

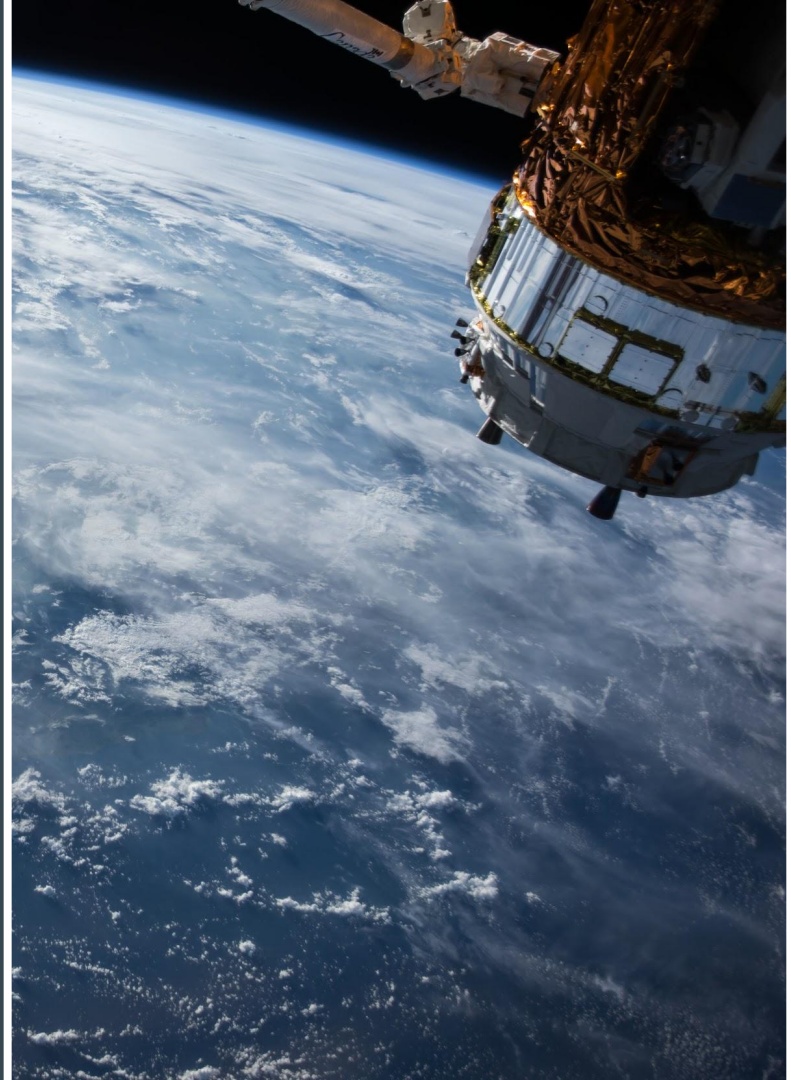


CRITICAL DESIGN REVIEW

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Presentation Overview

- Design Progression
 - Preliminary design choices
 - Final design choices
 - Choosing the design
- Hardware and Software Performance
 - Performance by design
 - Performance by scenario
- Final Product
 - Obstacles
 - Improvements

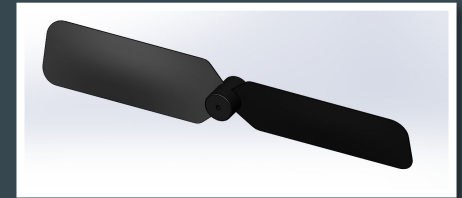
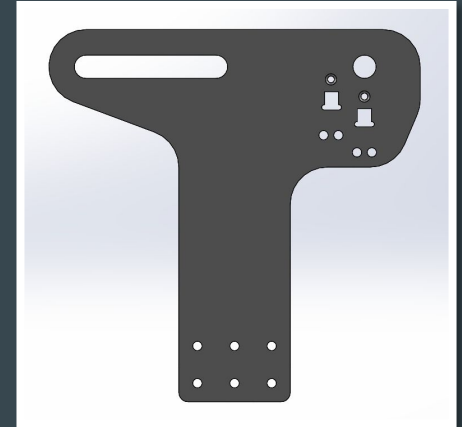
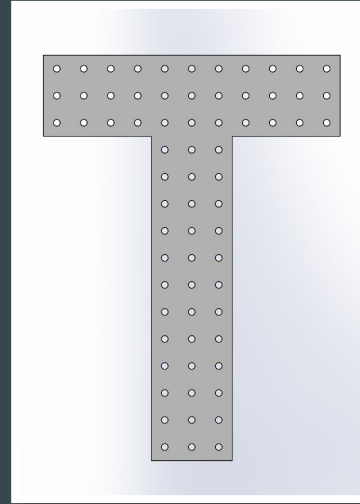


