

Lightweight Enterprises

Group 25
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Lightweight Enterprises' Team



Ben Hieltjes
VP Systems



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CEO



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CFO



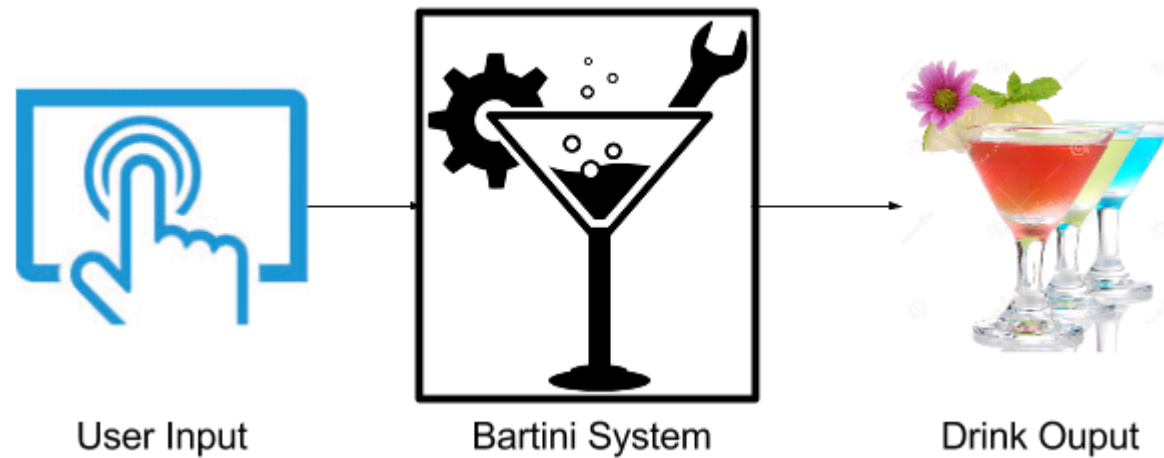
Outline

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- Background and Motivation
- Existing Solutions
- High-level Overview
- Schedule
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- Alterations
 - Future Additions and Production Level Design
- Business Case
- Learning Outcome
- Summary

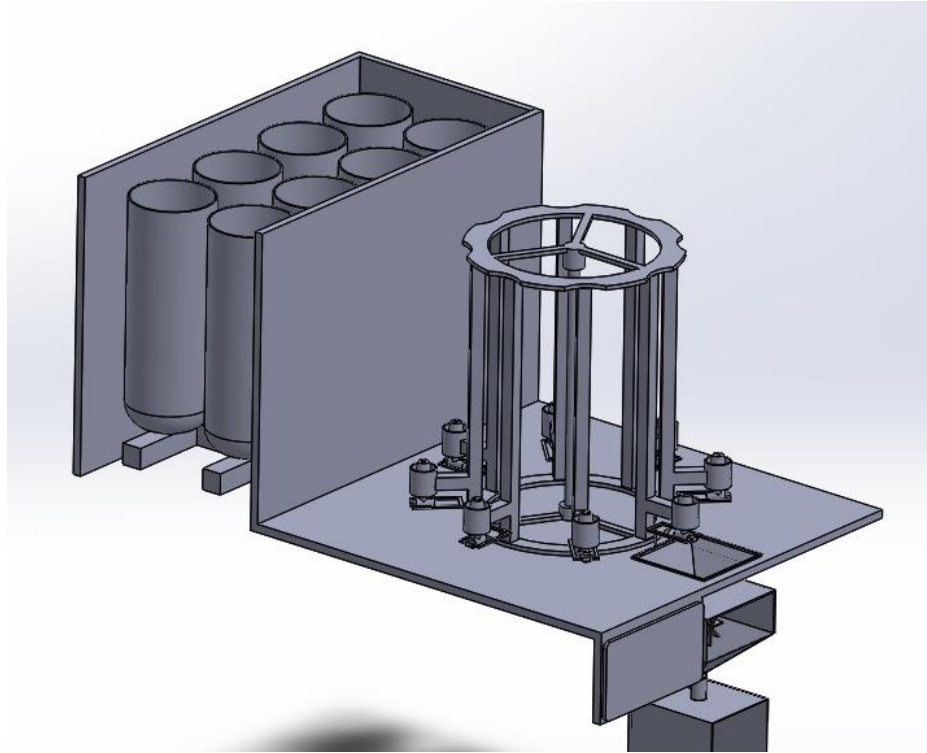
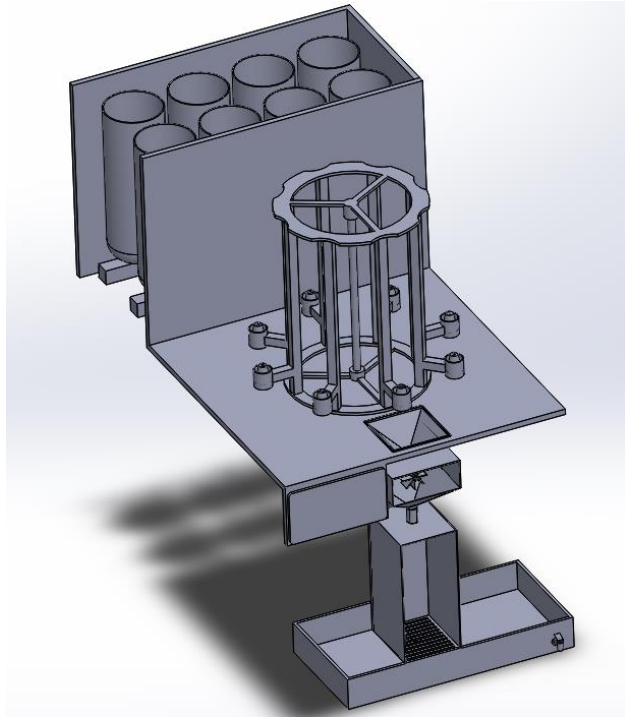


