

Progress Report

Team # 17

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Project Sponsor:



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Introduction

Problem Statement

The current generation of assistive walking devices is limited in their traversable terrain and functionality.

- Indoor operation only
- Only perform basic functions
- Scooters / electric wheelchairs unnecessary or expensive

Proposed Solution

Develop a walking assistive device designed to actively assist the user in both indoor and outdoor maneuverability.

- Further empower the disabled and elderly community
- Offer wide-range of assistive functions
- Maintain ease of use and intuitiveness integral to current generation walkers



Specifications

Frame

- Resemble current generation walker in aesthetics and standards
- Aluminum framing
- Supports up to 300 pounds
- Adjustable heights between 32 and 39 inches
- Adjustable handle width between 14 and 23 inches

Propulsion

- Minimum 11 inch diameter wheels or tracks
 - Travel over all indoor surfaces, grass, gravel...
 - Travel up or down slopes up to 10 °
- Move transversely 45° from the center axis
- Maximum operating speed of 3 mph

Control & Function

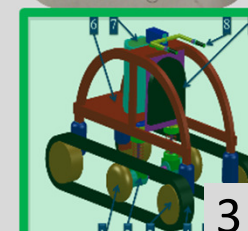
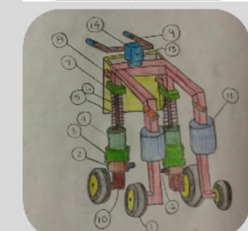
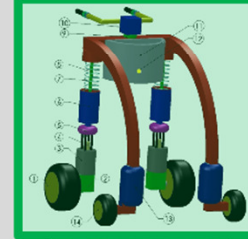
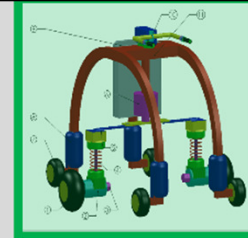
- Intuitive user input
 - Force-based drive control
- Fall Prevention
- Sit-Down/Stand-Up Assistance
- Object Detection/Avoidance
- Localization & Navigation

Criteria

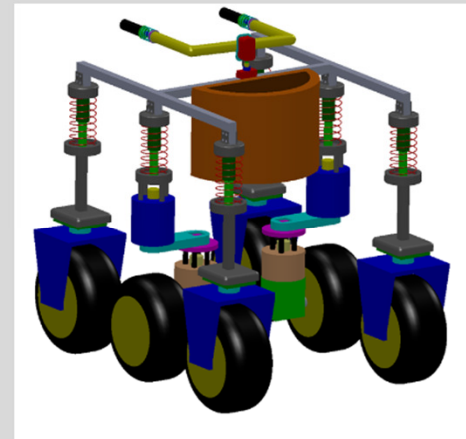
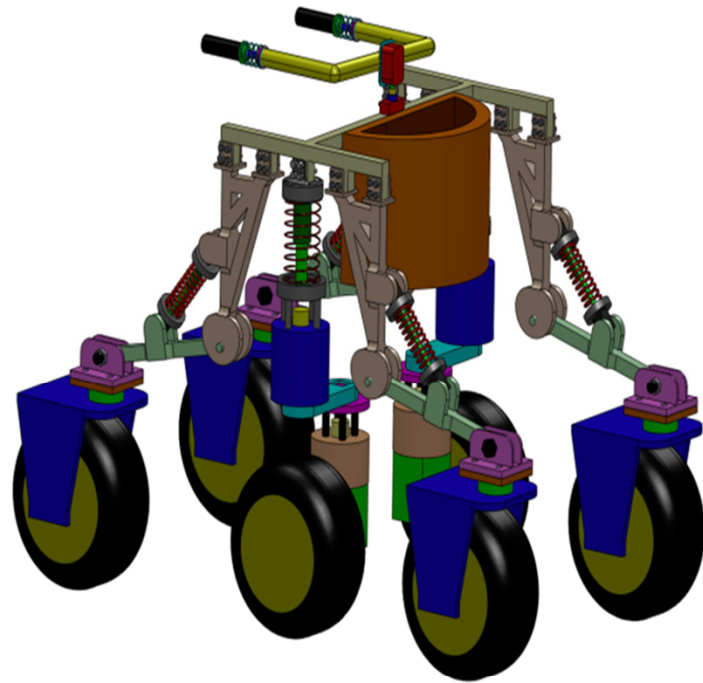
- Versatility
- Robustness
- User-friendliness
- Indoor operation
- Outdoor operation
- Cost
- Weight

