

# EE / CprE / SE 491 –sdmay20-03

## NOAA GEOS-R Satellite Receiver

### Bi-Weekly Status Report 4

02/28/2020 – 03/12/2020

Client: N/A

Faculty Advisor: Nathan Neihart

#### Team Members:

Nick Butts — *Software Group*

Rudy Lim — *Software Group*

Jonathan Massner — *Systems and RF Group*

Ted Mathews IV — *RF Group*

Riley Stuart — *ADC Group*

Jordan Tillotson — *ADC Group*

#### Past Week Accomplishments

- Antenna modifications - Jonathan Massner
  - Researched possible solutions for not seeing signal
  - Troubleshooted antenna; currently trying to find location without wifi interference
- Filtering and ADC - Jordan Tillotson
  - Designed Sallen Key filter
  - Researched differential opamps for Sallen Key filter and gain stage
- Data acquisition work - Riley Stuart
  - Researched speed limitations and applications of data acquisition on RPi4
  - Tested max toggle speed of 8bit GPIO
  - Began code for writing binary data on RPi4
- Finished frame synchronization code - Nick Butts
  - Cleaned up the code and added documentation notes
- Completed Viterbi Decoder - Rudy Lim
  - Compiled and ran Viterbi Decoder
  - Viterbi Decoder works with frame synchronization
  - Successfully found sync word in the data
- ADRF and LNB board development - Ted Mathews IV
  - Debugged initial issue with ADRF board and replaced loop filter
  - Spec'd power system for LNB and implemented in the schematic.

#### Pending Issues

- ADRF Board is still not outputting the correct LO with the replaced loop filter. Deeper debugging is required, but with the university shutting down the required hardware to accomplish this may not be available.

## Individual Contributions

Team Member	Contribution	Weekly Hrs	Total Hrs
Jonathan Massner	Antenna work	6	77
Nick Butts	Finished code for frame synchronization	10	95
Ted Mathews IV	Debugged and repaired ADRF board. Worked on LNB power system and added to the schematic. Continued ADRF driver development and LNB layout.	19	149
Jordan Tillotson	Filter design and implementation	4	73
Rudy Lim	Completed Viterbi Decoder	6	68
Riley Stuart	Research and tested RPi4 GPIO speed and applications.	5	85

## Plans for Coming Week

- ADC/DSP - Jordan Tillotson
  - Complete filter and ADC design
  - PCB design and layout complete
- ADC/DSP - Riley Stuart
  - Continue tests on RPi4 data acquisition limitations
  - Research alternative approaches for data acquisition
  - Finalize code for RPi4 binary data
- RF - Jonathan and Ted
  - Observe signal on SDR and check locations outside of the courtyard
  - Finish LNB layout and submit to Dr. Neihart for a design review.
  - Finish ADRF driver and debug LO issue.
- Software - Nick and Rudy
  - Use Reed Solomon Error Correction to correct bit errors from the Viterbi Decoder.
  - Start working on Virtual Channel Demuxer