling frequency

%T total sig length

%edge decay parameter

%f modulation frequency

%amplitude is 1

t=-T/2:1/fs:T/2;

%specifies signal length

sig=(T/8/edge)^2;

y=exp(-(t).^2/sig);

%guassian pulse

if f~=0

y = y.\*cos(2\*pi\*t\*f);

end

%modulation

test=y./max(abs(y));

# Planned Course of Action

Re-try to do the setup with the hardware later this week;

Test existing code block with the signal generator and SDR-RTL hardware

Down converting implementation

GNU radio instead of Matlab? (Still need to read more on this)

# Resources and relevant Forum Posts

# RTL-SDR Support Package Hardware Setup: <http://www.mathworks.com/help/supportpkg/rtlsdrradio/ug/support-package-hardware-setup.html#bunsvm7-34>

# Matlab Simulation Model: <https://pdfs.semanticscholar.org/66f7/d0d7e1bed27acc37b5721f4abe649f9a053e.pdf>

# Matlab Digital Down Converter:

# <https://www.mathworks.com/help/dsp/examples/design-and-analysis-of-a-digital-down-converter.html>