Design Progression:

Preliminary Design Choices

There were various issues:

- Large design
 - T-Base
 - T-Rail mount
- Lots of wasted space
 - Unused space
- Balance issues
 - Parts were too spread out
 - Pieces had to be positioned to correct balance

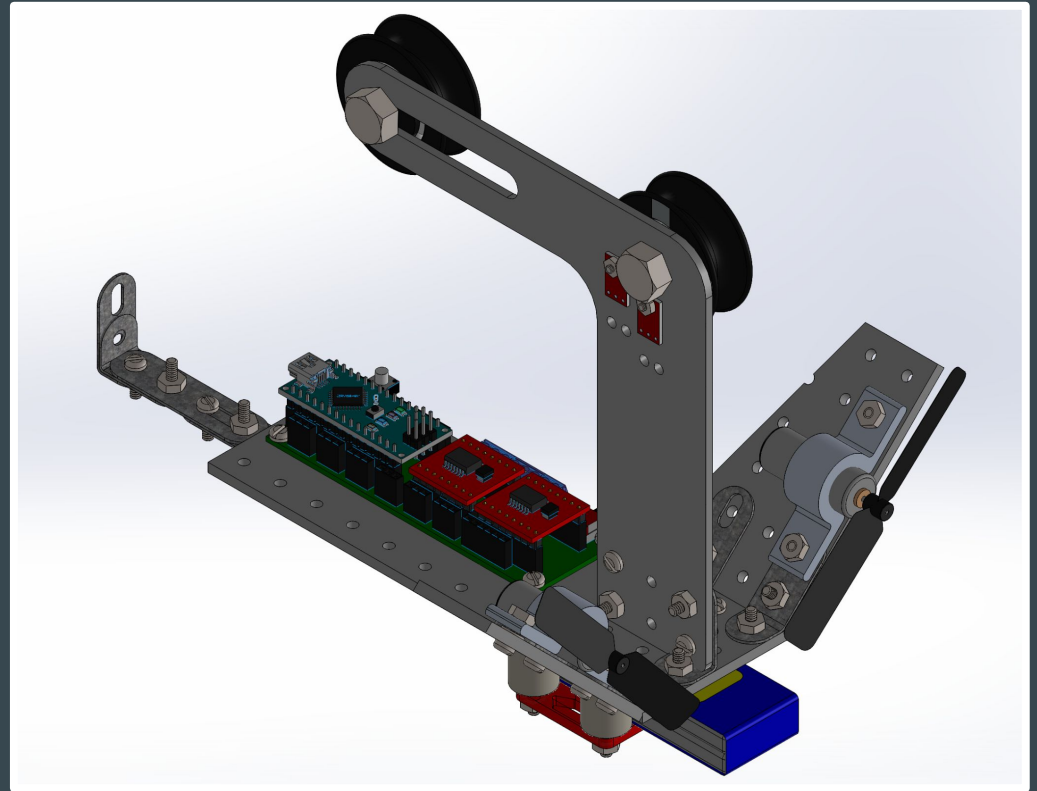


Design Progression:

Final Design Choices

Corrections to Old Design:

- Medium, rectangular base
 - Less wasted space, smaller/lighter build
- Improved balance
 - Center of mass more concentrated
 - Less sway during runs



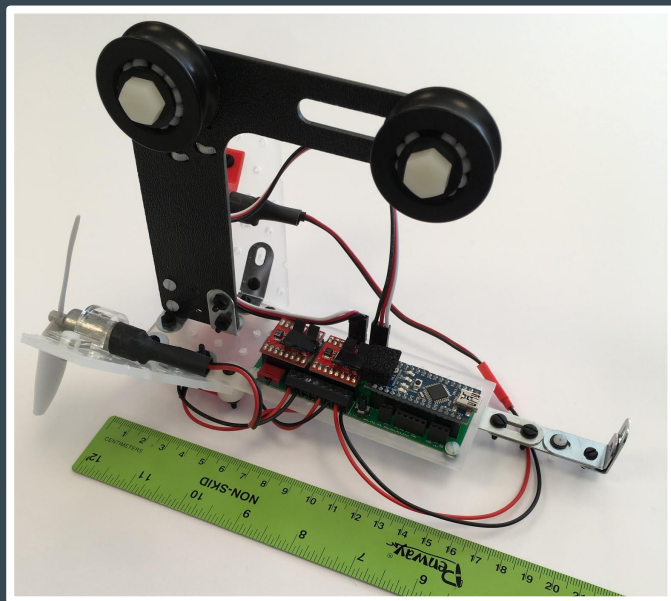
Final SolidWorks Design

Design Progression:

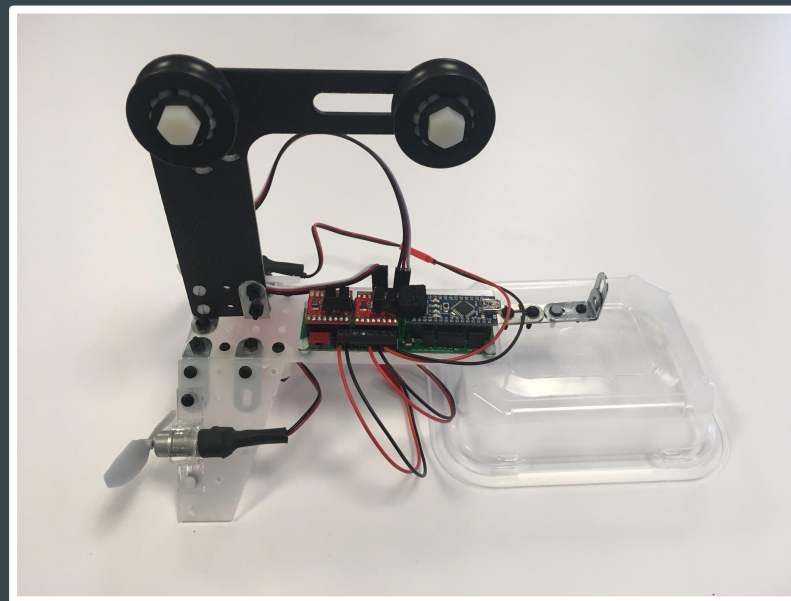
Scoring the Designs

		Reference		Design A - Kyle K.		Design B - Joe S.		Design C - Team	
Success Criteria	Weight (%)	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score
Balance	5	3	0.15	3	0.15	1	0.05	3	0.15
Minimal Blockage	15	3	0.45	3	0.45	3	0.45	4	0.60
Center of Gravity Location	10	2	0.20	2	0.20	2	0.20	3	0.30
Maintenance	25	3	0.75	4	1.0	2	0.50	4	1.0
Durability	15	2	0.30	2	0.30	1	0.15	4	0.60
Cost	20	3	0.60	3	0.60	3	0.60	3	0.60
Environment	10	3	0.30	3	0.30	3	0.30	3	0.30
Total Score		2.75		3		2.25		3.55	
Continue		REFERENCE		No		No		Refine	