Initial Designs

	Concept 1		Concept 2		Concept 3		Concept 4		Concept 5		
	Weight	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted
Versatility	0.15	3	0.454	5	0.757	3	0.454	3	0.454	3	0.454
Robustness	0.175	4	0.699	3	0.524	5	0.874	3	0.524	4	0.699
User-friendliness	0.22	3	0.670	4	0.894	2	0.447	5	1.117	3	0.670
Cost	0.04	2	0.086	2	0.086	1	0.043	1	0.043	1	0.043
Indoor	0.145	3	0.429	3	0.429	2	0.286	3	0.429	1	0.143
Outdoor	0.235	4	0.926	3	0.695	3	0.695	2	0.463	5	1.158
Weight	0.035	2	0.066	3	0.099	1	0.033	4	0.132	1	0.033
Sum:			3.331		3.483		2.832		3.163		3.200



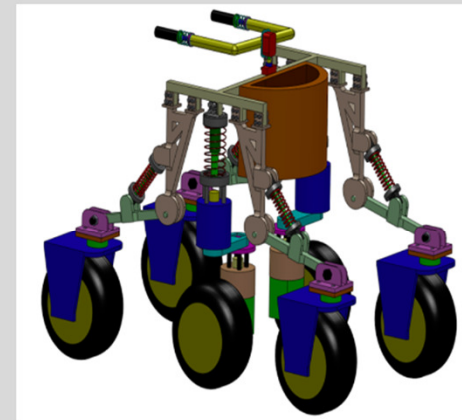
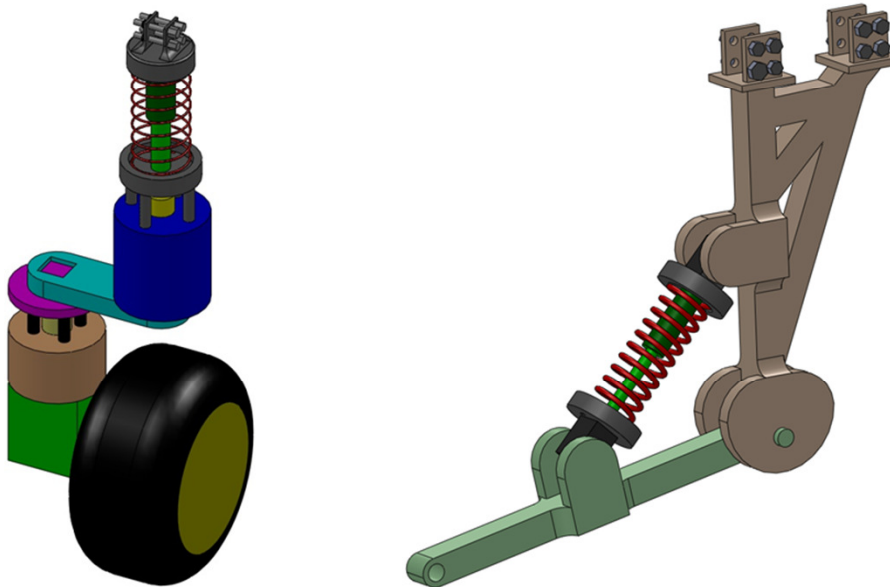
Interim Designs



Interim Designs

Problems:

- Large footprint
- Tight user space
- Non-uniform suspensions



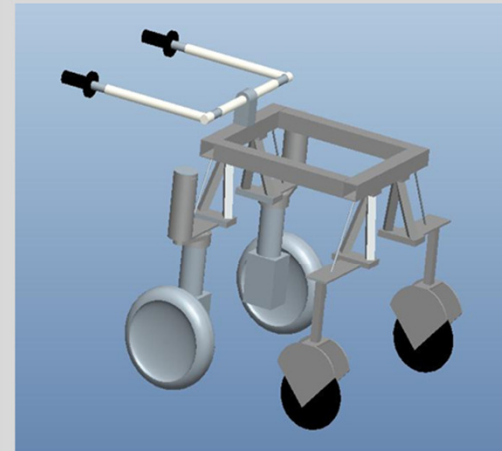
Interim Designs

Problems:

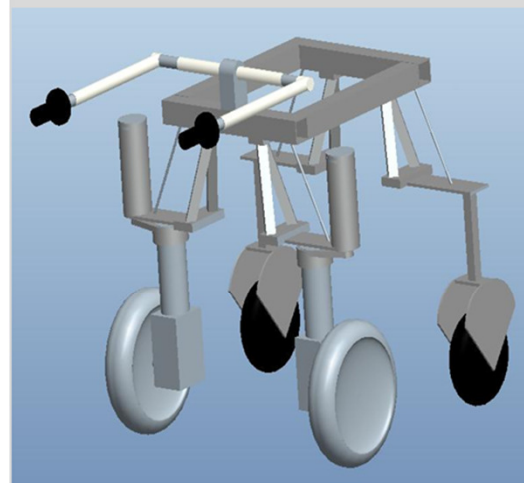
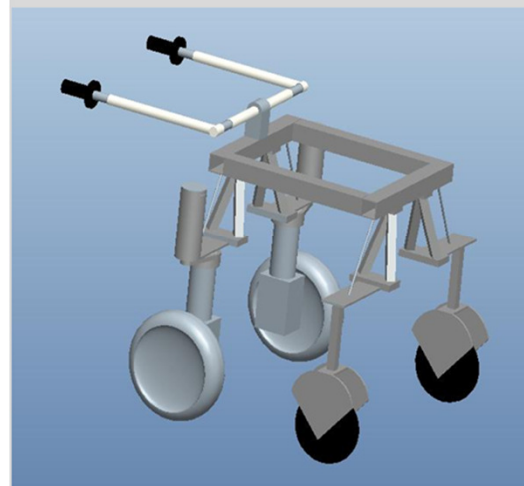
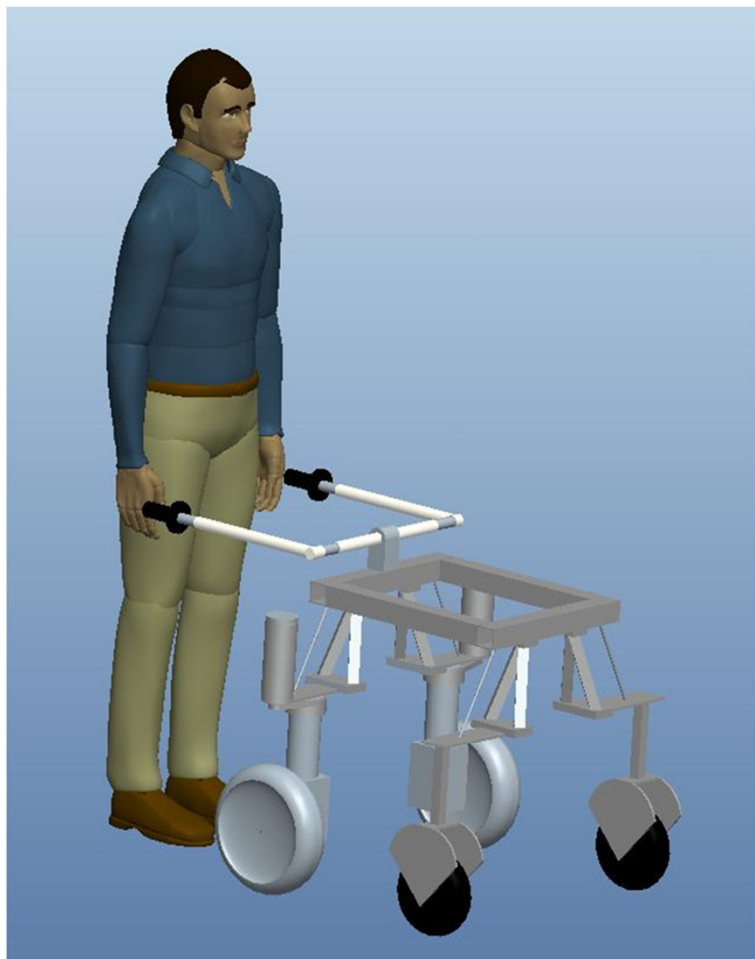
- **Large footprint**
- **Tight user space**
- **Non-uniform suspensions**

Solutions:

- **Eliminate angled suspension**
- **Four-wheeled design**
- **Uniform suspension**
- **Truly Modular**

