GNC Progress Documentation

Week 1 (Jan 13 - Jan 17)

Subsystem Progress

- Decided short term goals for the subsystem
- Decided the global state-machine execution relevant to ADCS in FSW

Individual Progress

Karthik Karumanchi

- Identified a potential IC for RW to replace the STM32, motor driver and encoder
- Caught up to RW work from the previous semester
- Worked with FSW team to decide on the state-machine for FSW

Derek Fan

- Added additional unit tests for corner cases: Issue #63
- Removed software conflicts with CircuitPython: Issue #82
- Conceptualized the remaining ADCS task structure in FSW

Arvind Car

- Caught up to Vision work from the previous semester/year

Amaar Quadri

- Created and set up the GNC-Payload repo, moved all relevant code there https://github.com/cmu-argus-2/GNC-Payload/issues/2
- Helped other team members get up to speed on orbit determination codebase
- Began looking into earth engine downloader for creating datasets https://github.com/cmu-argus-2/GNC-Payload/issues/16

(Contributors not signed up for the course)

Pedro Cachim

- No progress

Frederik Markus

- Caught up to Vision work from previous semester/year

Week 2 (Jan 20 - Jan 24)

Individual Progress

Karthik Karumanchi

- Placed order for a sensorless FOC chip
- Started translated MEKF implementation to FSW
    - Added gyro, sun sensor and magnetometer (Issue #75)
    - Added an orbit propagation function (Issue #89)

Arvind Car

- Set up scripts to train and evaluate the RCnet and LDnet pipelines, and converted absolute paths to relative paths in the code base (Issue #13 and #14) (https://github.com/cmu-argus-2/GNC-Payload/tree/Merged_Vision_Pipeline)

Amaar Quadri

- Set up a google cloud project for earth engine downloader, wrote a bash script to create a basic dataset, and copied the dataset to the workstation https://github.com/cmu-argus-2/GNC-Payload/issues/16
- Got image simulator + ML inference + NLS OD pipeline working https://github.com/cmu-argus-2/GNC-Payload/issues/20

(Contributors not signed up for the course)

Pedro Cachim

- Merged MEKF to main (w/ Tushaar's help). Joined MEKF/attitude controller simulations: PR #47
- Work on RW/magnetorquer controller: PR #49
- Added option to initialize sim spin-stabilized/sun-pointed: PR #49

Frederik Markus

- Worked on implementing the vision training ground and better understanding what already exists for eedl. On the GNC-Payload repo: PR #18 and issues #9, #14, #16, #17
- Started implementing the filter pipeline (at the moment only position and velocity) No PR yet for this.

Derek Fan

- Tuned controller parameters in SIL for sun-pointing task

- Working on restructuring ADCS app: Issue #94

Week 3 (Jan 26 - Jan 31)

Individual Progress

Karthik Karumanchi

- Calibrated MCF8315C sensorless FOC chip for RW speed control (Issue #4)
    - RW speed control works on the dev kit. Actual board yet to be designed
- Ran a magnetorquer - magnetometer settling time analysis (Issue #134)
    - Data collection frequency was too low and the test needs to be re-run

Arvind Car

- Incorporated Salient Region Analysis code to add more regions (commit)

Amaar Quadri

(Contributors not signed up for the course)

Pedro Cachim

- PR#49: RW controller, Sun Sensor eclipse function
- PR#52 (in the works): gravity gradient torque, plotting cleanup, aerodrag torque, dynamic perturbation fixes

Frederik Markus

- Helped Amaar on his eedl PR
- Set up tooling on the GNC-Payload codebase
- Worked on combined state filter

Derek Fan

- Tested ADCS task on mainboard–fixed library and task-related issues.
- Began fixing numpy-ulab and other circuitpython-related discrepancies (e.g. matrix multiplication)