What Is It?

- Bartini is an automated cocktail-mixing machine



Initial Concept



Overview



Goals

- User Friendly
- Marketable
- Entertaining



Background

- Existing Solutions
 - Very few options
 - No large player
 - Aimed at consumers instead of industry
 - Costly



Motivation

- Largely untapped market – Potential for profit
- Combines mechanical, electrical, and software engineering aspects
- A product we would use



Existing Solutions

- Somabar
 - Small household device
 - Debut at CES 2016
 - Yet to ship
 - Kickstarter sales only
 - \$430 US [1]



Somabar System



Existing Solutions

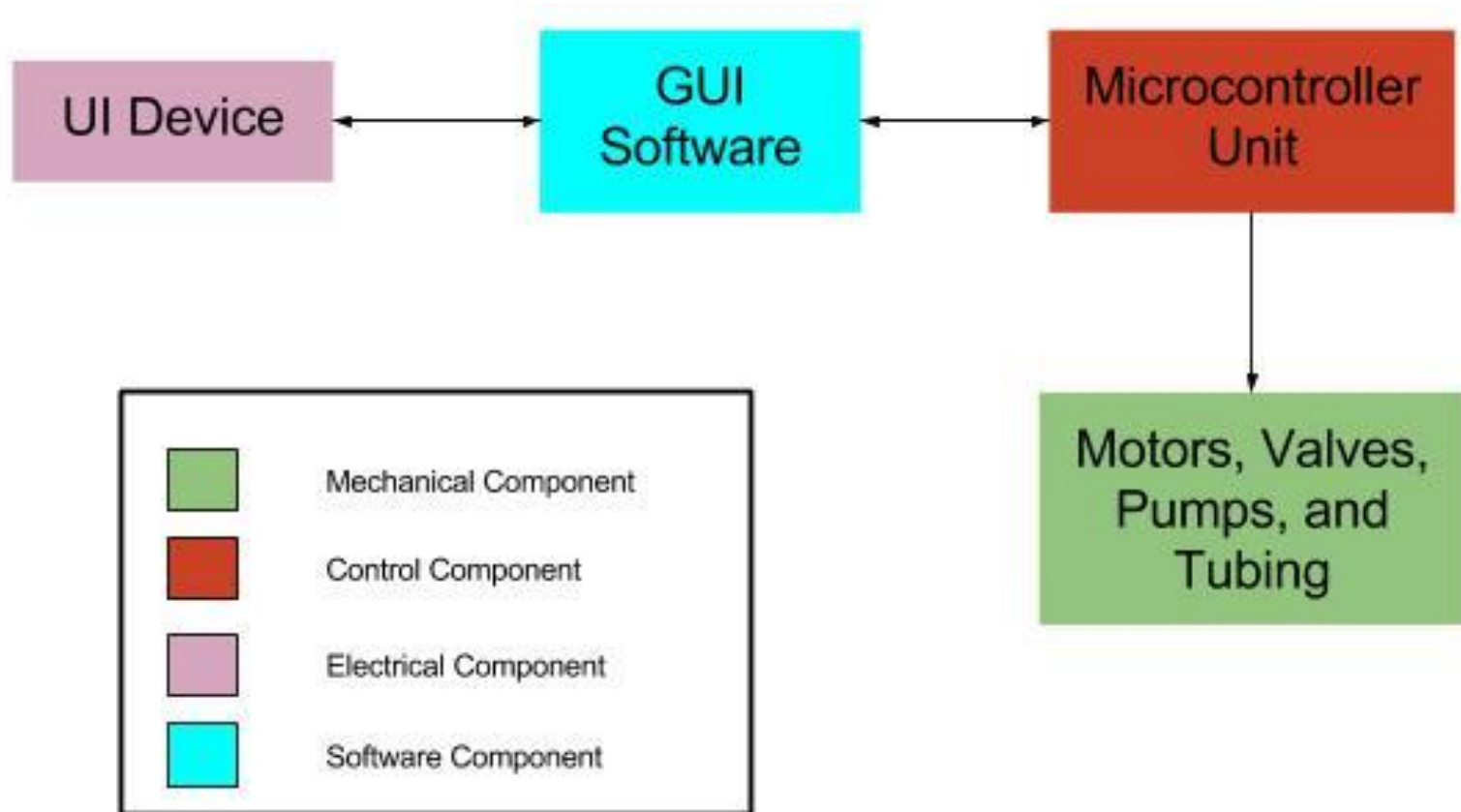
- Monsieur
 - Midsize device
 - Industrial/Consumer Market [2]
 - Small amount of sales in US