Hardware and Software Performance: Performance By Design



Up-Wing
Power Usage: 538.65 watts



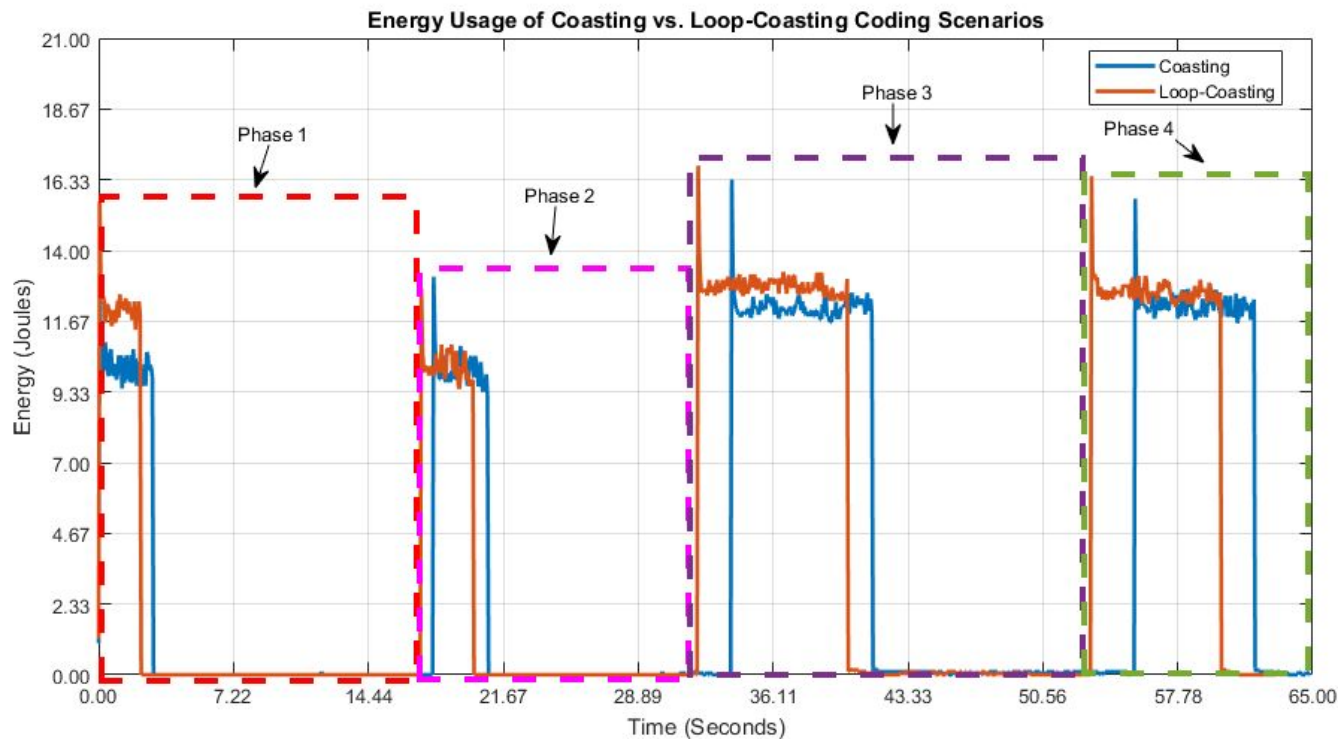
Down-Wing
Power Usage: 550.84 watts

Hardware and Software Performance:

Performance By Scenario

COAST SCENARIO	LOOP-COAST SCENARIO
230.52 J	247.76 J

Hardware and Software Performance: Performance By Scenario (cont.)



Final Product:

Final Testing Results

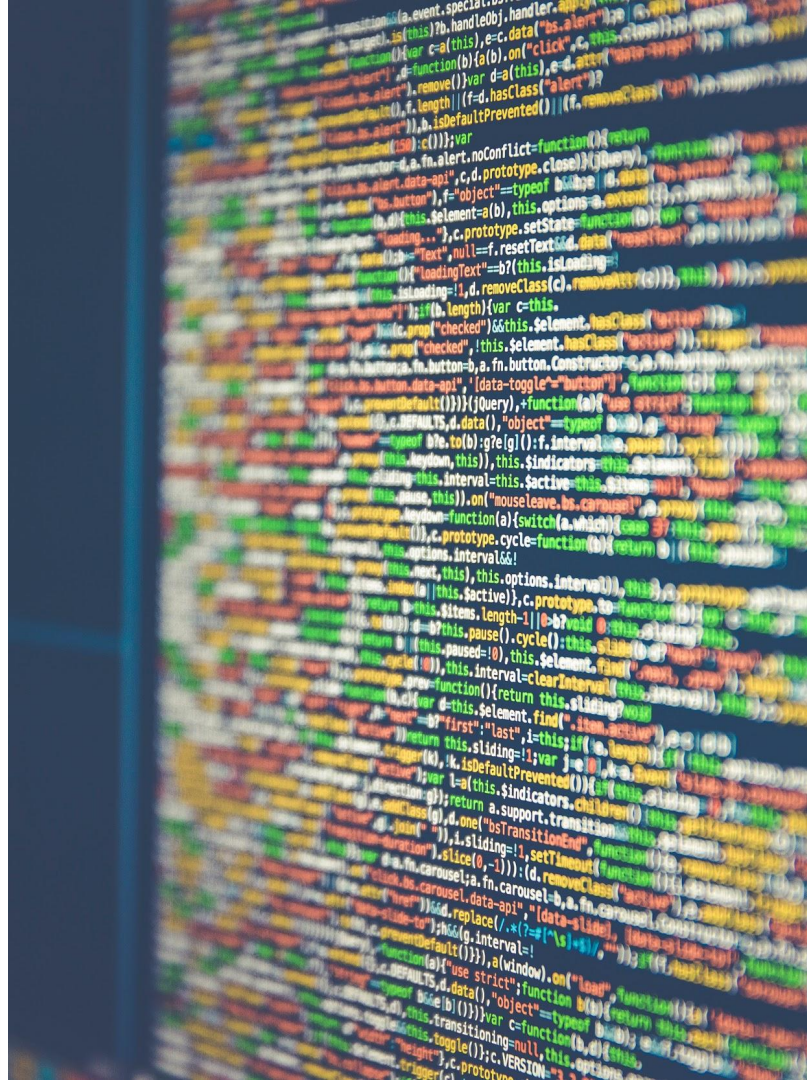
Final Design Testing Data	
AEV Mass (g)	Total Energy (J)
268.00	257.00
Run Time (s)	Energy/Mass (J/g)
75.0	0.959

