

SAMPLE PORTFOLIO

JAMES BOYDELL



JAMES BOYDELL

boydelldesign@gmail.com
boydelldesign.com
520.484.3045



REDIGO

POWERTOOL PROJECT



TSD

UI/UX PROJECT



E-99

GAMING MOUSE

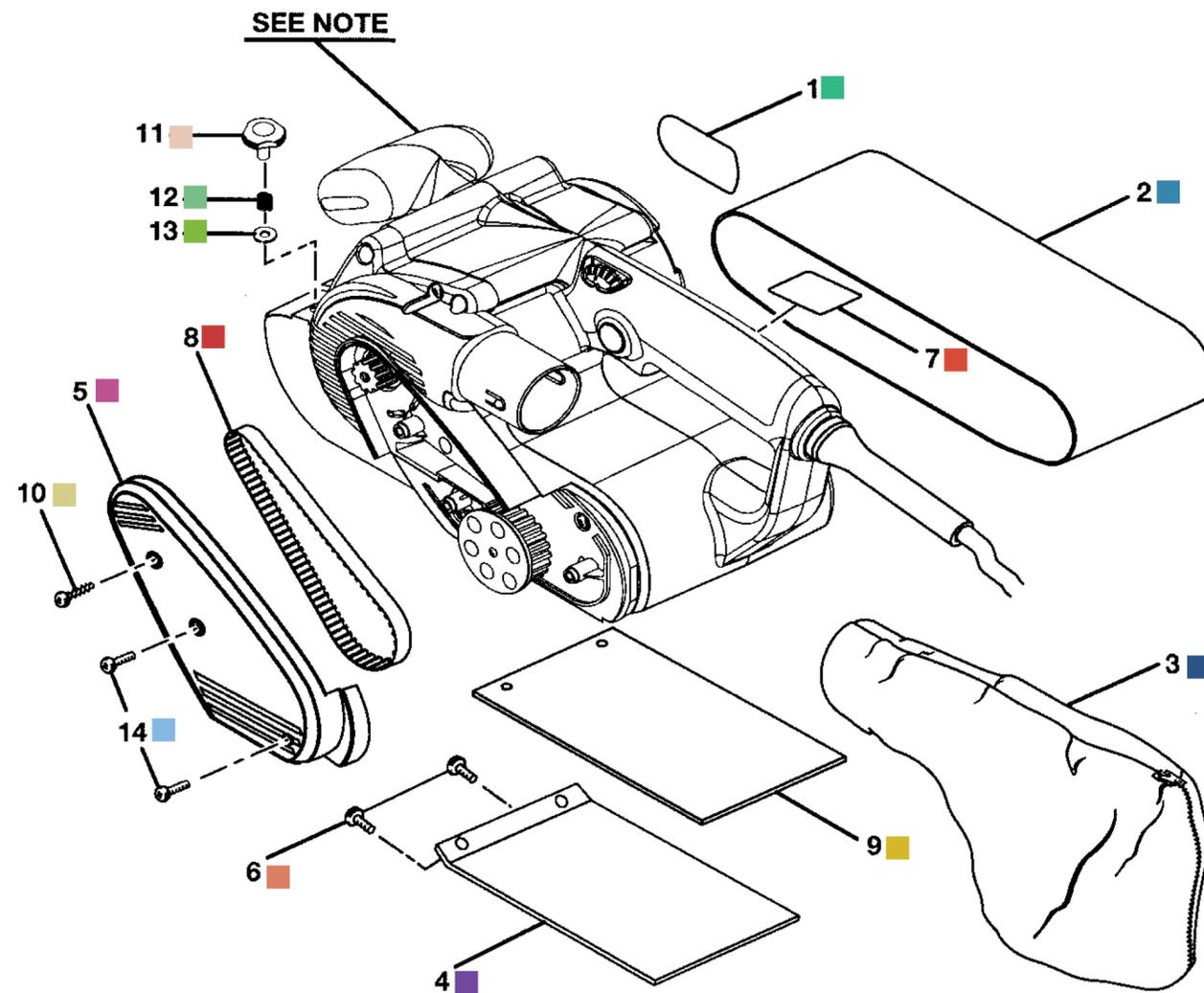




REDIGO

POWERTOOL PROJECT

Exploded View



1	Logo plate
2	Sanding Belt
3	Sander dust bag
4	Sander wear plate
5	Belt cover
6	Screw
7	Cover
8	Belt
9	Sander backing pad
10	Screw
11	Sander tracking knob
12	Spring
13	Flat washer
14	Screw

Revised Improvements List

Design based on ability to be used as stationary or portable

Design based on need to be placed upside down when changing belt

Power cord storage

Improved grip form/materials to reduce fatigue during use

Reduce materials needed for production

Allow hookup for shop-vac on dust bag port - used while in table-top mode

Actionable Insights

1. Users are often elderly, and proper grip design is important due to fatigue and arthritis.
2. Important contact points are the main grip (main-hand), the supporting grip (off-hand), and buttons (lever, trigger, and knob).
3. Safety isn't a huge concern, but it's important to keep hands safe from belt.

RESEARCH AND DESIGN DIRECTION

My task for this project was to redesign a Belt Sander. The design direction was decided through research.

After conduction research involving user interviews, identifying customer needs, and Heuristic task analysis, I discovered a **major actionable insight** in which to move forward with my design solution.

Two types of belt sanders.

Could be one.



Portable Belt Sander

User moves the sander around the wood.

Great for sanding down large objects that would be difficult to move.



