

CubeSat

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Faculty Advisor: Dr. Silaghi (msilaghi@fit.edu)

Client: Kennedy Space Center

Task	Completion %	To do
1. Investigate and select core framework	100%	none
2. Get framework running in VM	100%	none
3. Communications Demo	100%	none
4. Design Document	30%	map out state machine
5. Implement test application	10%	design and debug
6. Test Plan	30%	finalize science mission and requirements
7. Simulation	10%	create the system in Unity

Discussion:

Task 1: The first obstacle to overcome in the project was to choose a core framework for the satellite OS, as there are many both commercially available and open source. After trying a few out I settled on an open source distribution of NASA's Core Flight System (cFS) called OpenSatKit (OSK). OSK is intended as a training and application development environment for satellite projects that has rigorous documentation and what seems to be an active community.

Task 2: Although there is much documentation for OSK getting it running on a virtual machine was more of a challenge than expected. I had some trouble with the dependencies as it seemed that the installation guide was slightly outdated but after some troubleshooting I was able to get it running.

Task 3: While getting OSK running was an obstacle, getting it functional was less so. The base distribution of OSK provides a simulator to allow testing of user made applications with highly customizable sample data. This allows for the testing of programs without the need for a functional satellite. The simulator is very intuitive and it will benefit me greatly to be able to utilize this tool fully to test applications prior to a functional prototype being constructed.

Task 4: The actual designing of the specific application systems has slightly been put on hold as the team has yet to set in stone a science mission for the project, leaving me unable to fully design the systems needed to collect and receive the data required. Although I am able to design the more generalized parts of the system while leaving space for the data input.

Task 5: I have yet to fully begin implementing a test application as I do not want to create one that will become obsolete due to a changing science mission although I have looked at the bare essentials for designing an application to run on OSK.

Task 6: As previously stated, a great deal of the requirements and verifications rely on the science mission chosen so I have been unable to complete it. However, I have been able to get the basic requirements for the satellite to be functional otherwise.

Task 7: As a backup in case a physical prototype cannot be made, I have begun looking into creating a simulation of the system in unity in order to show how it would function. I am currently looking into using Unity for this purpose.

Plan for next milestone:

Task
1. Design Document
2. Implement test application
3. Test Plan
4. Simulation

Task 1: Continue work on the design document to finalize the requirements for the framework and applications. Specifically, map out a state machine of the project to streamline development and ensure that the product is what is expected.

Task 2: Finish work on a test application to help learn how to implement an application as well as laying the framework for function prototype applications in the future. Also, potentially write basic functions to streamline the process in the future.

Task 3: Finalize the general and specific requirements of the satellite application and how they will function and interact with the entirety of the system. As well as work out how exactly to measure the functionality of the application.

Task 4: Continue looking into Unity and attempting to design an example simulation of the system and applications.

Client Meetings:

Date	Purpose
9/1/2020	Checking in with NASA contact and talking about potential science missions
9/8/2020	“
9/15/2020	“
9/22/2020	“

Faculty Advisor Meeting:

9/24/2020 - Spoke about designing a state machine for the exact requirements for the application to streamline the implementation process. Also talked about getting a specific design plan from the team to help determine the functionality needed as well as working on creating a Unity simulation.

Faculty Advisor Signature:  DocuSigned by:
Dr. Silaghi
4C78522EF27840A... Date: 9/27/2020