

EE / CprE / SE 491 –sdmay20-03

NOAA GEOS-R Satellite Receiver

Weekly Report 1

9/2/2019 – 9/23/2019

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

- Define and research system requirements - Jonathan Massner
 - Determined system requirements
 - Research RF and DSP fundamentals
- Research possible ADC system components and filters - Jordan Tillotson
 - Need: Bandwidth 10x sampling rate
 - Digikey search for RF specific ADCs
 - Found SAWBird filter to filter incoming signal and provide low noise amplification
- Research system overview - Riley Stuart
 - Learn about the different components within our system block diagram.
 - Research potential resources for signal information, example projects, decoding approaches.
- Software Research - Nick Butts
 - Learn about file format of transmitted data
 - Look for more documents on how to decode binary data
- Research on system software- Rudy Lim
 - Looked up documents related to system software
 - Acquired flowchart to be used as a guide for system software
- RF system design and subteam education - Ted Mathews IV
 - Created overview presentation for other team members to brief on project goals and how the system will work overall.
 - Created subteams and defined their tasks to focus team members onto a specific area of research.
 - Research into RF components needed for the LNA, Filtering, Mixing, and demodulation.
 - Reached out to vendors about component availability.

Pending Issues

- DSP may be done on Rpi and needs to be investigated
- RF components need impedance matching throughout the system
- RF mixers and demodulators have to downmix to low enough frequency for our ADC
- The best software language is undecided and is currently being investigated

Individual Contributions

Team Member	Contribution	Weekly Hrs	Total Hrs
Jonathan Massner	System research and learning	16	16
Nick Butts	Software research	8	16
Ted Mathews IV	Full system block diagrams, Create presentation for initial meetings, Ground-work research for other teams, RF component search.	18	18
Jordan Tillotson	System Research and ADC	5	15
Rudy Lim	Software Research	16	16
Riley Stuart	RF, ADC, Software Research	5	15

Plans for Coming Week

- ADC/DSP - Jordan Tillotson
 - Narrow in on ADC components
 - Spice simulations
 - prototype/PCB design
- ADC/DSP - Riley Stuart
 - Narrow ADC/DSP approach
 - Research more on decoding approaches
- RF - Ted Mathews IV and Jonathan Massner
 - Research LNA, Mixers, and BPF components
 - Look into transceiver modules
 - Choose antenna
- Software - Nick and Rudy
 - Research on GEOS data packet and concepts related to encoding
 - Look into concepts regarding sampling theorem