EE CprE 491 – May 20 - 49
CySat Senior Design Team
Week 27 Report

February 20, 2020 – February 26, 2020
Faculty Advisors: Phillip Jones

Team Members:

Bryan Friestad —— *Team Lead / EPS Lead / OBC Lead*
Ryan Hansen —— *SDR Lead*
Chase Kirchner —— *Ground Station Lead*
Kyle Muehlenthaler —— *UHF Lead / Ground Station Secondary*
Talon Stromgren —— *Boost Board Lead / SDR Secondary*
Xiangzhu Yan —— *ADCS Lead*

Past Week's Accomplishments

- OBC: No direct OBC progress this week.
- ADCS: Implemented remaining commissioning steps. Emailed Dr.Lee to request a meeting for the plan to test the code for ADCS commissioning steps. [Xiangzhu]
- SDR: Implemented packet commands to start the Radiometer application python script that Matthew Nelson created over UART and pass customizable parameters. Started soldering carrier board components. [Ryan]
- EPS: All read functions are implemented. Written EnduroSat to determine which version of the I2C document we should use for the EPS. Testing a number of the EPS read functions. Developed a couple of methods for calculating the energy consumed by the EPS [Bryan]. Made a switch to easily turn on/off the eps module for quick restarts [Ryan and Bryan].
- Ground Station: Checksum Packet Implementation (similar to TCP), continued testing to find any bugs [Chase]
- UHF: Got the UHF transceiver on the stack with the EPS and OBC. It runs a program which continuously polls the UHF transceiver software version [Kyle and Bryan].
- Analog Components:

Pending Issues

- How can we determine how much energy is being generated by the solar cells?
  - We have +/- face currents for each axis, but only one voltage. What does this mean?
- Weird EPS I2C discrepancies, emailed ES
- JX Headers are very difficult to solder.
- Boost board mosfet ended up being connected wrong again. Footprint in Kicad was mirrored. Issue was fixed in Kicad, and mosfet pins were bent upside down so we will still be able to test the board solo.

Individual Time Contributions

Team Member	In lab hours	Outside lab hours	Total Weekly Hours	Last Week Hours	Total Project Hours	Attend Gen. Meeting?
Bryan Friestad	12.5	4.5	17	15	166	yes
Ryan Hansen	12	3	15	15	151	yes
Chase Kirchner	0	8	8	6	111	no
Kyle Muehlenthaler	7	7	14	10	123	yes
Talon Stromgren	9	0	9	10	127	no
Xiangzhu Yan	0	8	8	14	124	no

Description of Work contributed

Team Member	Contribution
Bryan Friestad	Finished implementing all base EPS read functions. Fixed some issues with the UHF I2C code, using the updated (from new firmware) ESTTC software version command. Started working on calculations for determining battery capacity and discharge over time. Read up on the documentation for the solar arrays.
Ryan Hansen	Continued writing code for startup SDR python script. Expanded on commands it can handle. Command for taking a payload measurement developed with adjustable parameters for configuration can be sent to SDR and it runs the GNU Radio application script. Files with dynamic names based on set SDR time are configured to be saved. Started working on the carrier board with Talon before he left town. Solder paste was not working so I have started hand soldering the headers onto one of the blank boards.
Chase Kirchner	Researched checksum solutions and implemented checksum for packets similar to TCP. Continued testing GUI to find any bugs.
Kyle Muehlenthaler	Fixed issues with test function and made functions to convert hex crc to asci and ascii crc to hex. Read into new documentation including crc32
Talon Stromgren	Soldered boost board. Started to solder the carrier board with Ryan but we ran into complications with stencils and we did not have a needle to do it without the stencils.
Xiangzhu Yan	Implemented remaining commissioning steps. Modified TLM C functions.

Plans for Coming Week

- Bryan Friestad: Write all 16 of the EPS write functions. Implement new checksum algorithms for OBC. Keep testing EPS read functionality. Start working on Battery energy tracking functions. Plan specifics for Mock Launch with M2I team.
- Ryan Hansen: Continue SDR control flow with packet commands. Finish soldering carrier board. Figure out method to test carrier board.
- Chase Kirchner: Adding GUI tabs for ground station for logging/buttons. Testing GUI as changes are made.
- Kyle Muehlenthaler: Correct and test the UHF configuration commands, Beacon, Pipe, set beacon message with calculated crc32. Write function to make crc32 calculations for esttc commands.
- Talon Stromgren: Test boost board, help write code anywhere else as needed as I will be out of town until Sunday night.
- Xiangzhu Yan: Test the code for ADCS commissioning steps.