LexAid
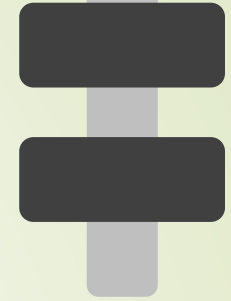
Flipp: A Page Turning Device

Team Introduction

- Daniel Miess (Chief Executive Officer)
  - Project Manager
  - Electrical Systems
- Hesam Bagheri Azghadi (Chief Financial Officer)
  - Budget Manager
  - Material Acquisition
- Rajdeep Singh (Chief Technology Officer)
  - Integration Manager
  - Software Development
- Kamal Ezz (Chief Information Officer)
  - Mechanical System Manager
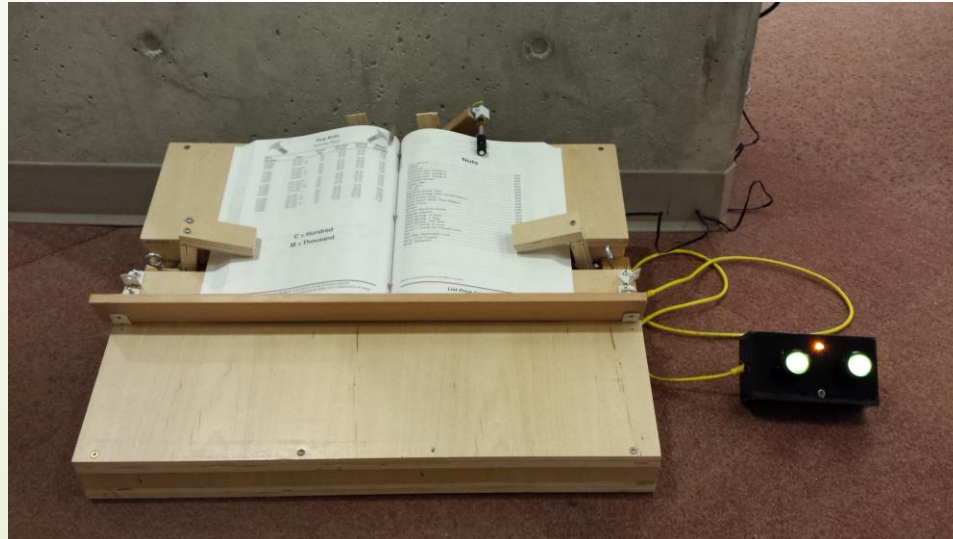 - Material Assembly

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Agenda

- Purpose
- System Overview
  - Software
  - Electrical
  - Mechanical
- Market Potential
- Schedule
- Budget
- Outcomes
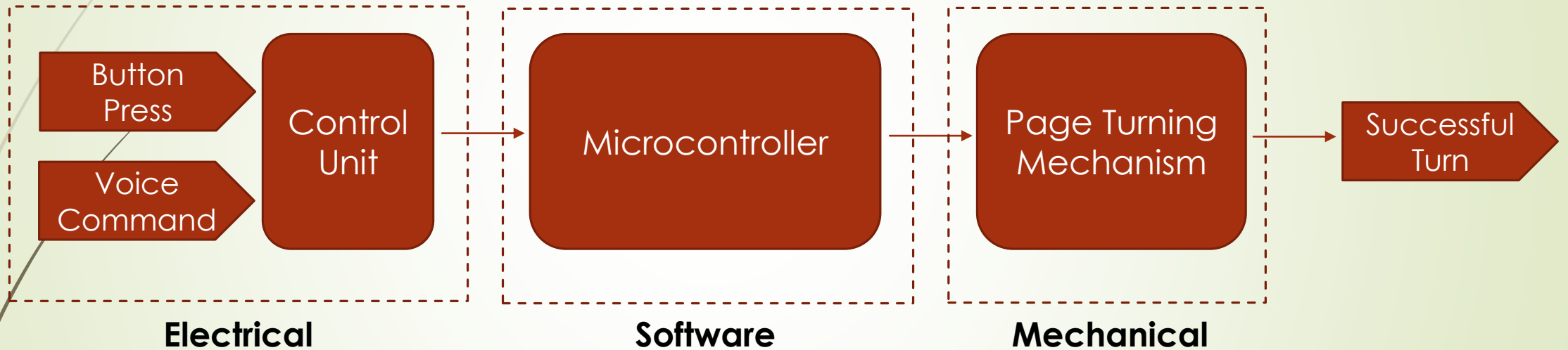- Acknowledgements
- Questions
- Demonstration

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Purpose

- Flipping through the pages of a book is a challenge for physically disabled individuals

- Studies have shown that printed media remains the most preferable and widely used among the older users as compared with digital text

- Older people are unfamiliar or uncomfortable with new technologies such as e-readers

- Frequent readers have complained about possible risks and eye fatigue associated with e-readers