Monsieur System



System Overview



Control Elements

- Stepper Motor
- Solenoid Valves
- DC Mixing Motor
- DC Pump
- Servomotor
- Ultrasonic Sensor
- Laser Module




Functionality and Features

- Graphical User Interface



Functionality and Features

- Customization of recipes

| Ingredient | Quantity (in mL) | |
|--------------|------------------|---|
| Vodka | 45 |  |
| Gin | 45 | |
| Cola | 135 | |
| Orange Juice | 20 | |
| None | 0 | |

Save Recipe

Continue >> Cancel

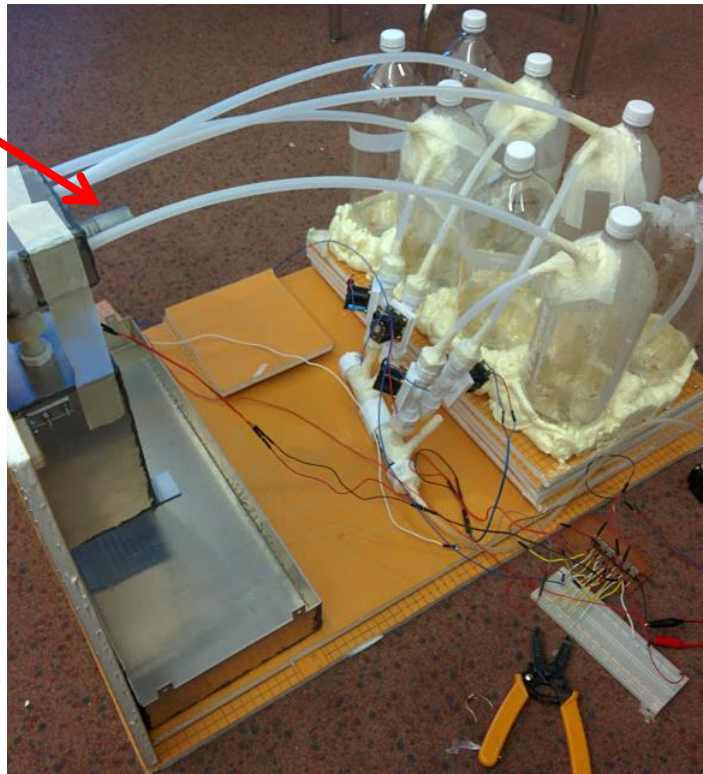
Bartini Customization Menu



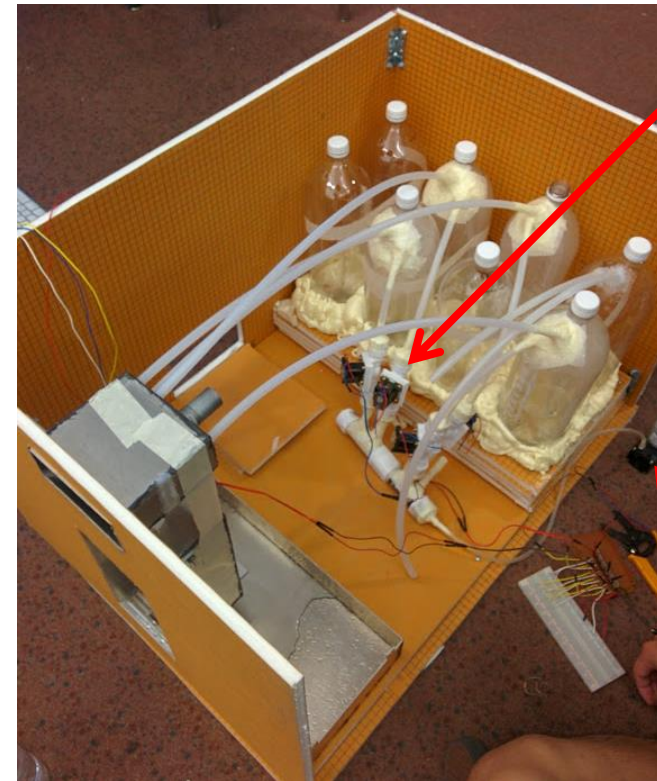
Functionality and Features

- Pressurized Mixer Dispensing System