Stationary Belt Sander

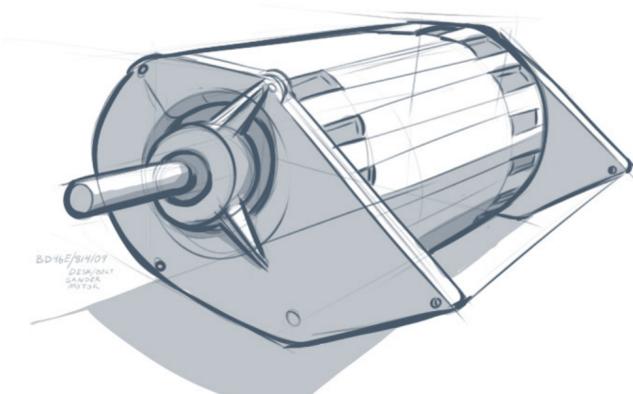
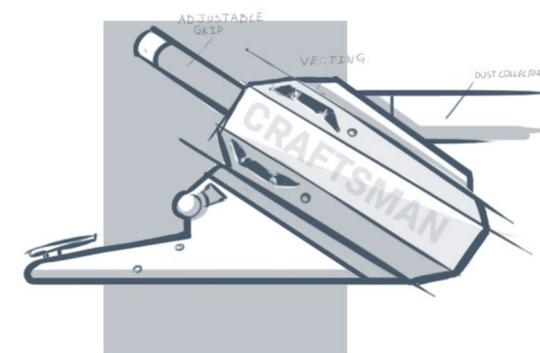
