

Spin Wheel

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1 Problem Statement

To be able to bring qualities in higher end scroll wheels into a lower costing option

Fixed Functionality – Most scroll wheels can only scroll.

Limited Customization – Users can’t adapt them for their workflow.

Mechanical Wear & Tear – Traditional scroll wheels degrade over time.

Inefficiency for Power Users – Designers, video editors, and gamers need specialized controls.

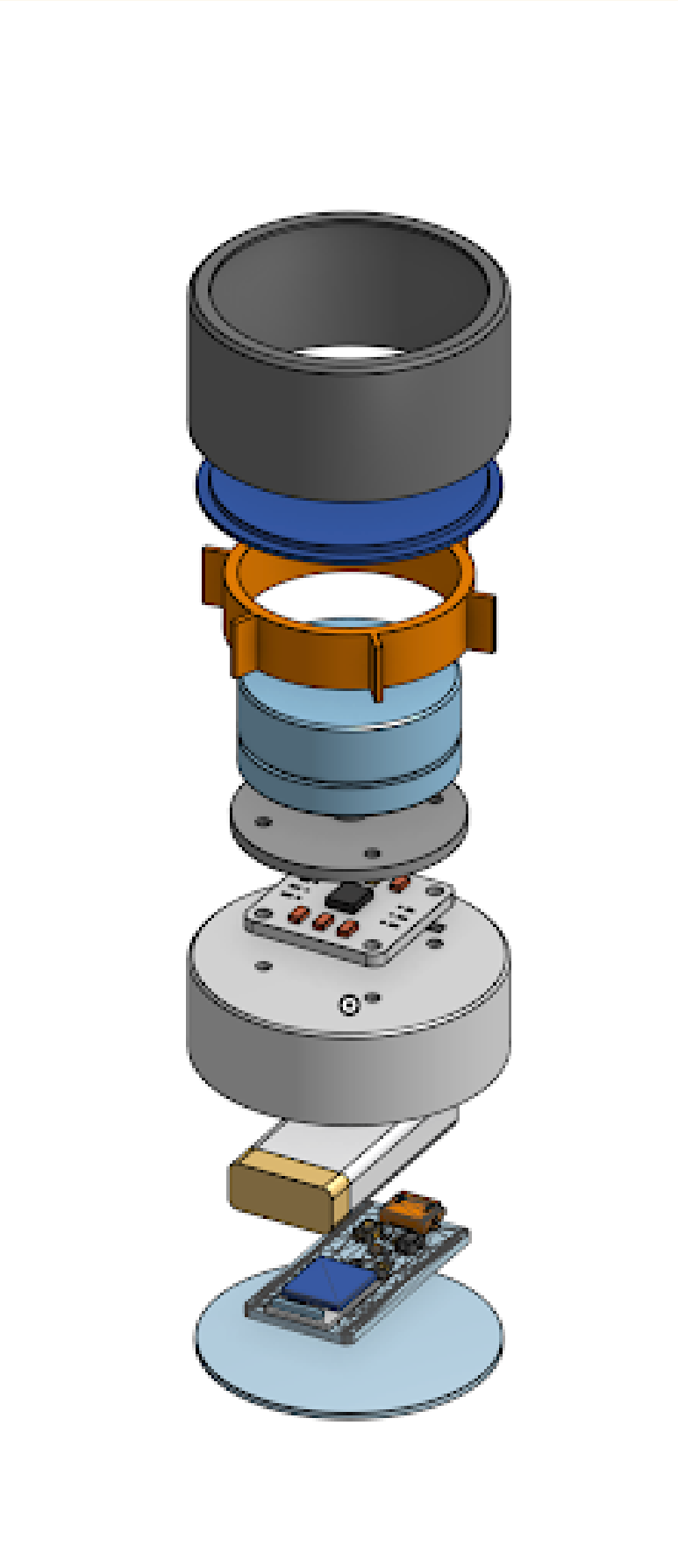
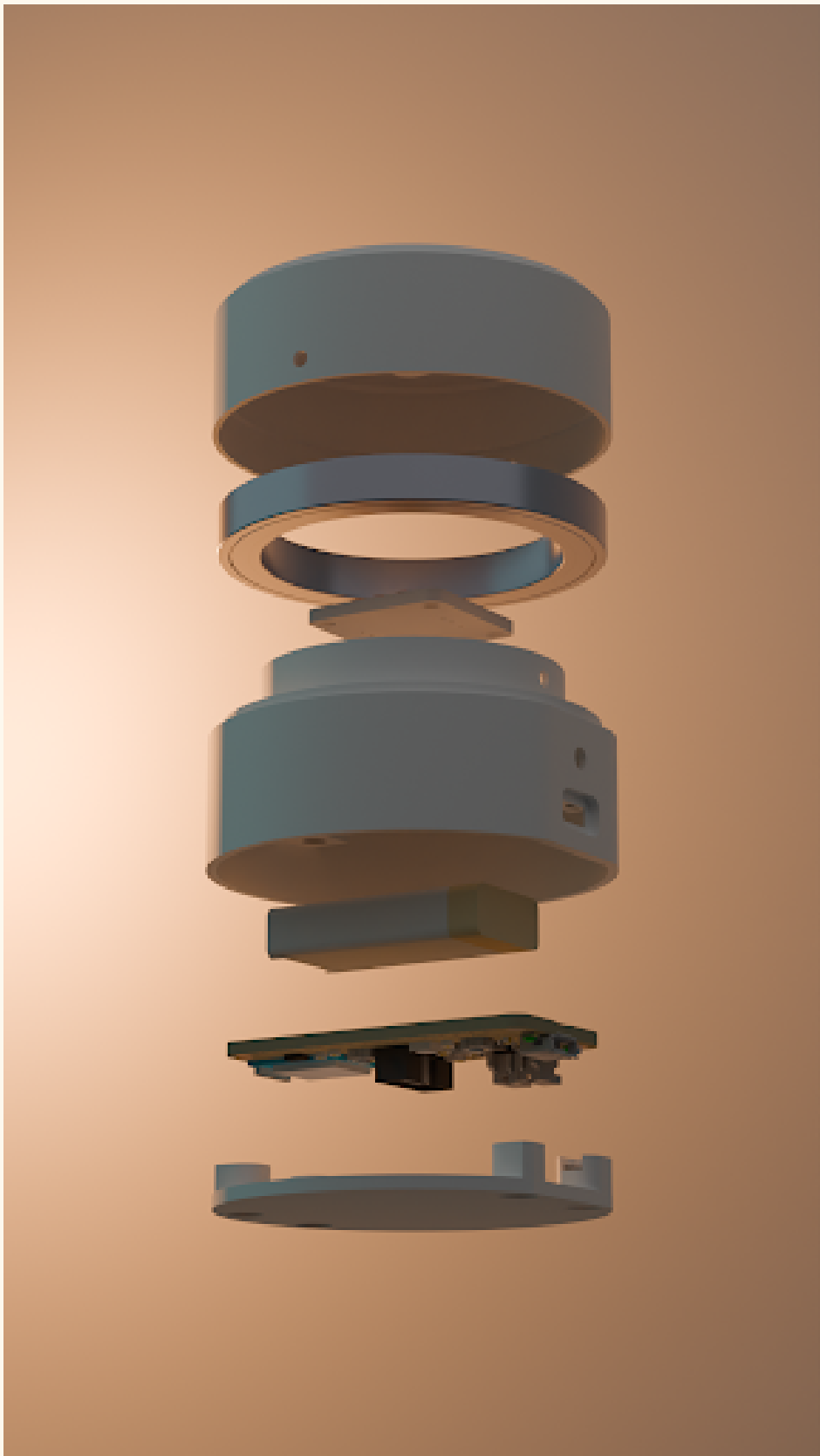
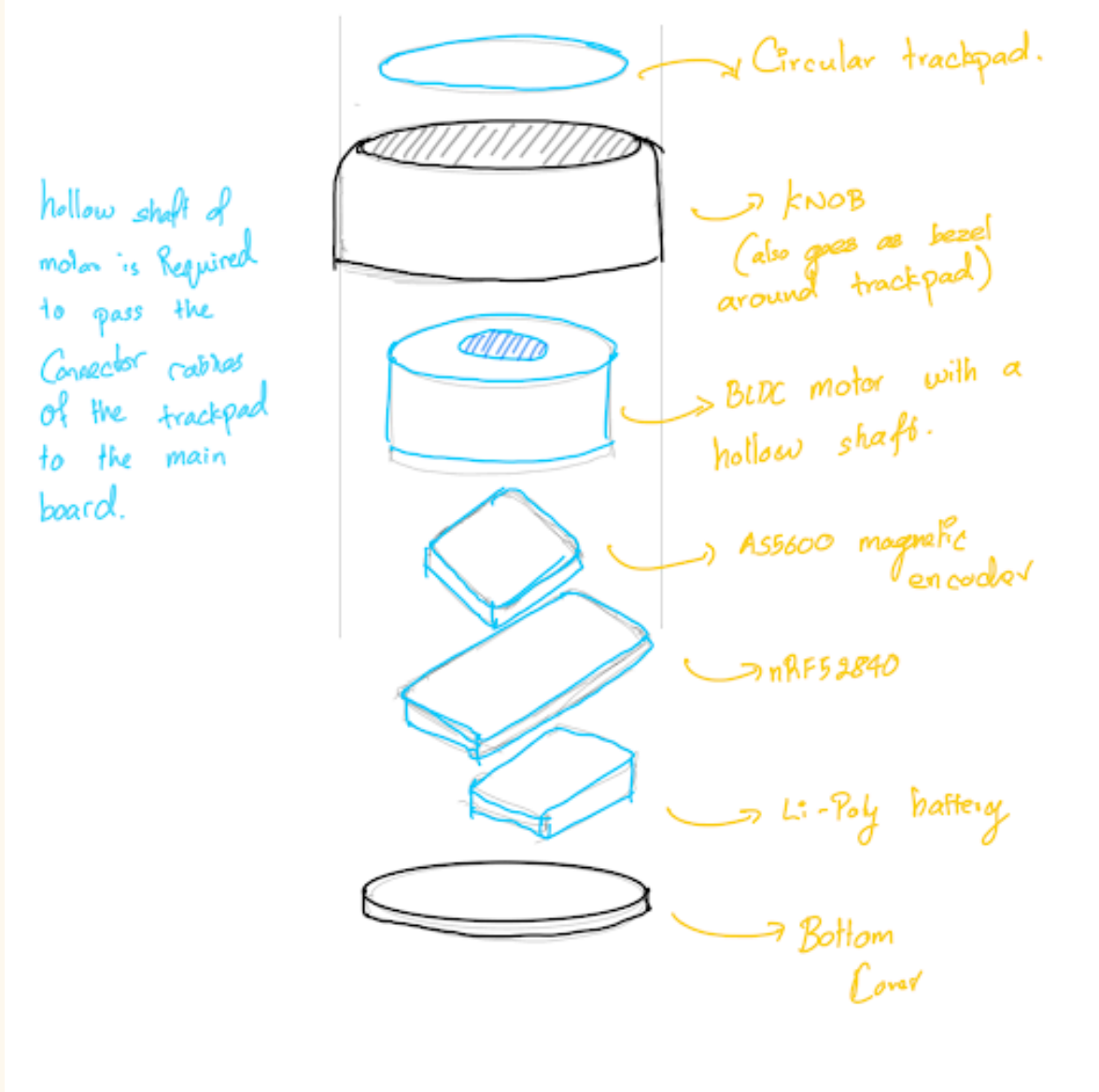
Easy Accessibility - usable without strain