Motor



Solenoid Valves

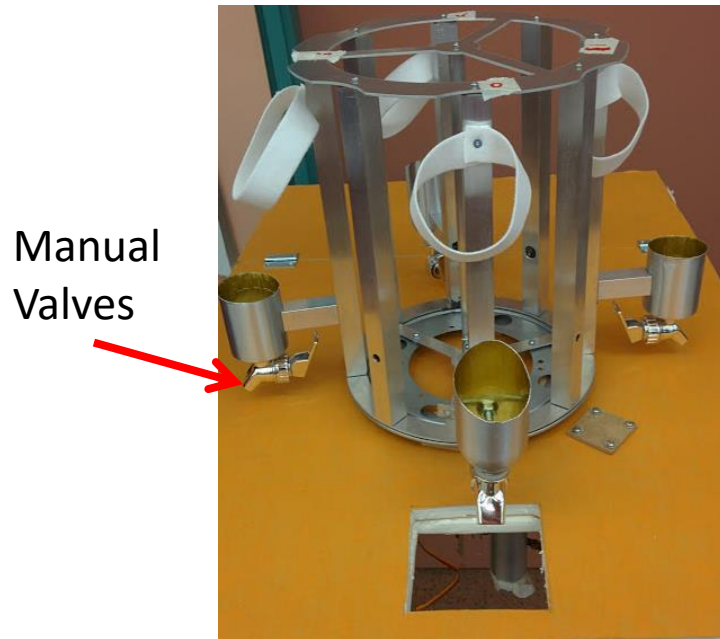


Pump

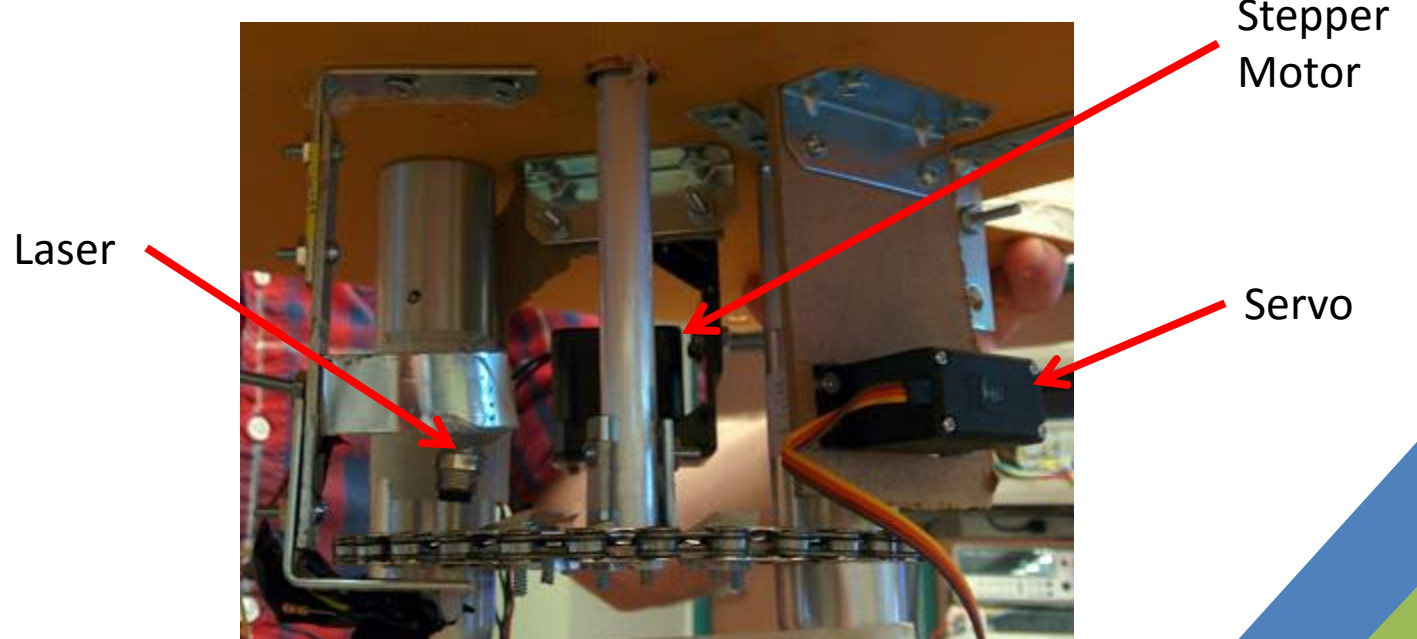


Functionality and Features

- Rotating Bottle-based Dispensing System



Carousel from Top

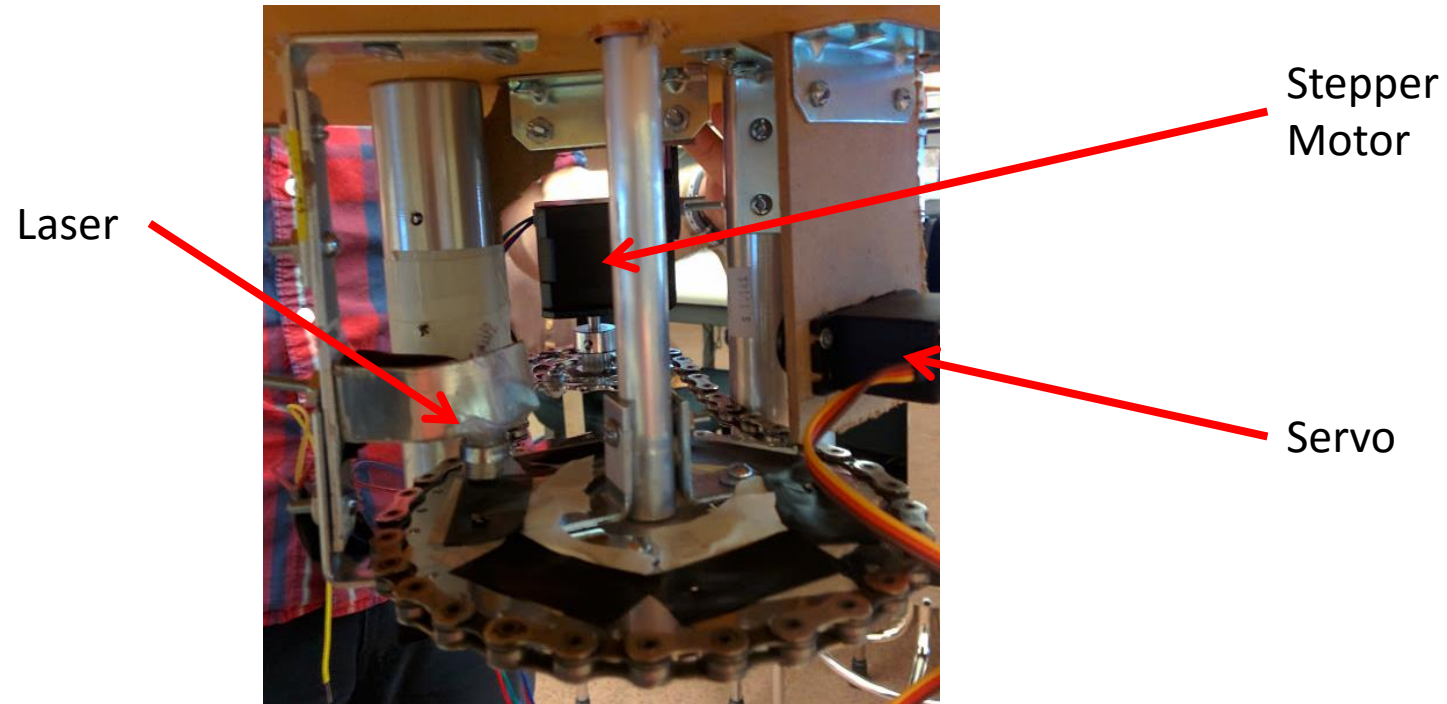


Carousel from Bottom



Functionality and Features

- Rotating Bottle-based Dispensing System



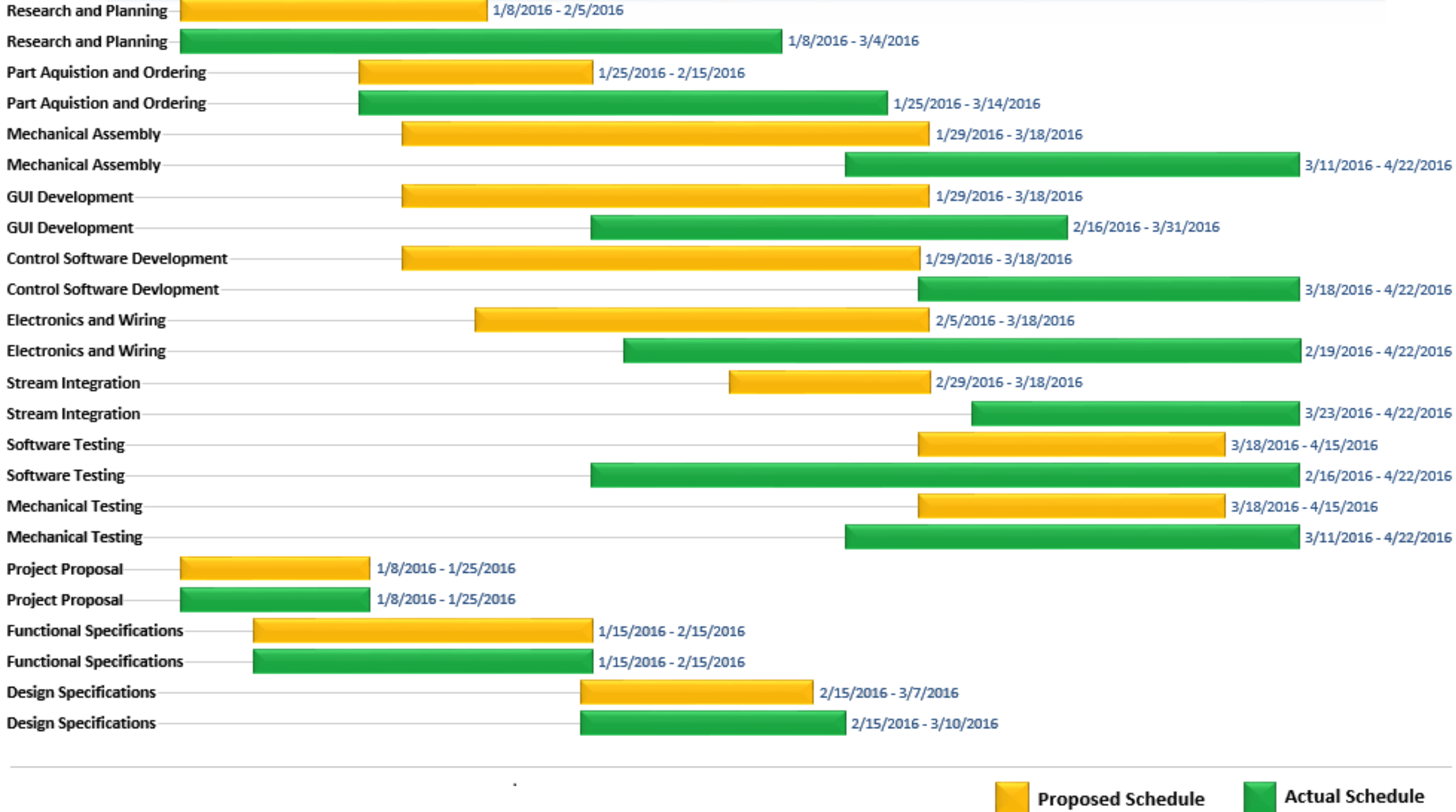
Alternate View of Carousel from Bottom



Schedule

- Delayed when compared to original schedule
 - Part acquisition challenges
 - Mechanically complex
 - Small team
- Concurrent development and test phases
- Prioritized features and functionality





Workload Distribution

| Task | Ben Hieltjes | Luke Mulder | Noel Barron |
|---------------------------|--------------|-------------|-------------|
| GUI Software | XX | | |
| Database Software | XX | | |
| Control Software | XX | XX | |
| Electronic Design | X | X | X |
| Electronic Implementation | X | X | XX |
| Mechanical Design | | XX | |
| Mechanical Construction | | XX | |
| Part Sourcing | X | XX | XX |
| Software Testing | XX | X | X |
| Mechanical Testing | X | XX | XX |
| Electrical Testing | X | X | X |
| Documentation | XX | X | X |



Funding and Donated Parts

- \$450 ESSEF
- Kerdi-Board - Daltile
- Gears, chains, and bearing - Cove Bike Shop