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System Overview

- LexAid Flipp is an electro-mechanical system designed to automate the action of turning the pages of a book

- By performing synchronized motor rotations, the system can turn pages in the desired direction

- Flipp can be triggered by either push-down buttons or voice commands

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System Overview

Button Press →
Voice Command →
Control Unit → **Microcontroller** → **Page Turning Mechanism** → Successful Turn

Electrical   **Software**   **Mechanical**

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System Overview - Software

- The system is controlled by an Atmel ATMEGA328 microcontroller programmed using C libraries

- The microcontroller is responsible for processing digital I/O signals that are needed to perform the desired actions

- I/O signals coordinate control of:
  - Motors
  - LEDs
  - Buttons
  - Voice Commands

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System Overview - Electrical
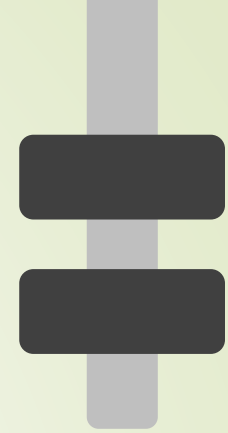
- The device is powered by a power converter connected to a standard wall outlet

- The main components of the electrical system include:
  - SpeakUp Board
  - Microcontroller
  - H-bridges
  - Hall Effect Sensor

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System Overview - Mechanical

Flipp's turning mechanism is performed by:

- Flaps – Hold the book open
- Main Lifting Arm – Determines the direction of the turn
- Rotating Wheel – Grips the top page to be turned
- Turning Arm – Flips the page to the desired side

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Market Potential

- Our targeted audience is individuals with dexterity impairments that prevent them from fine control of their fingers
  - Disabled
  - Elderly

- Current devices fail to fully satisfy the needs of this market

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Schedule
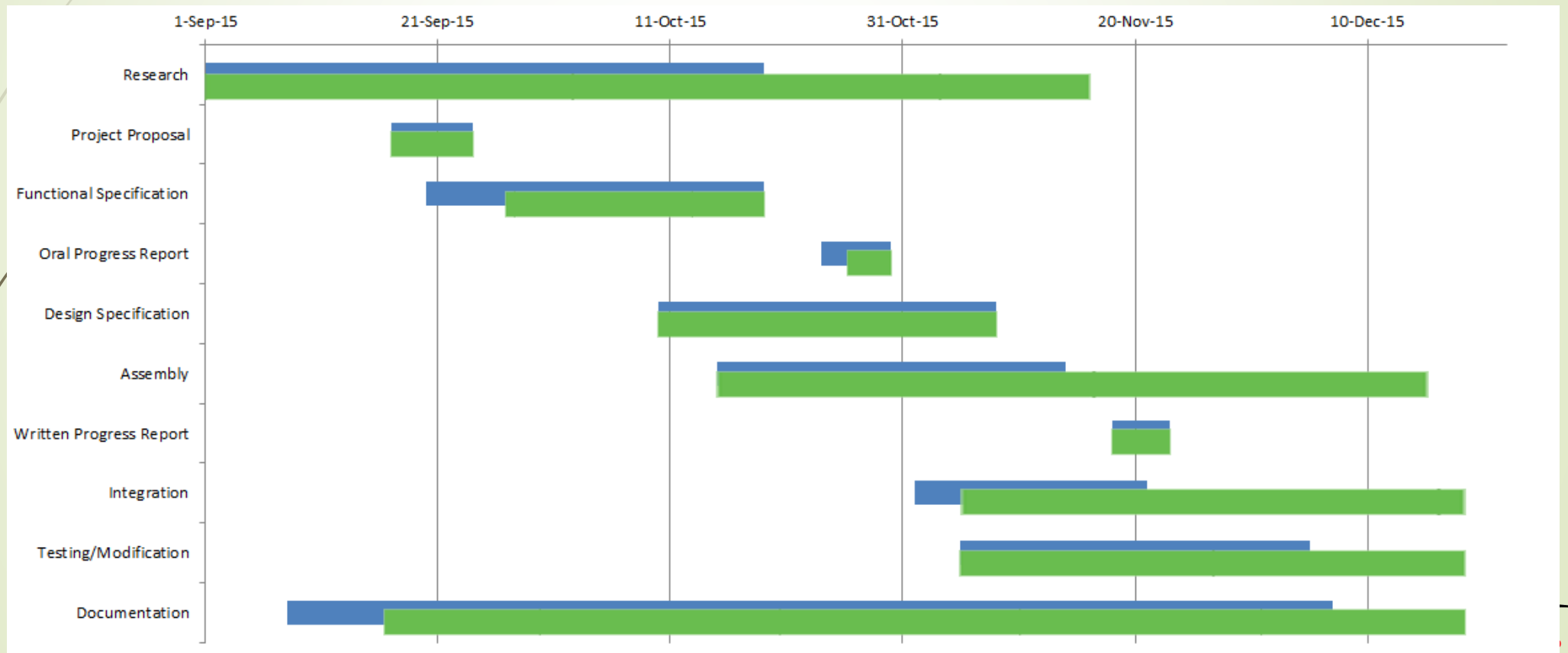
Budget