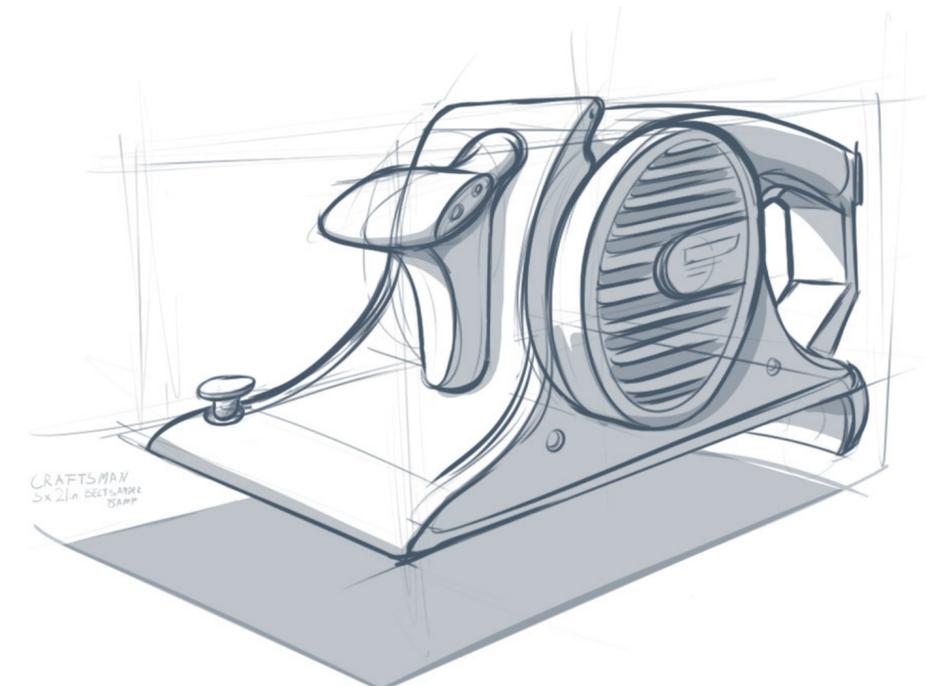
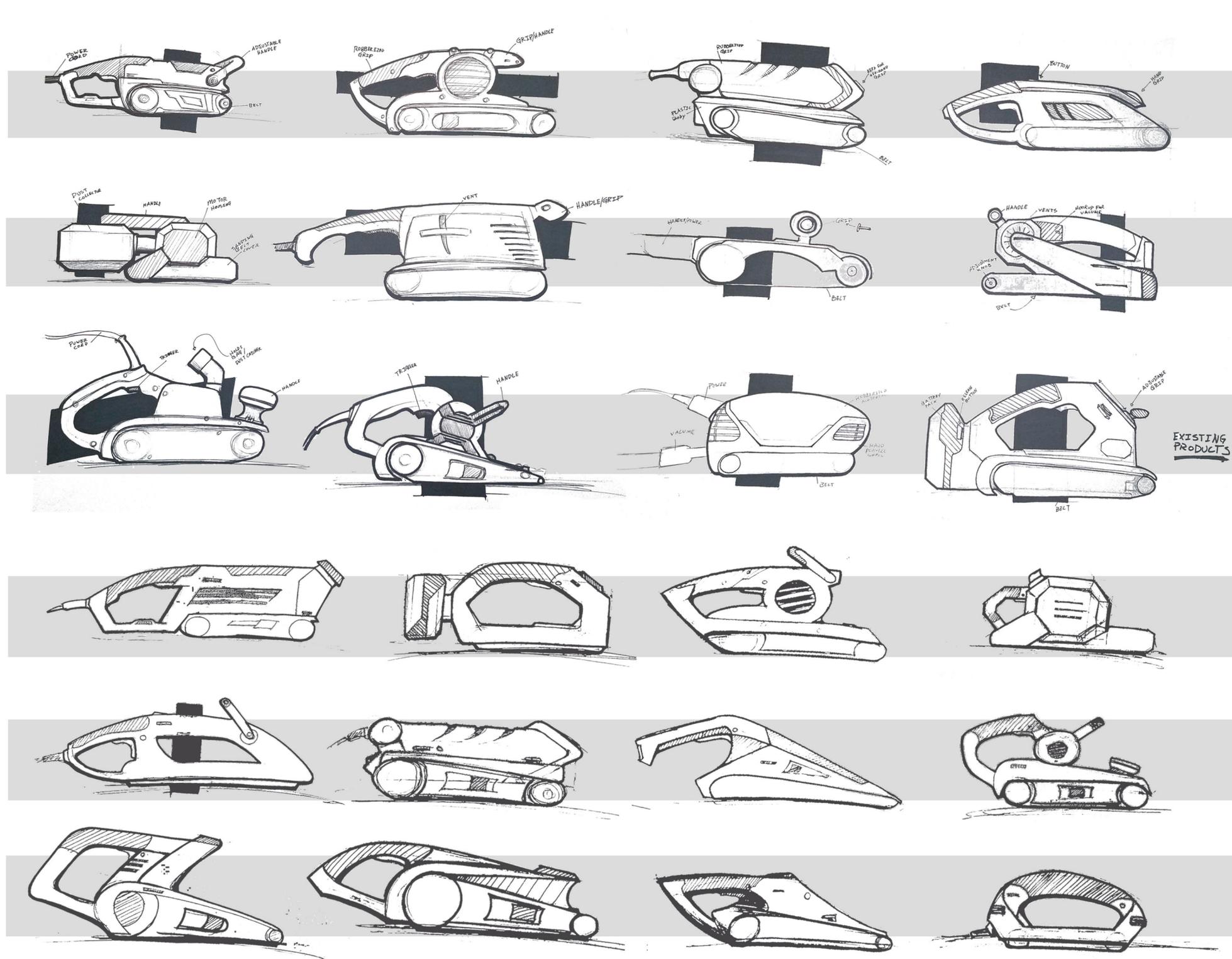
User moves the wood around the sander.