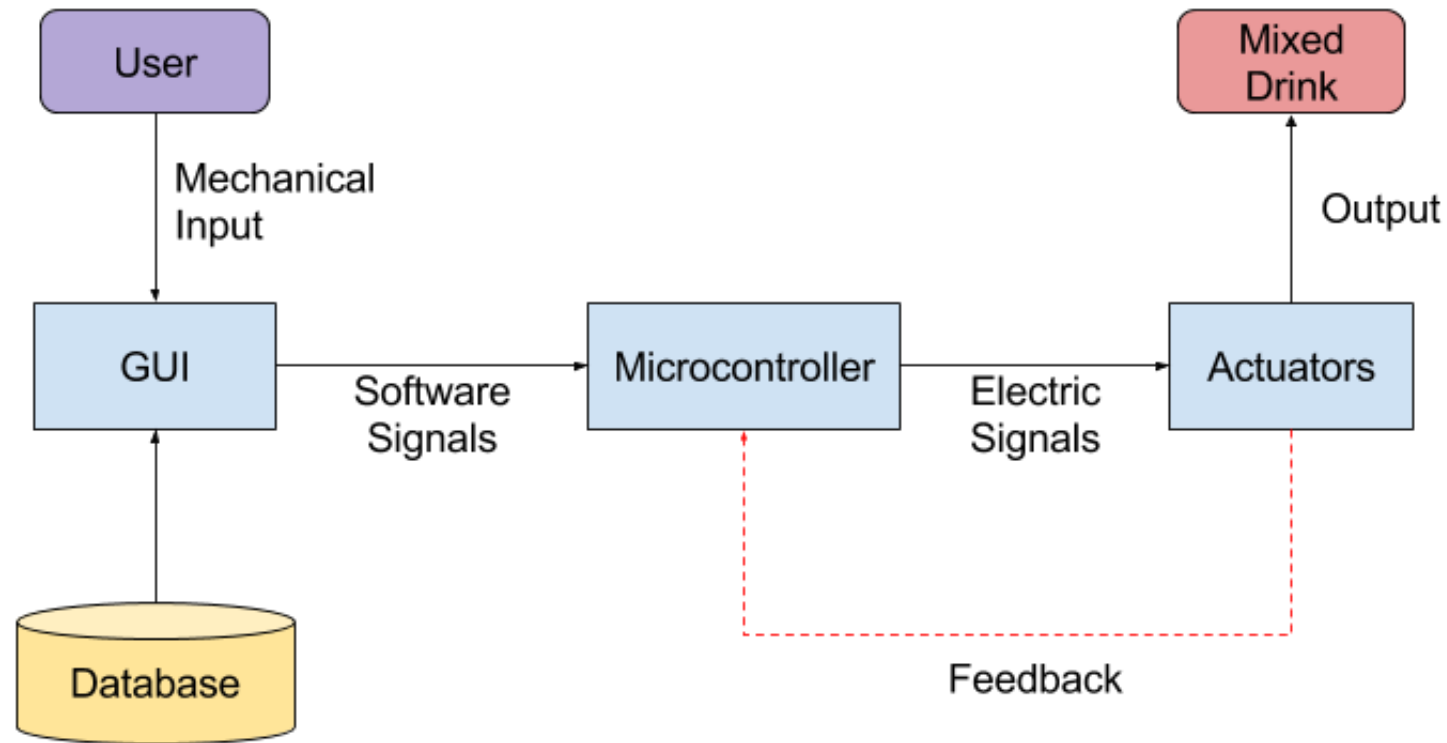
Final Budget

| Equipment | Proposed Cost (\$) | Final Cost (\$) | Difference |
|---|--------------------|-----------------|-------------|
| Raspberry Pi 2 Model B | 60 | 54 | +6 |
| Servos, Mixing Motor, and Carousel Motor | 100 | 32 | +68 |
| Tubing and Fittings | 40 | 30 | +10 |
| Solenoid Valves, DC Pump | 110 | 140 | -30 |
| LEDs and Visual Components | 30 | 0 | +30 |
| Building Materials and Manufacturing | 300 | 360 | -60 |
| <ul style="list-style-type: none"> • Waterjet Cut Parts • Aluminum Tubing • Bottles • Nuts and Bolts • Glue, Epoxy, Silicone Sealant | | | |
| Cooling/Refrigeration | 90 | 0 | +90 |
| Touchscreen for Raspberry Pi | 90 | 0 | +90 |
| Total | 820 | 616 | +204 |
| Tax (12%) | 98 | 74 | +24 |
| Contingency | 150 | 80 | +70 |
| Total (After-Tax) | 1,068 | 770 | +298 |