Final Product:

Design and Software

Obstacles:

- Positioning of magnetic connection
- Coasting inconsistencies
- Distance coasted varied with uncontrollable variables
 - Battery charge
 - Air flow in room
 - Different tracks

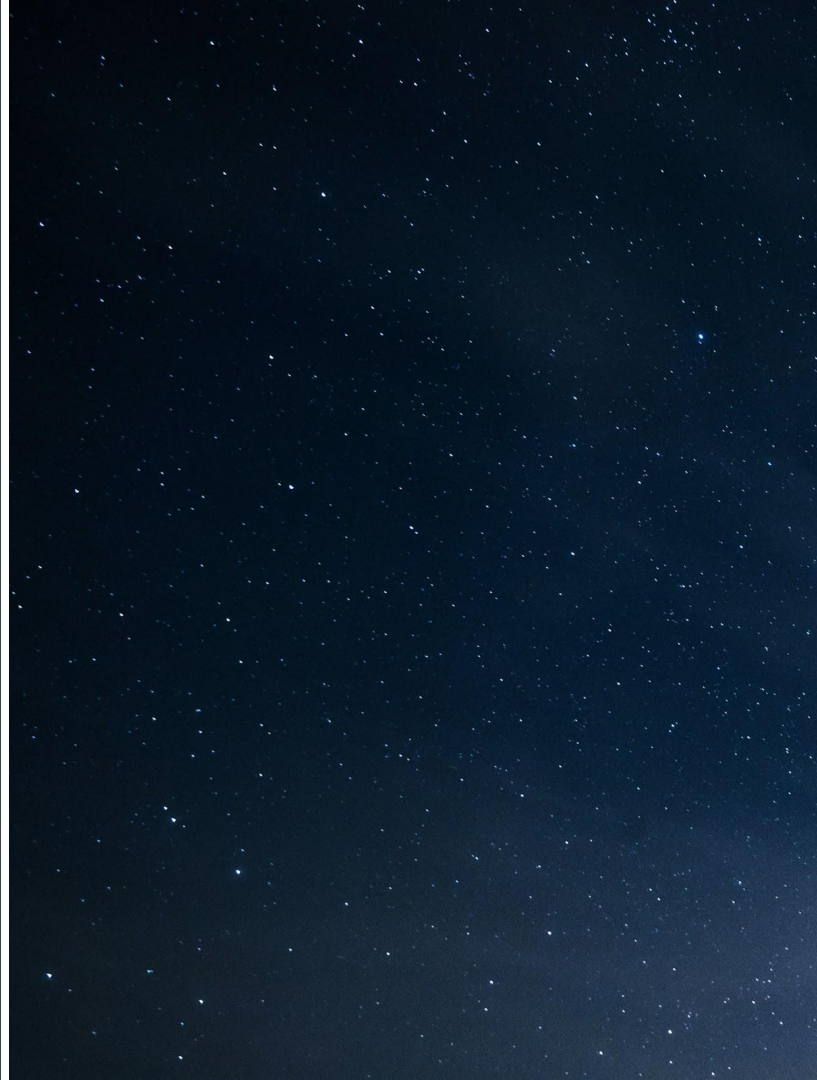


Final Product:

Design and Software

Improvements:

- Design and 3D print a part
 - Improve aerodynamics
- Use while loops correction earlier in the testing process
 - Result in more time to test and perfect code
 - Use different positioning method with `goToAbsolutePosition()`
- Be more prepared overall for unexpected events



Questions?