Great for sanding small objects with high precision.

ACTIONABLE INSIGHT

Users generally had a need for both a portable and stationary belt sander.

My design solution aims at designing a belt sander which can be used as **both a portable and a stationary belt sander.**

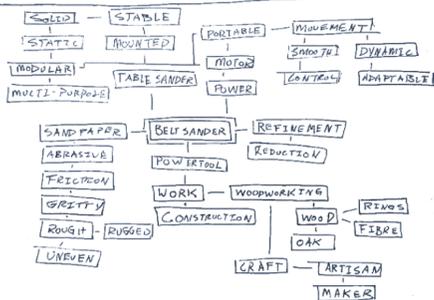


FORM EXPLORATION

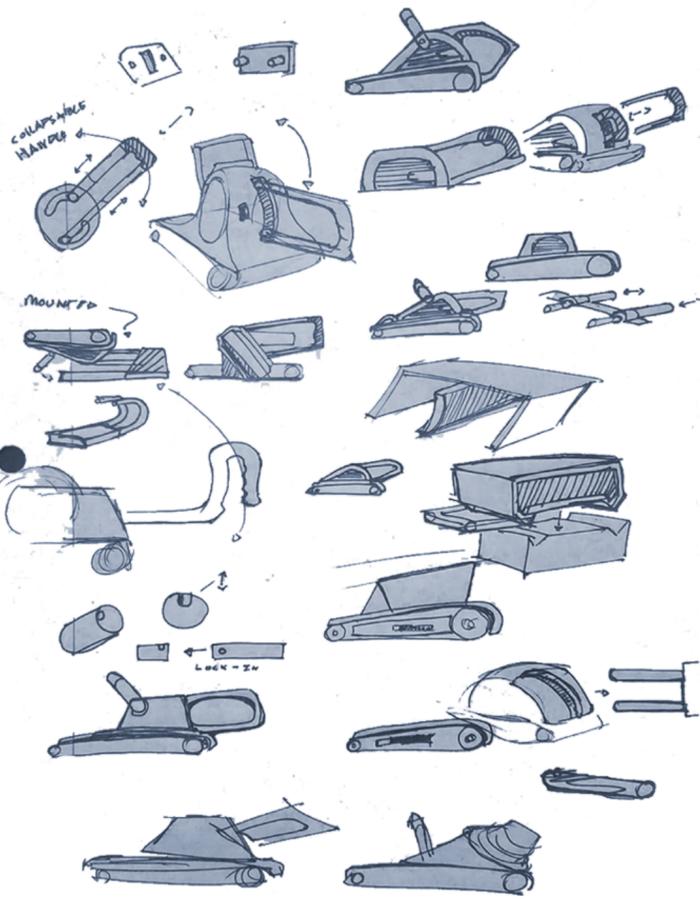
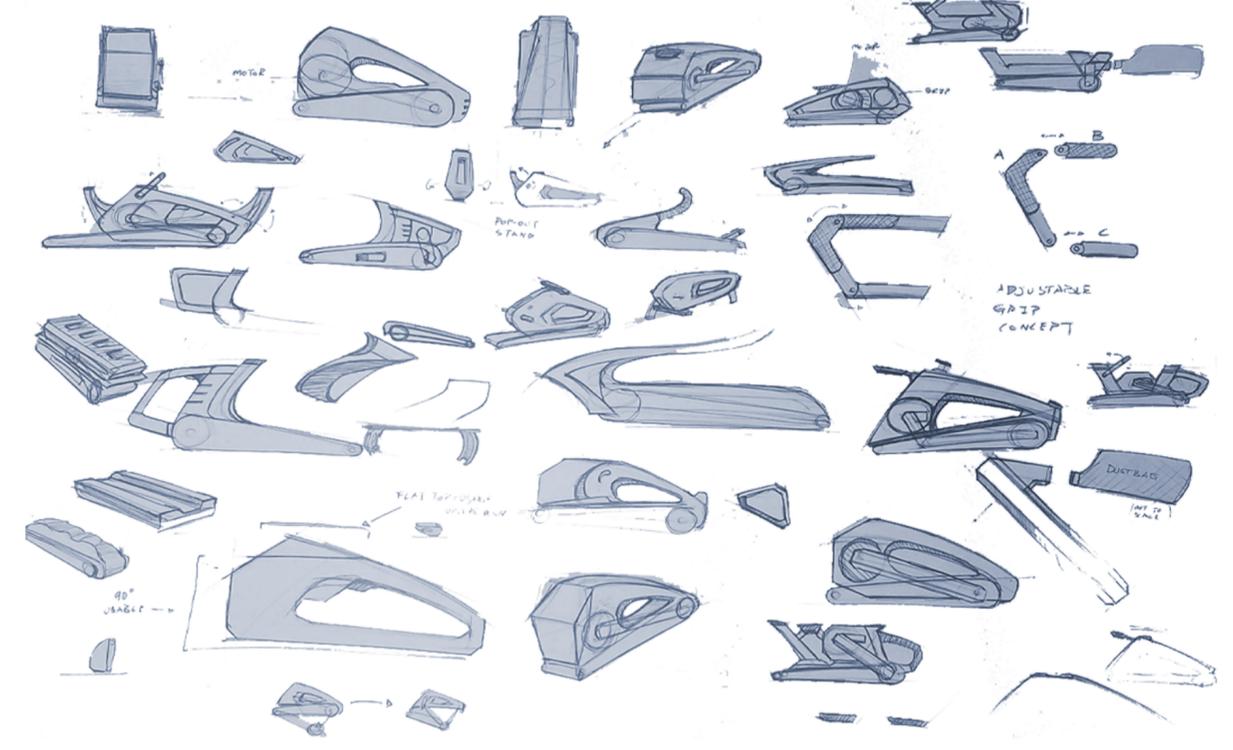
By researching existing products and ideating new forms, I was able to brainstorm and come up with a forms close to what I desired.