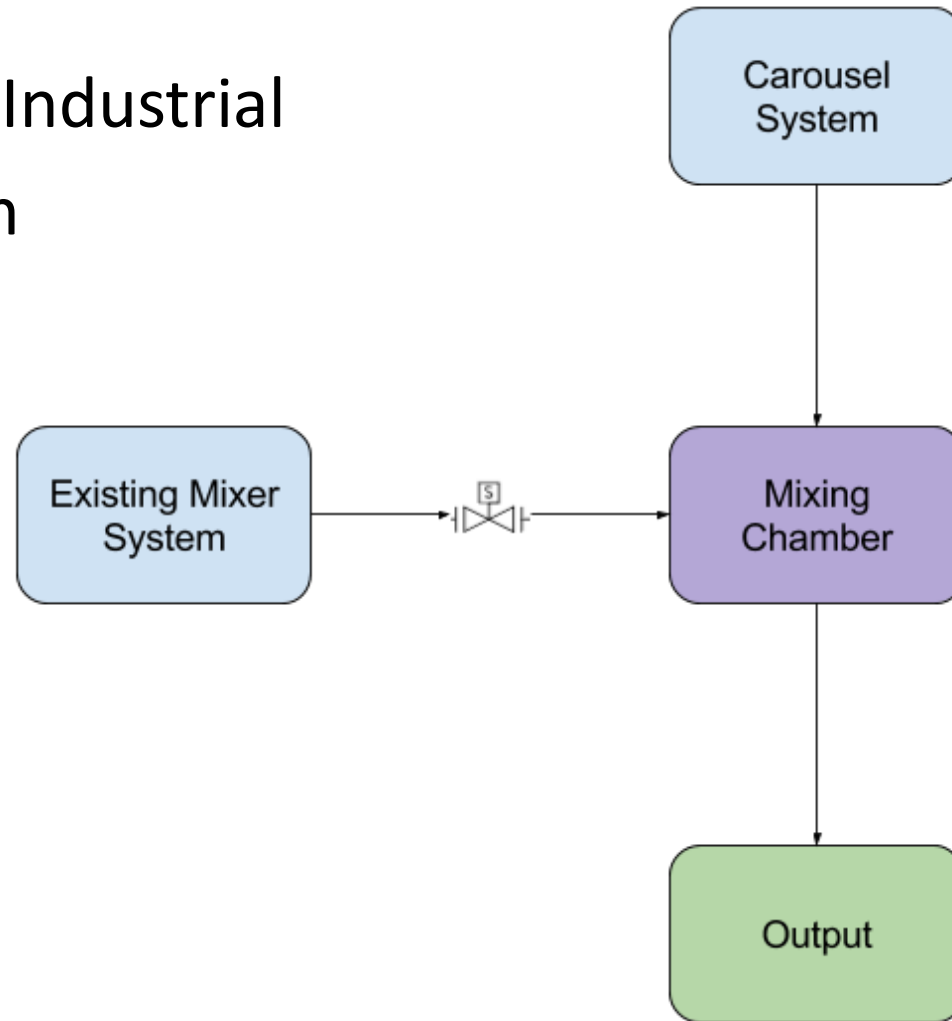
Future Alterations

- Volumetric Feedback System

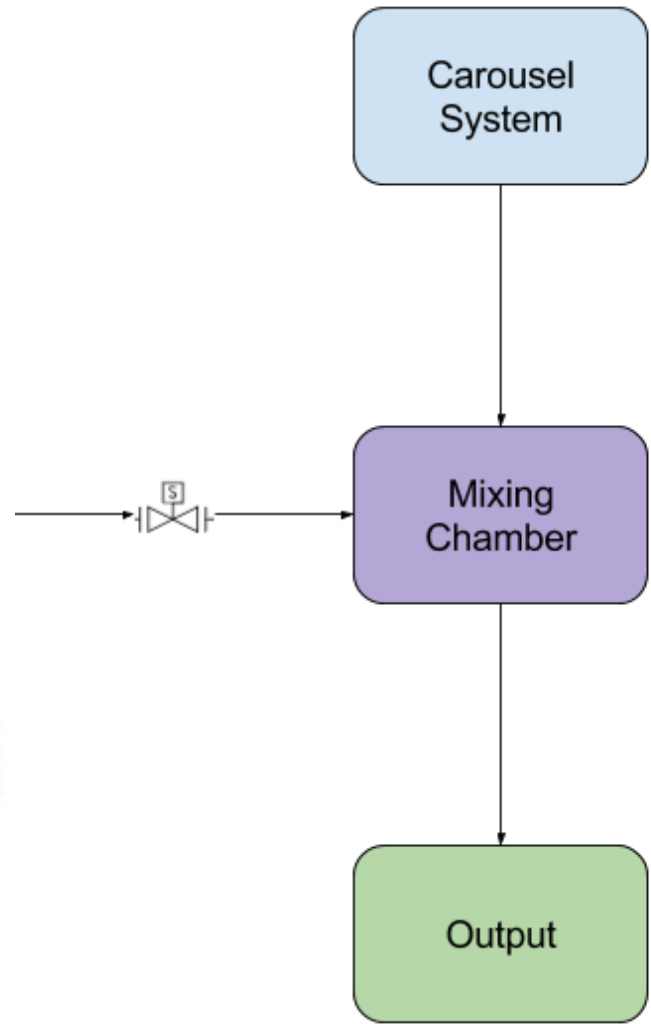


Future Alterations

- Interface for Industrial Mixer System

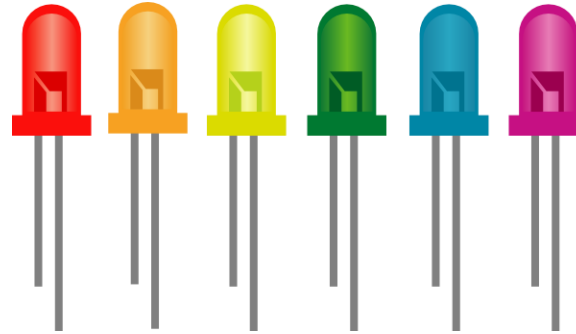


Future Alterations



Future Alterations

- Visual improvements
 - LEDs and lighting
 - Fully metal structure
 - Engineered fittings



- Touchscreen interface



- Integrated cooling system



Business Case

- 3 sources of revenue
 - Unit sales (\$2000-4000 est.)
 - Unit lease
 - Advertising and promotional space
- Large market
- Few competitors



What We've Learnt

- Projects can be significantly more complex than one would believe
- Logistics and budget play a significant role in engineering design
- Project documentation requires as much attention as the technical aspects
- We do not want to be mechanical engineers
- If it can go wrong, it will
 - Mechanical components will break
 - Code/Library incompatibles will be present
 - Simple circuitry problems will take ages to debug



Summary

- The Bartini is capable of dispensing any combination of up to 5 liquids in the system
- Opportunity for profit in an emerging market
- Proof-of-concept system demonstrates the motivation for the project
- Further design is required to take it to a production-level system
- No future development of Bartini is expected



Thanks To

- Dr. Andrew Rawicz
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- Mona Rahbar
- Mahssa Abdolahi
- Soroush Haeri
- Lee's Electronics
- Daltile
- Cove Bike Shop
- DISCo



Questions?



References

- [1] Somabarkickstarter.com, "Somabar | Robotic Bartender for your Home", 2016. [Online]. Available: <http://www.somabarkickstarter.com/>. [Accessed: 22- Jan- 2016].
- [2] MONSIEUR: The Automated Bartender - Professional Quality Cocktails in Seconds, "MONSIEUR: The Automated Bartender", 2016. [Online]. Available: <http://monsieur.co/>. [Accessed: 22- Jan- 2016].

