# S/C ODIN Simulation

## Flight Control System

### Subsystems

* Control mode selector
* Control law
* State estimator

### Current state:

* Attitude error was implemented to provide error signal to the controller
* PD Controller for the reaction wheels is in process
* Documentation on the linearized equations of motion

### To do:

* Provide an error model for state estimator
* Build dynamic model for Kalman filter
* Build the linearized EOM to tune the parameters of the controller
* Build logic for the mode selector, maybe state machine?
* Set up the desired attitude (Nadir, sun, ground station)
* Set up magnetorquer controller

## Environment

### Subsystems

* Sun position
* Magnetic field

### Current state:

* Magnetic field calculator is almost done
* Sun position vector script from Vallado is being tested

### To do:

## Disturbances

### Subsystems

* Atmospheric drag
* Magnetic field
* Solar pressure
* Gravity gradient

### Current state:

### To do:

* Research on the disturbances and start building the model

## Actuators

### Subsystems

* Reaction wheels
* Magnetorquers

### Current state:

* Reaction wheel was modeled with rpm command input

### To do:

* Model magnetorquer
* Add disturbances to the actuators

## Spacecraft Dynamics and Kinematics

### Subsystems

* Dynamics
* Kinematics

### Current state:

The Dynamics and kinematics have been tested. They provide the correct results.

### To do:

It is complete

## Sensors

### Subsystems

* Sun sensor
* Magnetometer

### Current state:

### To do:

* Sun sensor measurement model
* Magnetometer measurement model
* Bias and noise modelling