

## Week VIII Report

**Advisor(s):** Gary Tuttle

**Client:** NASA Marshall Space Flight Center

**Members (Roles):** **Isaac Johns**-Team Communicator, **Ryan Bissett**-Team Communicator, **Tom Henry**-Webmaster, **Luke Dahlman**-Team Leader, **Anh Ho**-Key Concept Holder, **Dustin Pierce**-Key Concept Holder, **Antjuan Buffett**

**Project Title:** Remote Deployment Circuit and Mechanism for Lightweight CubeSat Solar Panels

### Weekly Summary

This week we continued work on our design and on our components selection. We determined how much torque it takes to open and close our prototype and decided since our prototype is much more crude than the final product, we can use that value plus an extra safety margin as a value to shoot for with the motor we will eventually buy. As one of the bulkier components, this is important since space is now at more of a premium than ever. We received another email from John Carr stating that now we only have a 10cm x 10cm x 10cm space to work with and need to deploy 1 square feet of solar panel rather than the cubic foot and 4 to 9 sq. ft. we have designed our whole project around. We attempted to meet with him on Monday, October 27, 2014, however he was unable to meet. We have another meeting scheduled for Thursday, but since the information we need to confirm with him is so important to the overall design of the project much of the work has been halted until then.

### Meeting Notes

From our weekly meetings:

- Our prototype takes 18 inch-pounds of torque to turn, however it is much heavier, cruder (and now that we have new requirements) much larger than our final product will be.
- Nearly the entire scope of this project has changed. Instead of the relatively large system we had designed we now have very little space to work with.
- Our motor is very dependent on the size of the system, but we have models picked out for each eventuality we can think of, from large to small.
- John was unable to meet with us as a group this week, so that has been rescheduled.

### 10/22/2014 Group Meeting to Decide Course of Action and Discuss New Requirements

**Duration:** 1hr      **Members Present:** Isaac Johns, Ryan Bissett, Tom Henry, Luke Dahlman, Anh Ho, Dustin Pierce, Antjuan Buffet

**Purpose and Goals:**

This group meeting was called mostly to discuss how we have to change our design now that we have different requirements for the project. We took an hour to brainstorm potential new ideas for the system if our current design proved unusable, but came to the conclusion that just scaling down our current idea will probably work for the best if we even need to. We scheduled a conference call with Mr. Carr for Monday and divided up responsibilities for writing our Design Document.

### **10/27/2014 Group Meeting to Talk with John Carr**

**Duration:** 1hr                   **Members Present:** Ryan Bissett, Tom Henry, Luke Dahlman, Anh Ho, Dustin Pierce

#### **Purpose and Goals:**

The point of this meeting was to talk with John Carr, since he said our design scope may have changed. He himself wasn't entirely sure as he only passed on to us what he discussed in a meeting at NASA, but may have had solid information by now. However, he was unable to meet so we rescheduled for Thursday evening. While we were there we discussed the project for a while but without being sure what exactly we need to do with our design we didn't want to waste time following the wrong design path.

#### **Achievements**

This week most of our achievements have been in our individual areas of research, with the most important being we have found potential motors and materials for the scissor jack.

#### **Pending Issues**

- Need to meet with John Carr before we can continue. Without confirmation we are working towards the right goal nothing else can be done without potentially being a waste of time.

#### **Plans for Next Week**

- Luke: Contact Professor Tuttle and John Carr as well as work on the circuit interface to motor, wooden cube
- Isaac: Help with digital logic, and continue looking into sensors or switches and how to implement them
- Ryan: Weekly Group Report, research on regular motors versus stepper motors considering torque, and materials (VESPEL), give reports to Tom.
- Anh: Keep group on task, SolidWorks design for simulation
- Dustin: Keep group on task, research on regular motors versus stepper motors considering torque
- Tom: Manage Google Docs and Weebly site, help with digital logic, scissor jack, wooden cube and update site to have our weekly reports.
- Antjuan: Controllers for the motor, how to interface controllers with the motor, motor models.

### **Individual Contributions This Week**

- Luke: Further progress made on the programming of the PLC, wrote the hardware description for the design document.
- Isaac: No specific hours submitted due to being out of town but did do work.
- Ryan: Wrote weekly report, attended meetings, wrote systems description and edited materials portion for Design Document.
- Tom: Updated website, attended meetings, fixed broken part of boom, software specification for Design Document
- Dustin: Attended meetings, researched motors and worked on the Design Document.
- Anh: CAD drawings, assembly, documents, CES Edupack graphs.
- Antjuan: Compiling information for the design document.

### **Total Contributions for this Project**

#### **1 – 1 hour meetings**

- Luke: 8 hrs
- Isaac: 6 hrs
- Ryan: 6 hrs
- Tom: 8.5 hrs
- Dustin: 6 hrs
- Anh: 12 hrs
- Antjuan: 1.5 hrs