AEROSPACE ENGINEERING DESIGN PORTFOLIO

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Project :-

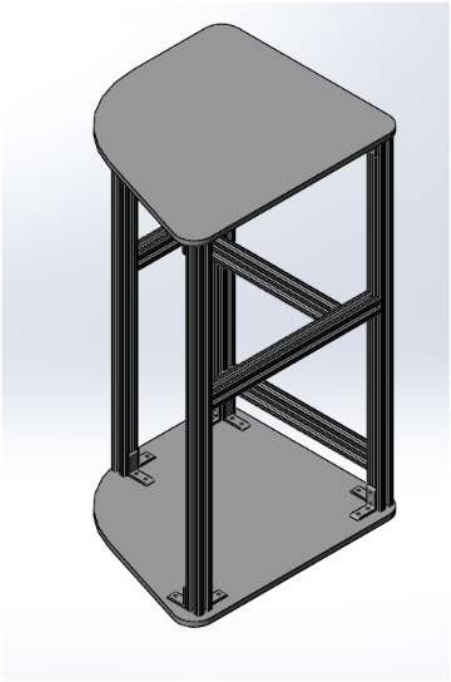
Welcome, and thank you for giving me your precious time to view my experience and skills I have gained recently.

Pan Chromatic Imager Case

- Framing: 1.5”x1.5” aluminum
  - 35’’ long
- End plate: 0.5” think aluminum

Al 6061 - T6 extrusion (80/20 brand)

- 7.5” Hole in top plate for the telescope



Pan Chromatic Imager

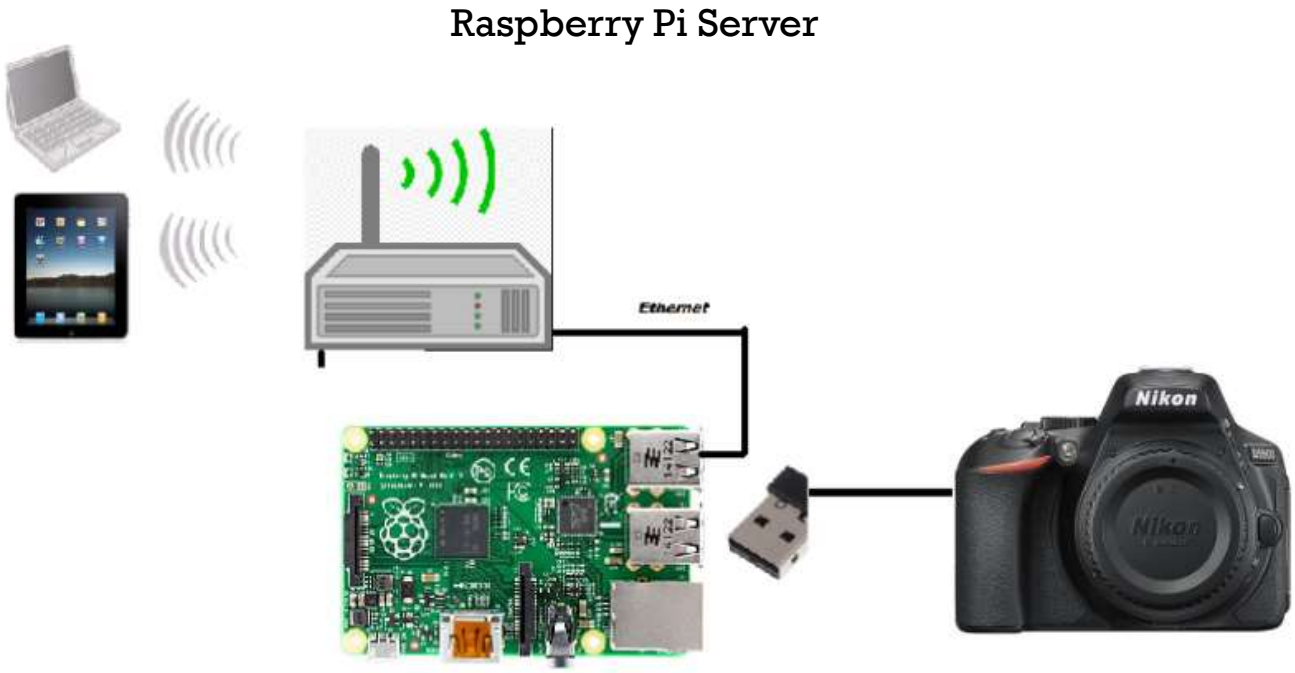


Figure 9: Data Network Configuration

PC→ Router→ Pi→ Optical Sensor(DSLR + Telescope)