2 Customer & Engineering Hypothesis

I believe that, by the end of 2050, our new scroll wheel will become common place for frequent computer users. Changing how people traverse through long pdfs and other large files. This change is needed because of how tedious it currently is to scroll through text files with more than 100 pages. Most companies put efficiency above most other metrics. Increasing precision and customizability when performing such common place tasks like scrolling, will increase work efficiency.

If the Spin Wheel integrates a high-resolution magnetic encoder (AS5600) with customizable resistance and low-latency Bluetooth/USB connectivity, users will experience a 30% productivity boost due to enhanced scrolling precision, reduced lag, and tactical feedback, leading to higher adoption among professionals, gamers, and accessibility users while maintaining acceptable power efficiency, and device weight. Outweighing trade-offs like a more cluttered desk and the reliance on batteries, and allowing qualities found in high end models to be accessible at a more affordable price.

6 Modelling & designs



5 NPV

NPV - ABS

Injection Molding

Reports

Part Information

Material: Acrylonitrile Butadiene Styrene (ABS), Molded

Envelope 2.5 x 2.5 x 1

Max. wall thickness (in): 0.08

Ported area (in²): 3

Volume (in³): 5

Surface roughness (in): Not critical (Ra > 32)

Connectivity: Moderate

Process Parameters

Cost

Update Estimate

Material: \$183.790 (\$0.184 per part)

Production: \$52.267 (\$0.053 per part)

Tooling: \$56.056 (\$0.056 per part)

Total: \$292.113 (\$0.293 per part)

Tooling & Ramp Up

Material cost and production cost is included in the unit production cost.

Tooling comes out to \$ 60K

So, we approximate tooling and ramp-up to \$ 100K

Development & Testing

Did not change values.

Development : 120K for 9 periods ~ \$ 1M

Testing : 100K for 4 periods ~ \$ 400K

Total ~ \$ 1.5M

Project NPV \$ 3,035,521

Base NPV 10,000,000

Changes from Base NPV % of NPV \$ change -69.6% -6964479

Model Values

	first	last	base burn rate	adjusted burn rate	%Δ from base value	\$Δ from base value
Development	1	9	-120000	-120000	0.0%	0
Testing	7	11	-100000	-100000	0.0%	0
Tooling and Ramp-Up Cost	10	11	-100000	-100000	0.0%	0
Market Introduction	10	22	-80000	-80000	0.0%	0
Ongoing Marketing Costs	11	22	-250000	-250000	0.0%	0
Unit Sales	1	36	38458	38458	0.0%	0
Unit Price	1	36	50	50.000	0.0%	0.00
Unit Production Cost	1	36	-25	-25.000	0.0%	0.00
Discount Rate (per time period)			10.00%			

Set input values in shaded cells.

NPV (ABS) ~ \$ 3 Million

3 HOQ 1 & 2



Engineering Characteristics	Competitor Rankings 1-Poor, 3-Ok, 5-Excellent				
	CR	dell mouse	kensington track ball	3d connection space mouse	Microsoft Surface Dial
Expecter	Scrolling (Smooth, Precise)	4	4	2	4
Expecter	Cross Platform Use	5	5	3	1
Competitive advantage	Customizable Scroll Feel	1	1	3	3
	Durability	2	2	1	3
	Battery Life	5	5	3	3
Competitive advantage	Additional Control	1	1	4	3

4 Utility Value Summary from CBC

- The Value:
- Addresses unmet needs (precision, control, and ergonomics).
 - Provides customization that standard scroll wheels lack.
 - Enhances productivity and workflow efficiency for specific user groups.

Utility Factor	Benefit to Users
High-Resolution Scrolling	More precise navigation for CAD, video editing, and gaming.
Adjustable Resistance (Free-Spin & Detents)	Customization enhances user experience based on preferences.
Low-Latency Bluetooth & USB Support	Ensures seamless scrolling across different platforms.
Power-Efficient Design (nRF52840 MCU)	Longer battery life for wireless users.
Durable Magnetic Encoder (AS5600)	No mechanical wear, ensuring long-term reliability.
Cross-Platform Compatibility	Works with Windows, macOS, Linux, and gaming consoles