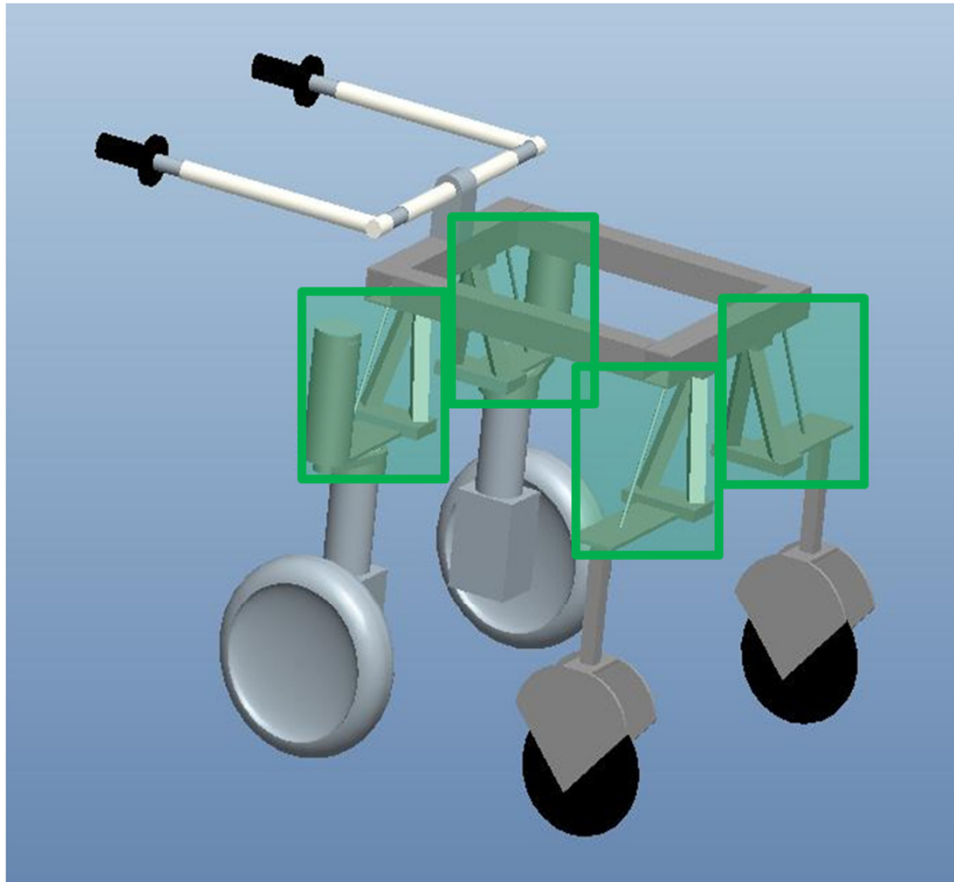


Final Design



Final Design

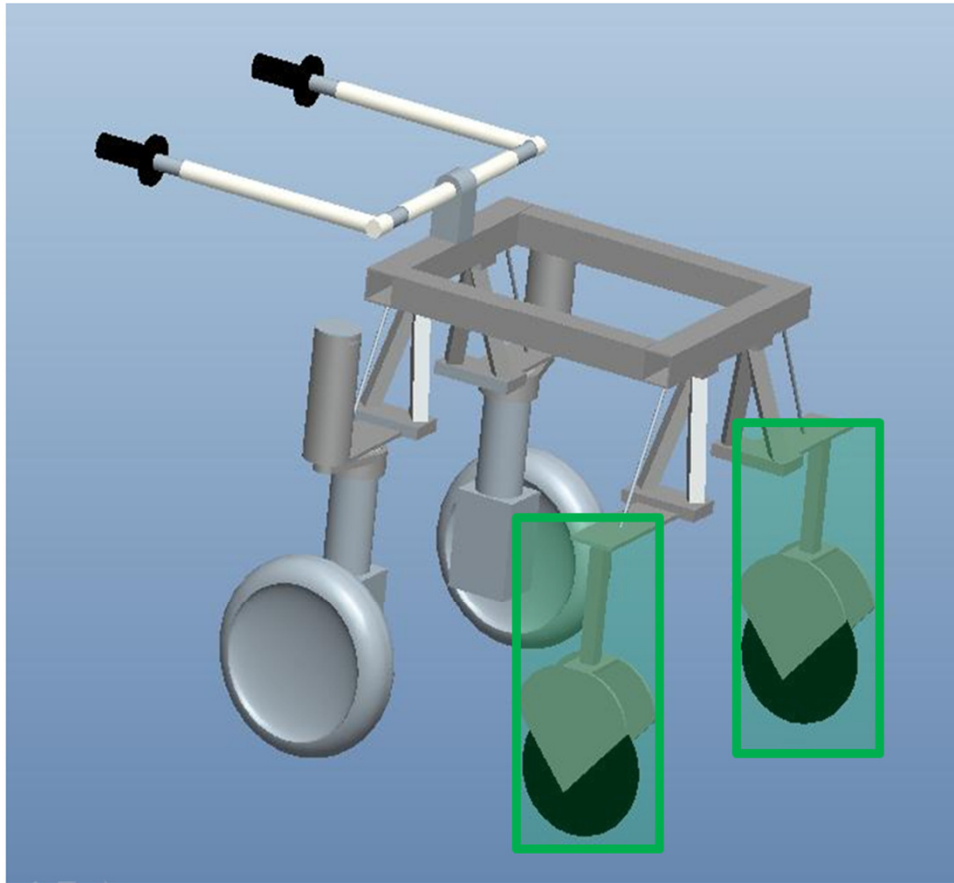
Suspension:



