EE / CprE / SE 491 –sdmay20-03
NOAA GEOS-R Satellite Receiver
Weekly Report 3

10/13/2019 – 10/26/2019
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
- IQ Demod Research - Jonathan Massner
  - Conducted research into IQ demodulator implementation
  - Researched using Altium as a CAD tool for schematics
- ADC Development - Jordan Tillotson
  - Further research into useful microcontrollers with desired ADC capabilities
  - Compared development boards for use (decided on Nucleo-32)
- ADC Development - Riley Stuart
  - Researched necessary parameters used within ADC use.
  - Compared microcontrollers for project use.
  - Learned about decoding and encoding theory.
- Worked on Viterbi decoder and frame synchronization - Nick Butts
  - Learned about theory
  - Built simple MATLAB frame synchronizer
- Found CCSDS space packet protocol - Rudy Lim
  - Identified relevant information needed for decoding the raw binary data.
  - Identified relevant concepts such as Convolutional Encoding and Reed Solomon needed for decoding the data.
- Research and Schematics- Ted Mathews IV
  - Finished IQ demodulator research and determined ADC requirements as well as found an ADC/uC that should fit both rolls.
  - Began creating schematics for both rf boards in altium

Pending Issues
- Decoding techniques
  - Process for decoding is very complicated and will require a lot of development time to implement on our own; may look into alternate methods
- Board and schematic development
  - Schematics and PCBs for ADC, RF processing, and IQ board all need developed to allow continued development of final product

Individual Contributions

Team Member	Contribution	Weekly Hrs	Total Hrs
Jonathan Massner	Researching IQ demodulator implementation and breakout board ideas	5	25.5
Nick Butts	Began piecing together how to structure the decoder	10	35
Ted Mathews IV	Defined ADC Requirements and suggested an ADC, Began creating eval board for ADRF6850, Began LNB schematic in Altium	13	43
Jordan Tillotson	Researched development boards, ADC specifications, and microcontrollers	7	26
Rudy Lim	Software Research	3	22
Riley Stuart	Research decoding process and theory, find ADC, further define signal requirements.	4	25

Plans for Coming Week

- ADC/DSP - Jordan and Riley
  - Continue working through Nucleo-32 code for processing incoming signals
  - Complete ADC design requirements.
- RF - Jonathan and Ted
  - Complete feed horn redesign and start feed horn testing.
  - Setup test system in courtyard and verify signal availability.
  - Continue working on schematics and defining component requirements based on part datasheets.
- Software - Nick and Rudy
  - Look through CCSDS Document and identify relevant information
  - Learn about Reed Solomon and Convolutional Encoding
  - Learn about Viterbi decoding - in particular soft decoding