

# CySat Senior Design Team

sdmay21-25

Report Period: September 28 – October 11

---

## Team Members:

Alexis Aurandt - OBC Lead and Payload Sub-Lead

Alex Constant - Ground Station Front-End Lead / Boost Board Sub Lead

Chandler Jurenic - Payload Lead and OBC Sub-Lead

Jeffrey Richardson - ADCS Lead/Team Lead

John Lenz - Radio Lead

Scott Dressler - EPS Lead / Boost Board Sub Lead

---

## Summary of Progress in this Period:

Team

- Completed Project Plan Lightning Talk

OBC

- Created document for installing the STM32CubeIDE
- Fixed build error and warnings on OBC\_SDK code
  - UHF code was trying to convert bits to bytes incorrectly
- Created a new project called “discoboard\_new”
  - The “discoboard\_no\_rtos” project is an absolute mess; it was easier to just create a new project.
  - New project only includes the required UART, I2C, and GPIO initializationso
  - New project also includes all updated code from last years’ team
- UART communication between discovery board and computer established

Ground Station Front-End

- Small Experiments with TKInter
- Instructions on creating Python Virtual Environments for dependency management
- Studied UART data transfer protocol
- Began work on Command Logging Schema

Payload

- Got a hold of Matt Nelson, almost finished with SDR tutorials. Supposed to meet with Matt regarding the Payload to cover anything not mentioned in the getting started docs.

- Didn't get a response from Matthew Nelson, plan to try to get ahold of him again for meeting that was supposed to happen
- Worked on reflection with team

#### EPS

- Continued work on I2C upgrade
- Reviewed equations for battery capacity, discharge, and recharge

#### Radio

- Connected to remote desktop
- Began learning Python for transceiver
- Worked with Dylan to understand and implement packet structure, but radio would not enter read status control

#### ADCS

- Defined milestones for ADCS
- Set up Dev Environment
- Writing "Hello World" program for getting ADCS telemetry data
- Approval of high-level mode workflow diagram for ADCS mode switching

---

### **Pending Issues:**

#### OBC

- Should I delete the discoboard\_no\_rtos? Or just leave it for now
- The OBC\_SDK indicates some work on a file system and FreeRTOS. It also includes a bunch of unneeded initializations (such as SPI). This will need to be cleaned up in the future. I would say that this can be cleaned up later when we are ready to test our actual code on the EnduroSat. Agree?

#### ADCS

- Mathew Nelson hasn't responded to my latest email. Currently there is no way to remotely connect to ADCS to my knowledge. Will bring this up at M2I meeting.
- Unsure of how final code will work without multithreading.

#### Radio

- Cannot read/write to radio through PuTTY
  - For UHF to OBC code to be tested a discoboard needs to be connected
  - For UHF to Ground Station to be tested a second radio is needed. This radio is currently awaiting funding approval as per M:2:I
-

## Individual Contributions:

Team Member	Contributions	Hours Worked	Total Hours
Alexis Aurandt	Ethics reflection, Lightning Talk, met with Bryan, and got familiar with the IDE, document for installing STM32CubeIDE, fixed OBC_SDK, created a new discovery board project, established UART communication	17	31
Alex Constant	Ethics reflection, PR reviews, help with Git, Ground Station Documentation, Lightning talk, Ground Station Next Steps document, researched Python globe implementations	11	23
Chandler Jurenic	Contacted Matthew Nelson, worked on SDR tutorials, practiced Linux usage Ethics reflection	5	15
Jeffrey Richardson	Meetings with M:2:I, Ethics reflection, Design Document, writing hello world for telemetry data, dev environment setup	2	8
John Lenz	Design Document, Ethics Reflection, python, Connection to remote desktop, email Dylan for presets and walk through, worked on UHF packet structure	3	8
Scott Dressler	Ethics reflection, Design document, I2C update, battery capacity equations	5	12

---

## Plans for Upcoming Reporting Period:

### OBC:

- Finish cleaning and get the OBC changes reviewed and merged
- Start looking at mock mock launch
- Start looking at I2C and UART Interrupts

### Ground Station Front-End:

- Ensure and test UART connection between Ground Station and SDR stand-in
- Document procedures for setting up and testing UART connection with SDR stand-in
- Work to integrate working command console into current Ground Station Front End

### EPS:

- Finish I2C updates

Payload:

- Meet with Matthew Nelson, get “Hello World” working for SDR
- Start with “Next Steps” portion of the payload PDF

Radio:

- Get a walk through and learn how to use UHF/OBC config
- Send and receive “Hello world” with UHF through PuTTY

ADCS

- Meeting with Dr. Lee to continue to plan operational mode workflow
- Testing hello world code with ADCS and discovery board