Project Component	Estimated Cost	Actual Cost	Difference
Materials	$25	$158.49	+534%
Mechanical Components	$262.50	$110.00	-58.1%
Electrical Components	$475.00	$759.91	+60.0%
PCB Fabrication	---	$72.00	---
Total	$762.50	$1100.40	+44.3%

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Outcomes

Goals achieved:

- Flaps are able to engage to keep the book open
- Rotating wheel is able to grip a single page
- Turning arm is able to successfully turn the page
- The device is triggered via voice commands

Future goals:

- Increasing the rate of success of grabbing a single page
- Accommodating a wider range of book sizes
- Improving voice recognition
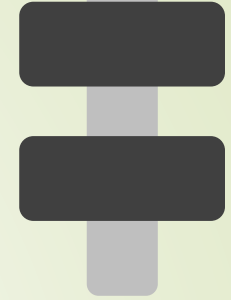- Custom PCB Implementation

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What We Learned

- Electro-mechanical Systems
- H-bridge
- Current Sensing
- PCB Design & Assembly
- Time Management
- Budgeting
- Design Changes

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Acknowledgements

- Dr. Andrew Rawicz
- Steve Whitmore
- TAs - Jamal Bahari, Shaun Fickling, Lukas-Karim Merhi
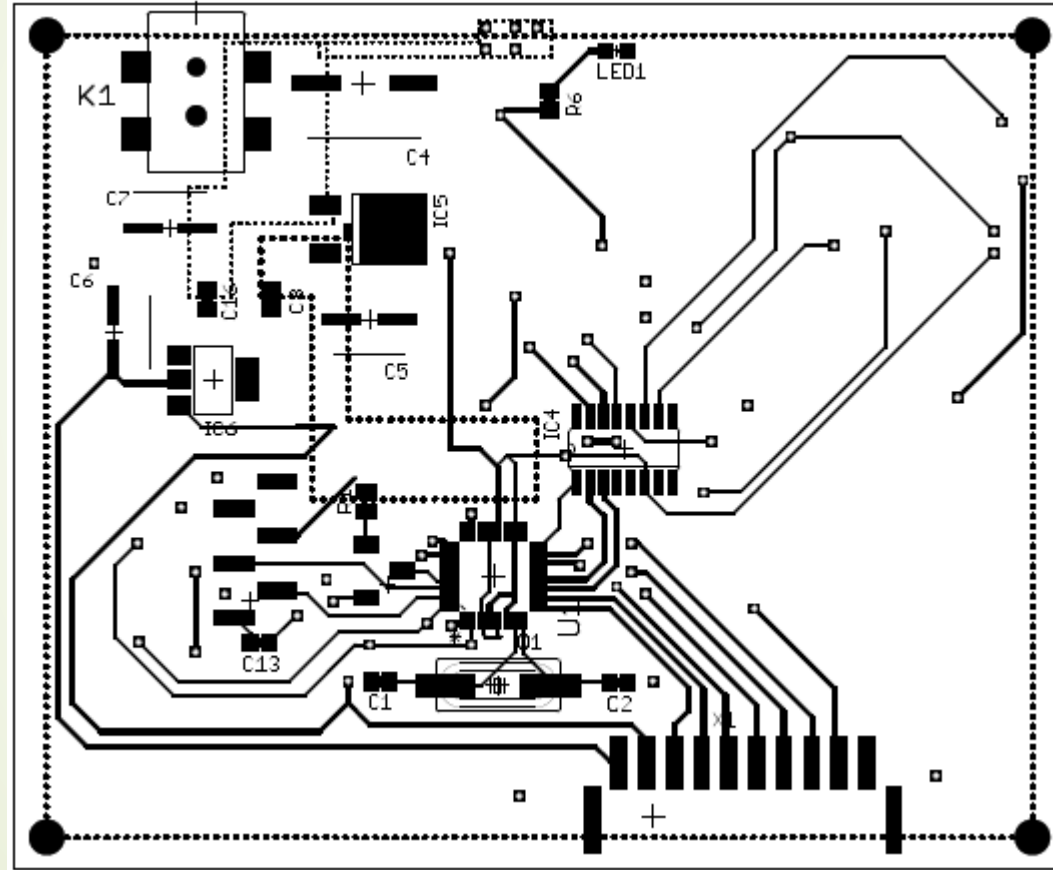- Bob Zubic (Machinist)
- SFU Engineering Science Student Society

Questions

Demonstration

Appendix

Appendix