Pan Chromatic Imager

Experimental Results Lunar Image

Lunar Image 008

Lunar Image Taken 3/24 12:30am, Hazy Sky Conditions

ISO:320
Exposure: 1/160 sec
Taken in .NEF RAW, 6000x4000px

Lunar Image 008 Detail

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Pan Chromatic Imager

Project Schedule

Line #	Milestones	2018				2019			
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
1	Literature Review and Research								
2	Hardware Selection and Purchasing								
3	Hardware Assembly and Initial Testing								
4	Raspberry pi setup and Camera Interface								
5	Jhemi Project Proposal								
6	Jhemi Project Results Presentation								
7	Final Testing and GSD Calculation								

Project Gantt Chart

		January			Febuary				March				April			
Tasks	week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Literature Review/Research																
Structural Design																
Hardware Purchasing/Selection																
Camera/Optics Purchasing																
Hardware Assembly/Testing																
Optics Setup/Calibration																
Raspbery Pi Setup/Camera Interfacee																
Final Presentation																
Final Report																
Final Testing																

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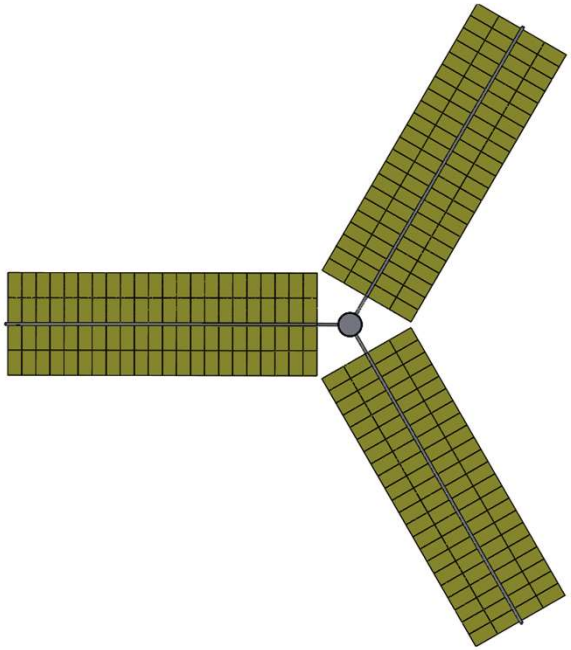
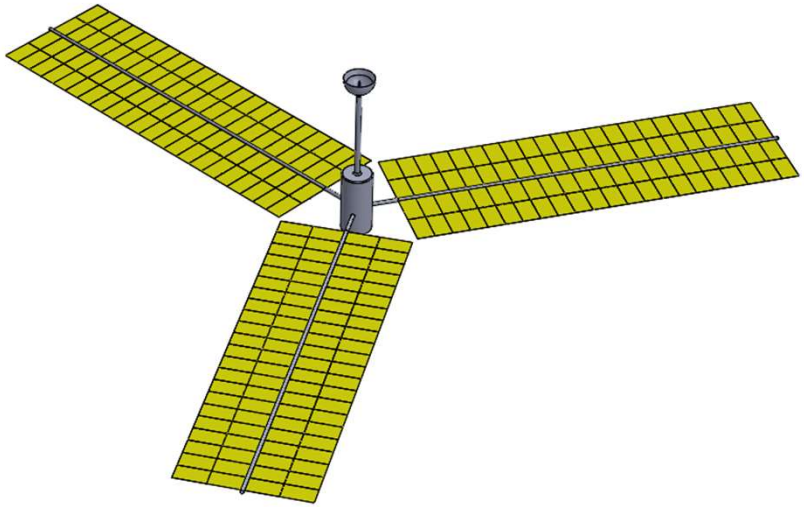
Pan Chromatic Imager