BELT SANDER

- REDUCTION MATERIAL WORK MOVEMENT CONTROL SMOOTH REFINE PRESS FRICTION
- PORTABLE STATIC MODULAR CONTIGUABLE DYNAMIC WORK SHOP WOOD WIDDL WEAR-DOWN
- ADJUSTABLE GRIP COMFORT LOW-VIBRATION MINIMAL BASE HOLDS-TO-USER ADAPTABLE INTER-CHANGEABLE



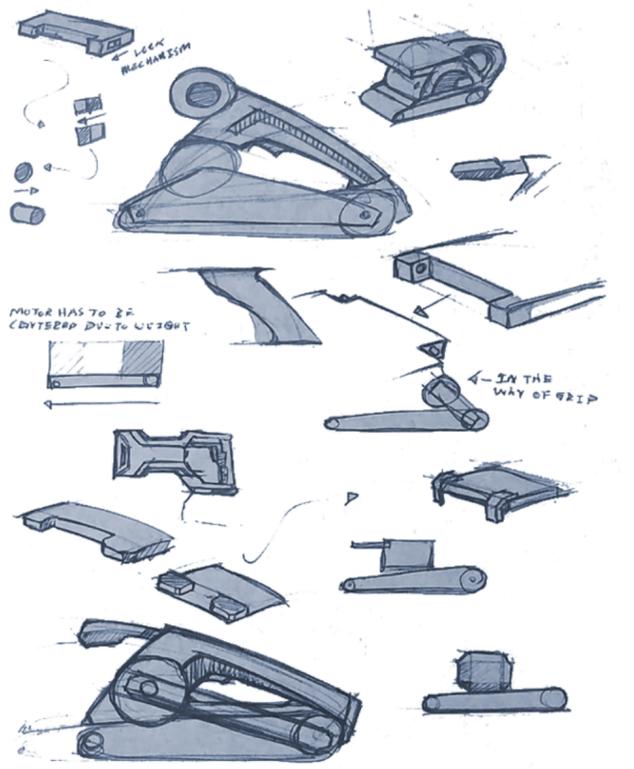
18in x 6in x 6in object dimensions
 18.5 x 6.5in x 6.5in Package dimension
 7.4



