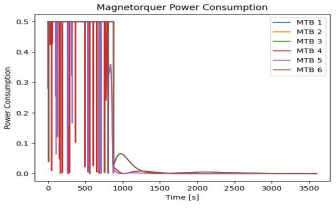
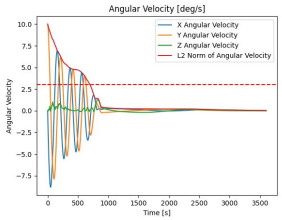
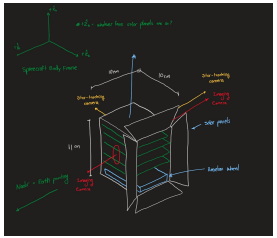
GNC Quad Chart

October 23 2024







External Tools Needed:

Blockers:

- **Time**

Progress:

1. Simulation
    a. Tested models for Gravity, Sun position and Magnetic Field
    b. Debugging sun pointing scenario

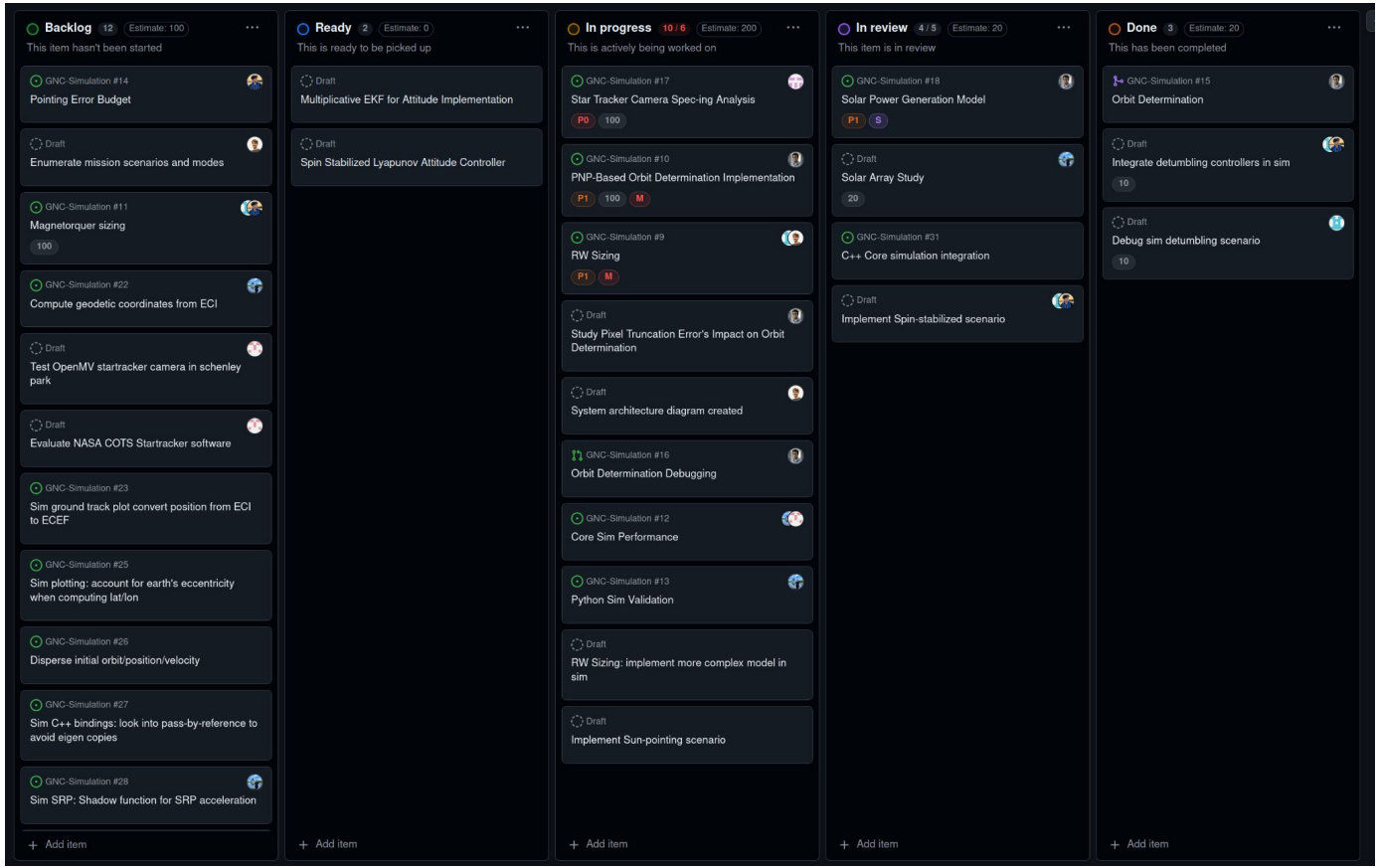
Plan for the Upcoming Week:

1. First sun pointing, nadir pointing control simulation results
    a. Power, torque use for RW sizing
2. Switch to C++ simulation completely

Interfaces:

1. Mechanical + Avionics + comms: We believe we can make 4 cameras work, and which faces to put them on + reaction wheel placement. WIll this configuration work?
2. Vision: incorporate landmark geographic locations into orbit determination

Kanban


Backlog 12 Estimate: 100
This item hasn't been started
GNC-Simulation #14
Pointing Error Budget
Draft
Enumerate mission scenarios and modes
GNC-Simulation #11
Magnetorquer sizing
100
GNC-Simulation #22
Compute geodetic coordinates from ECI
Draft
Test OpenMV startracker camera in schenley park
Draft
Evaluate NASA COTS Startracker software
GNC-Simulation #23
Sim ground track plot convert position from ECI to ECEF
GNC-Simulation #25
Sim plotting: account for earth's eccentricity when computing lat/lon
GNC-Simulation #26
Disperse initial orbit/position/velocity
GNC-Simulation #27
Sim C++ bindings: look into pass-by-reference to avoid eigen copies
GNC-Simulation #28
Sim SRP: Shadow function for SRP acceleration
Add item
Ready 2 Estimate: 0
This is ready to be picked up
Draft
Multiplicative EKF for Attitude Implementation
Draft
Spin Stabilized Lyapunov Attitude Controller
Add item
In progress 10 / 6 Estimate: 200
This is actively being worked on
GNC-Simulation #17
Star Tracker Camera Spec-ing Analysis
P0 100
GNC-Simulation #10
PNP-Based Orbit Determination Implementation
P1 100 M
GNC-Simulation #9
RW Sizing
P1 M
Draft
Study Pixel Truncation Error's Impact on Orbit Determination
Draft
System architecture diagram created
GNC-Simulation #16
Orbit Determination Debugging
GNC-Simulation #12
Core Sim Performance
GNC-Simulation #13
Python Sim Validation
Draft
RW Sizing: implement more complex model in sim
Draft
Implement Sun-pointing scenario
Add item
In review 4 / 5 Estimate: 20
This item is in review
GNC-Simulation #18
Solar Power Generation Model
P1 S
Draft
Solar Array Study
20
GNC-Simulation #31
C++ Core simulation integration
Draft
Implement Spin-stabilized scenario
Add item
Done 3 Estimate: 20
This has been completed
GNC-Simulation #15
Orbit Determination
Draft
Integrate detumbling controllers in sim
10
Draft
Debug sim detumbling scenario
10
Add item