

## Project Bi- Weekly Progress

Date: 10-15-13

**Project Title: Solar Powered Arc Jet Thruster**

**Students Names: Chris Brolin, Cory Gainus, Gerard Melanson, Tara Newton Griffin Valentich, Shane Warner**

**Mentors/ Coordinator/ Sponsor: Dr. Guo, Dr. Andrei, Dr. Kwan, Kurt Polzin, NASA**

### **1. Project Title: Solar Powered Arc Jet Thruster**

#### **2. Project Objectives/tasks Breakdown:**

Design, build, and test a direct drive arc jet thruster for purposes of providing propulsion under vacuum.

Design and execute a test plan to systematically quantify the range of operating conditions over which gas ionization can be achieved.

Perform tests to see if a continuous discharge at these power/current levels can be sustained, and quantify if possible

### **3. What was accomplished the last two weeks on individual tasks- representative supporting data/ documents**

During the last two weeks the team finished the ideation and invention phase of the project. This is right on track with the timeline set by the Gantt chart.

Team finished and submitted the reformatted Code of Conduct, as well as the Project Plans and Specification.

Met with Dr. Guo again to discuss more issues concerning the high temperatures, materials, magnets to confine plasma, and procedure to verify Paschen's curve

--- Need to vary the voltage spike as well as gas pressure to navigate around Paschen's curve – done through a variable resistor in circuit

--- Break through on understanding the instrumentation needed to accurately calculate the pressure of the gas at the location of the arc. – done with a mass flow meter and a pressure probe.

---Magnetic field purpose was understood and rough equations developed to calculate the needed magnetic field strength to confine the plasma to a radius less than the radius of the nozzle throat to be designed.

--- Vacuum chamber design ideation was simplified, decided to go with a steel box with a few windows instead of plexi-glass, ports feeding into chamber will be placed on bottom of vacuum chamber.

Circuit simulation was made and tested by Shane and Jerry. Determined we will be able to get the correct amount of voltage needed to initiate breakdown. Variability in resistors will be added to adjust voltage attained

**4. Summary of problems encountered and actions taken (and by whom)**

Lack of understanding of expectations – Meeting held with Guo, attended by all and discussed concepts to get everyone on the same page

Code of Ethics was incorrect – typed again by Griffin, signed by all

Unclear project path – issue corrected by Tara by developing a critical path model for our project

Deadline for Project Plans and Product Specs – action taken by all to come together efficiently and work on all aspects of deliverable.

Government shutdown – Kurt Polzin has been unreachable for technical advice.

**5. Attached Gantt chart modifications and analysis if project is behind schedule and summarize actions planned to overcome the problems)**

Certain design plans may be curtailed or pushed back to ensure quality midterm presentation for next week.

**6. Work planned for the next period and the person(s) responsible:**

Midterm presentation 1 is quickly approaching, the majority of the next week will be spent on developing presentation using current knowledge and ideas for design– ALL

**Design work**

-Design work will continue throughout week starting with the materials needed – Chris, Tara

-Design of thruster housing will begin – Griffin

-Measureing devices will be researched and selected – Cory

-Circuit will be modeled and tested with respect to new potentiometer idea –  
Shane and Jerry

**7. Open comments/suggestions (Please feel free to include your private comments):**

**No comments at this time.**

**Coordinator/ Instructor assessment report and corrective action**

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