KEY COMPONENTS

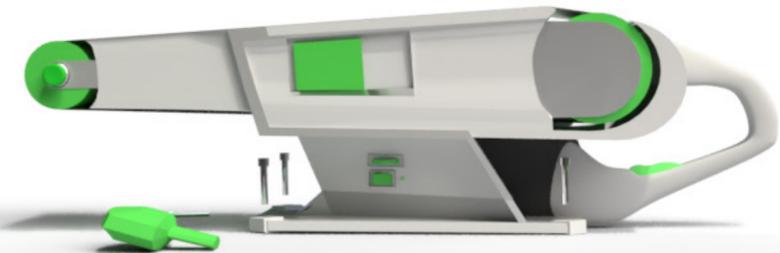
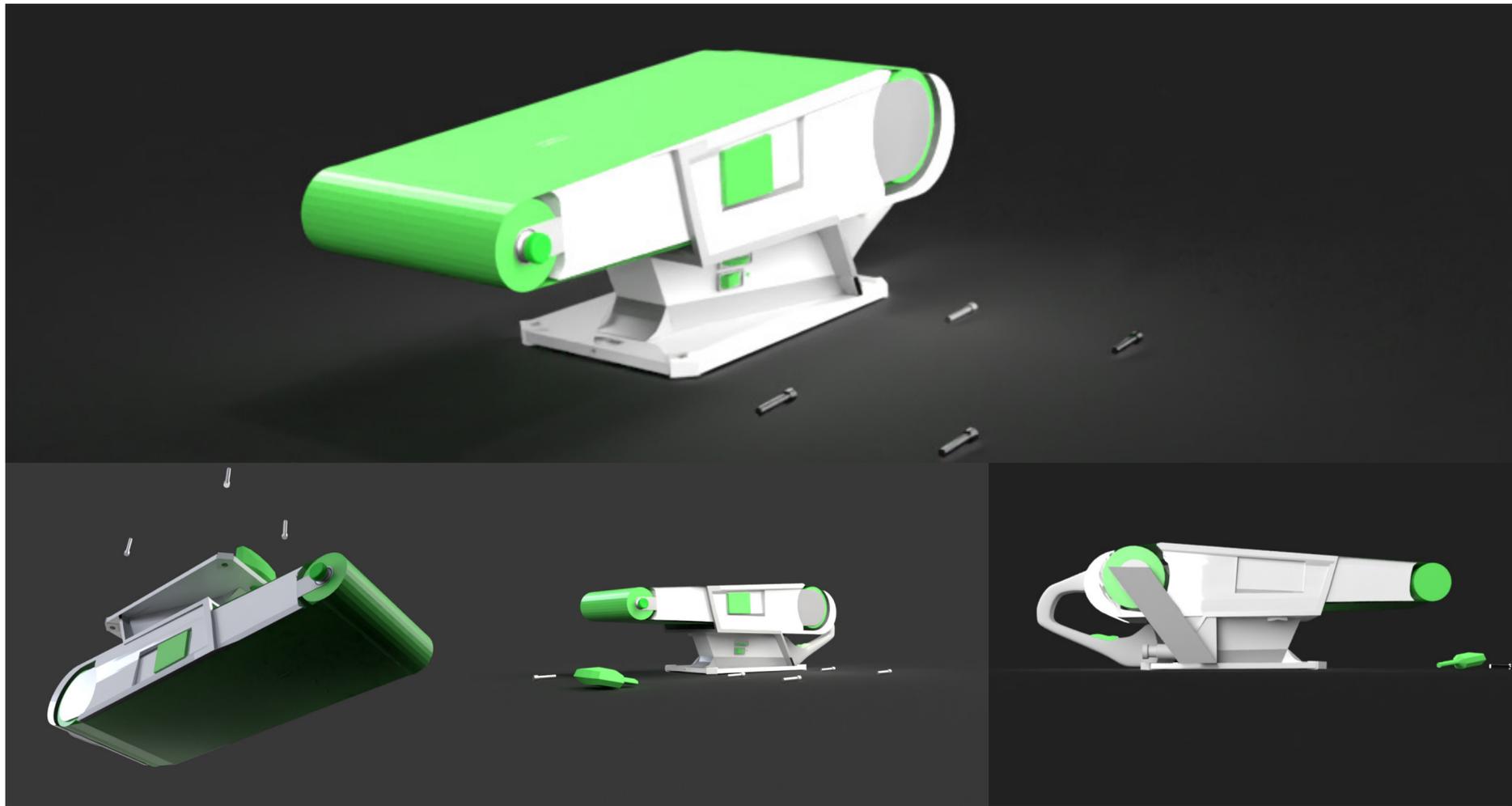
- MOTOR
- BELT
- BELT TRANSMISSION
- DUST COLLECTOR
- HANDLE
- 2nd GRIP

BASICALLY I NEED AN EXPOSED AREA 3x18.
 I ALSO NEED AN AREA TO HOUSE THE MOTOR
 A HOLE ABOUT 2x2 FOR DUST COLLECTOR
 SPACE FOR BLOWER FAN -> DUST COLLECTOR
 DUST COLLECTOR ON ONE SIDE - BELT TRANSMISSION ON OTHER



FUNCTION EXPLORATION

In order to make the belt sander usable for handheld AND tabletop, I decided to design around a “flat top” form, which would give the user the ability to flip over and secure the belt sander. Using screws and rubber stand-offs, the belt sander can be turned over to mount to a stable surface.