Conclusion

- Accomplished
  - Met goals set for the ground sampling distance
  - Met goals for packaging and space requirements
  - Met goals for data transfer
  - Met these goals considerably under budget
- Unable to Meet
  - Were not able to test remotely
  - Complete systems integration
- Next Steps
  - Integration of components into full system
  - Implement line scanner to system
  - Mount system to airplane for ground scanning
  - Develop data fusion techniques

Space Solar Power Plant

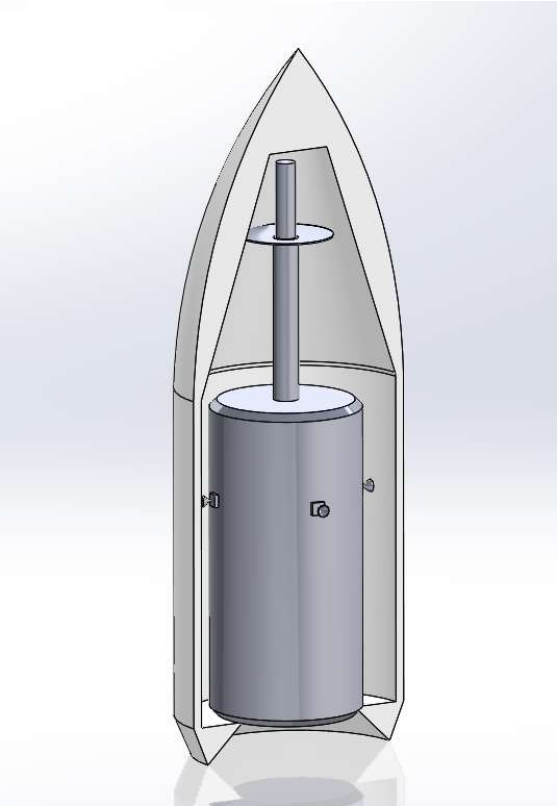




Space Solar Power Plant

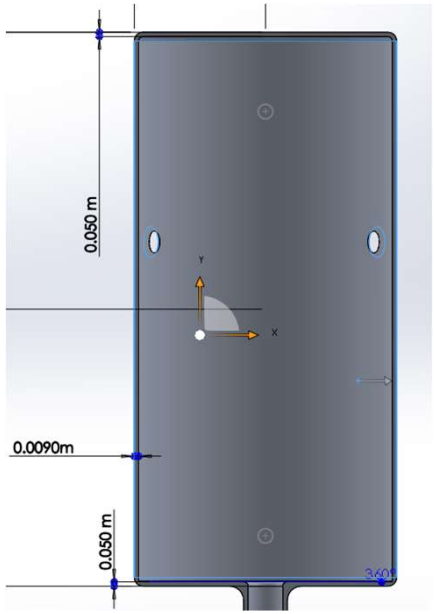
Launch System & Orbit

- Geostationary orbit
  - 35,800 km altitude
  - Allows for constant visual contact with ground facility
  - Provides near continuous solar exposure
    - Maximum eclipse time of 4000 seconds
  - Minimizes onboard control system complexity & battery density
- Launch Vehicle: Falcon Heavy
  - 26.7 tons to GEO (non-reusable)
  - Insertion into GTO is an available launch option