Uniform Suspension

Final Design

Suspension:



Uniform Suspension

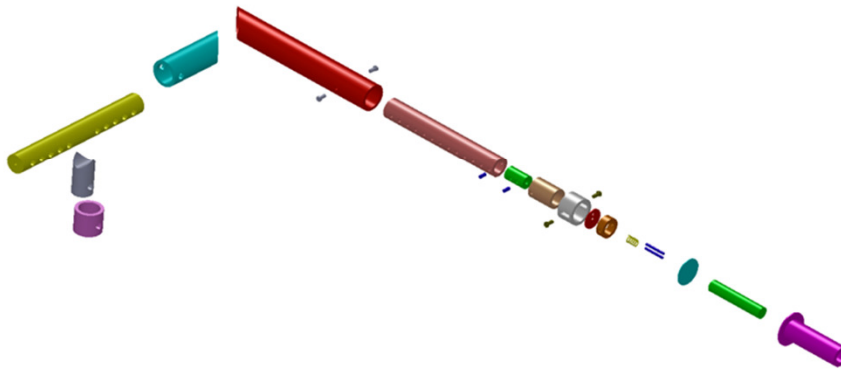
Truly Modular

Current Status



1) Design Overhaul

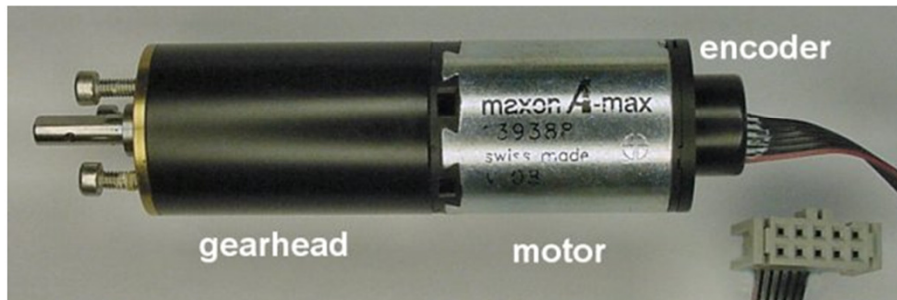
Current Status



1) **Design Overhaul**

2) **Handle Redesign/Parts
Ordering**

Current Status



- 1) Design Overhaul
- 2) Handle Redesign/Parts Ordering
- 3) Steering Motor Specs/Ordering

Current Status



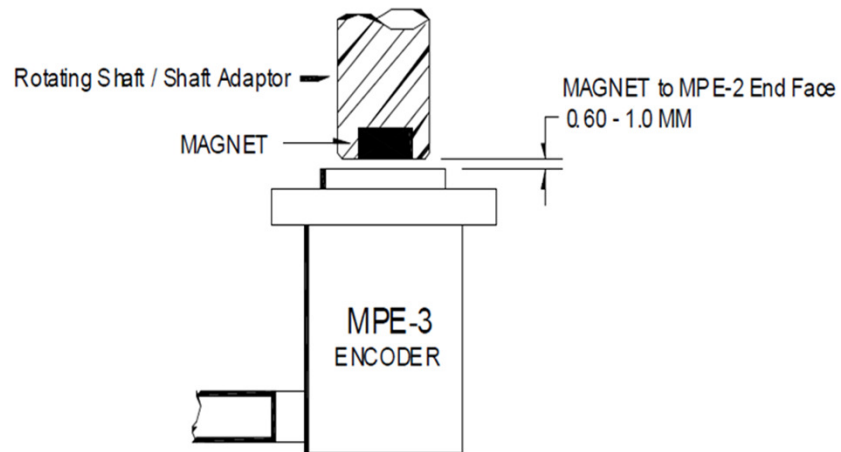
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- 2) **Handle Redesign/Parts Ordering**
- 3) **Steering Motor Specs/Ordering**
- 4) **Driving Motor/Wheels Ordering**