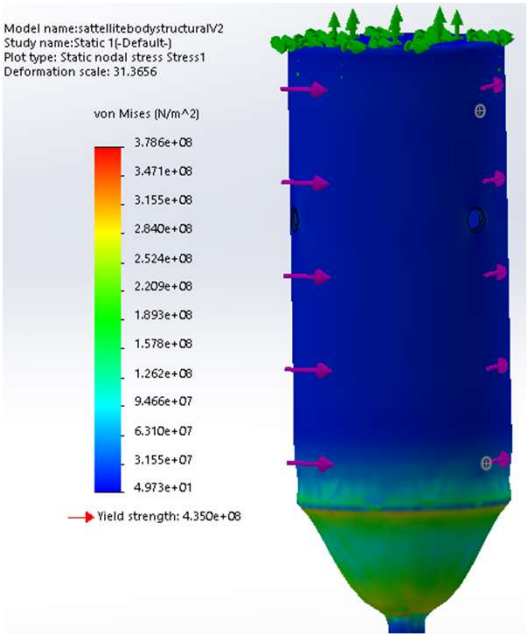
Space Solar Power Plant

Primary Structure Design & Adjustments



Main Body

Iteration	Thickness	Safety Factor
First	135mm	1700
Second	50mm	88
Third	9mm	1.5



Space Solar Power Plant

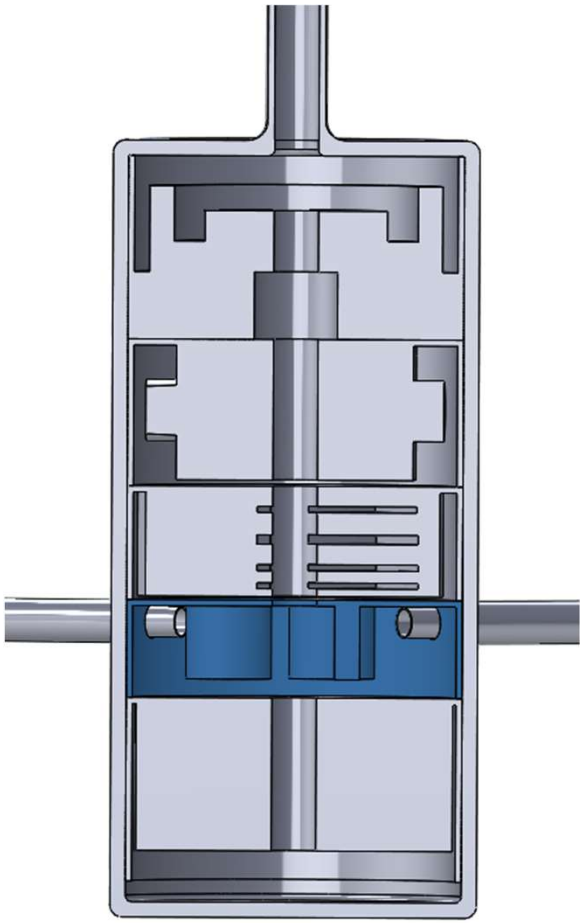
Control Systems

- Need the transmitter pointed within 0.1 degree of ground facility
- Utilized a 9-meter collapsible gravity gradient boom
  - Doubles as mounting point for power transmitter
- 2-axis gimbal mount to fine tune transmission aiming

Space Solar Power Plant

•3 momentum wheels for primary attitude control
(highlighted in figure)

- Mounted near solar panel juncture



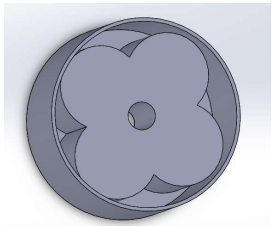
Space Solar Power Plant

High Level Requirements

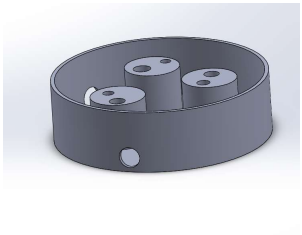
- Power a moderate scale manufacturing facility (i.e. CDME at OSU)
  - Deliver at least 228.5 kW of usable electricity
- Fit entirely into SpaceX Falcon Heavy Fairing Dimensions
- Mass less than 26.7 tons
- Deliver energy to 1 km diameter receiver on the ground
- Promptly return to nominal after attitude disturbance
  - 30 degree deviation returned in ~60 seconds
- 20 year planned lifespan

Space Solar Power Plant

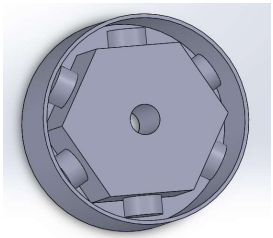
Components



Internal Payload battery

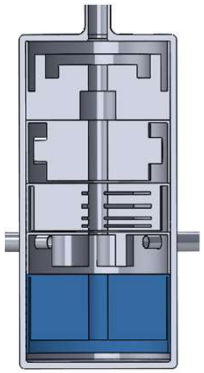


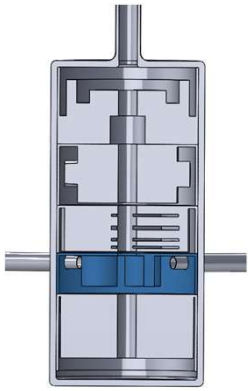
Momentum Wheel

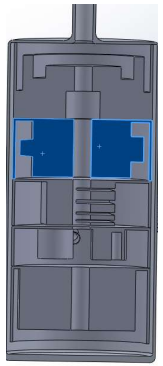


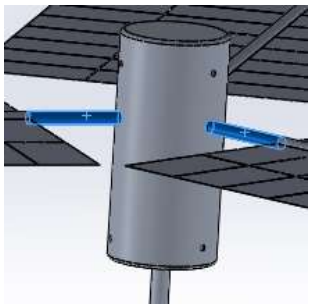
Thermal Control

Central Conector Rod









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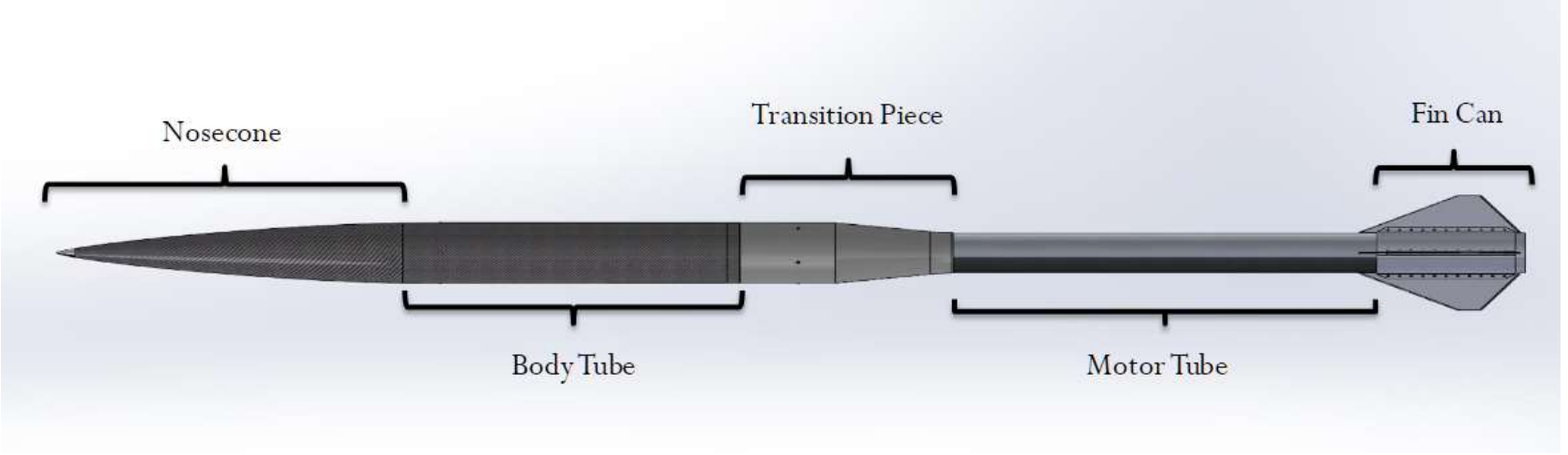
Rocket Team

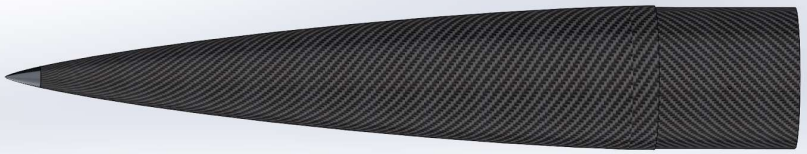
Purpose: Designed and developed a rocket to reach 30k feet for 3 year.



Rocket Team

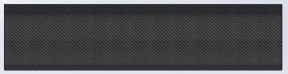
Material : 6 Layers of Carbon Fiber

Nosecone



33.54 in Length

Body Tube



26 in Length

Rocket Team

Sub Systems