Current Status



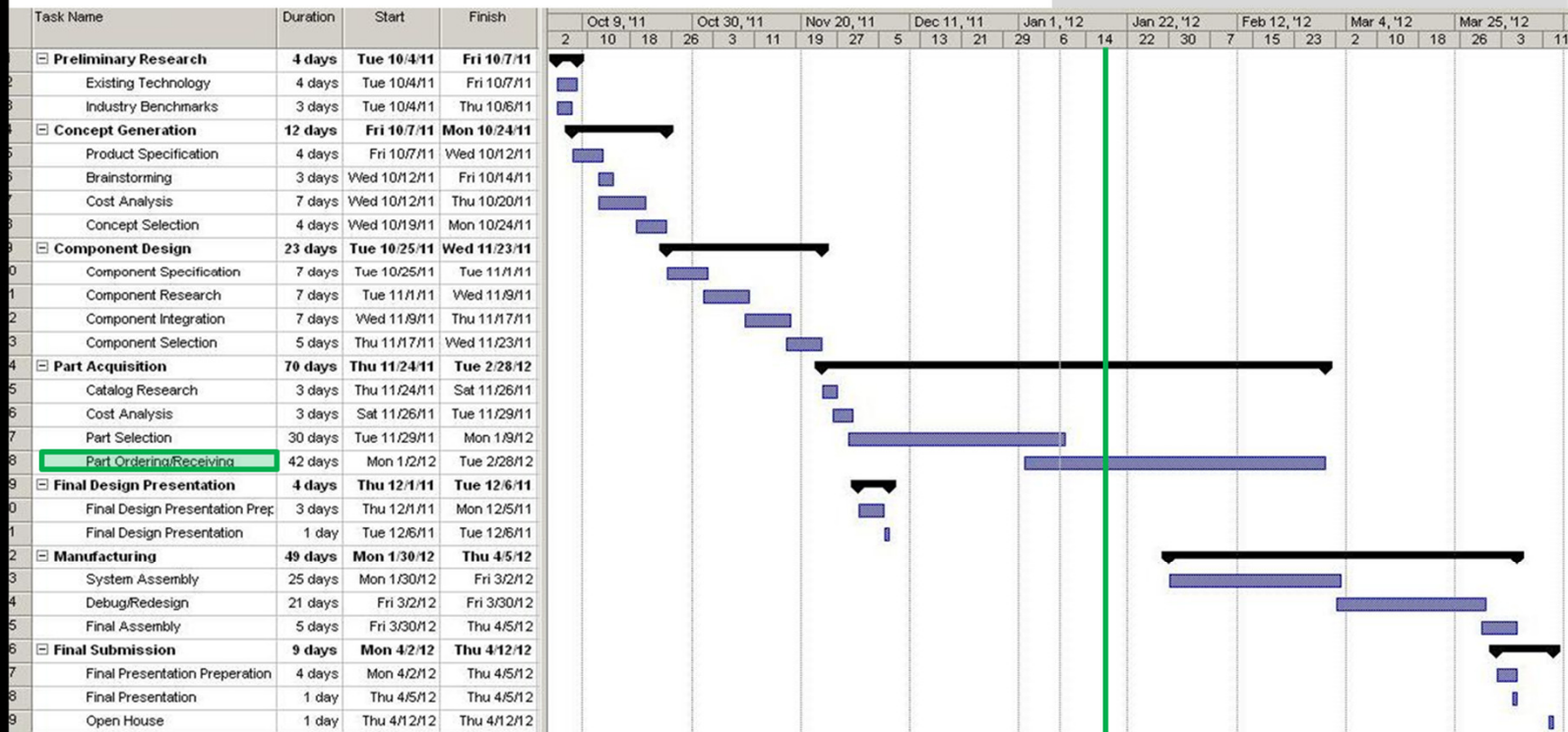
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- 4) Driving Motor/Wheels Ordering
- 5) Battery Specs/Ordering

Current Status



- 1) Design Overhaul
- 2) Handle Redesign/Parts Ordering
- 3) Steering Motor Specs/Ordering
- 4) Driving Motor/Wheels Ordering
- 5) Battery Specs/Ordering
- 6) Magnetic Encoder Ordering

Updated Timeline



Questions?