Belt Sander



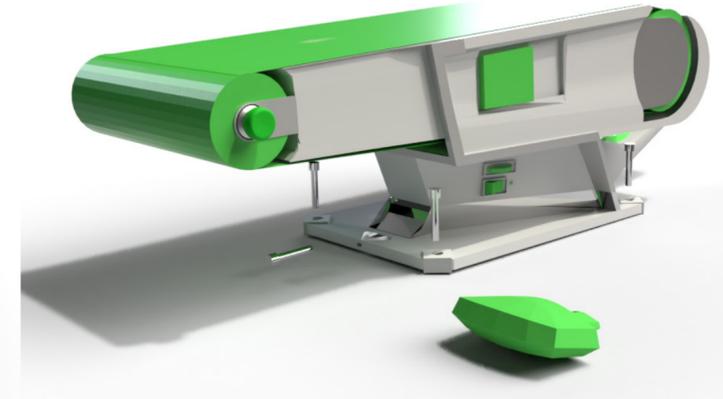
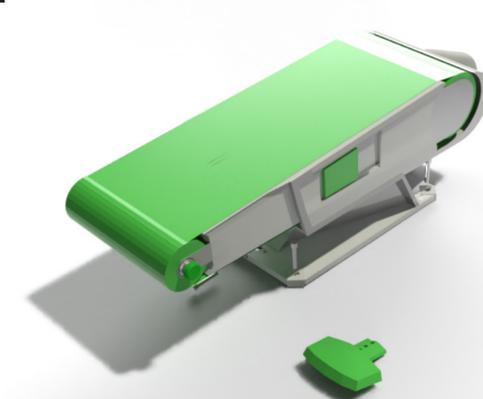
Remove Grip



Flip over, and
Screw into place



Table Sander



CAD MODEL EXPLORATION

Using my sketches/studies, I moved into CAD where I could combine many of my ideas into one.

My design solution to allow users to easily switch between portable and stationary use. This is done by simply removing the screws and adjustable grip, allowing the user to effectively have two tools in one.

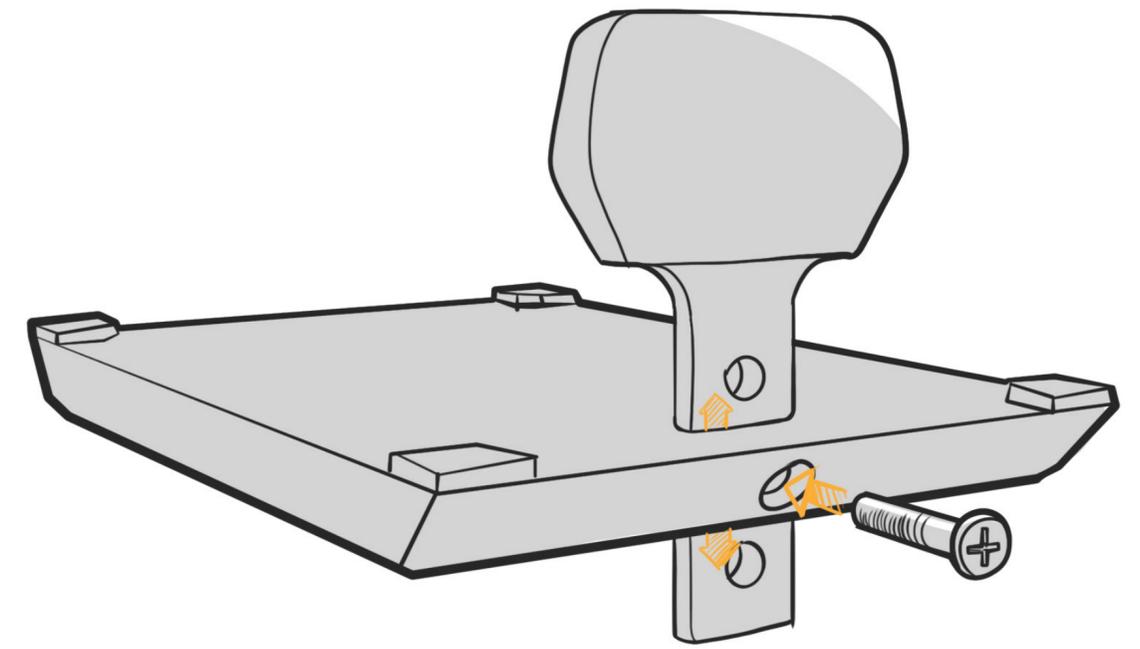
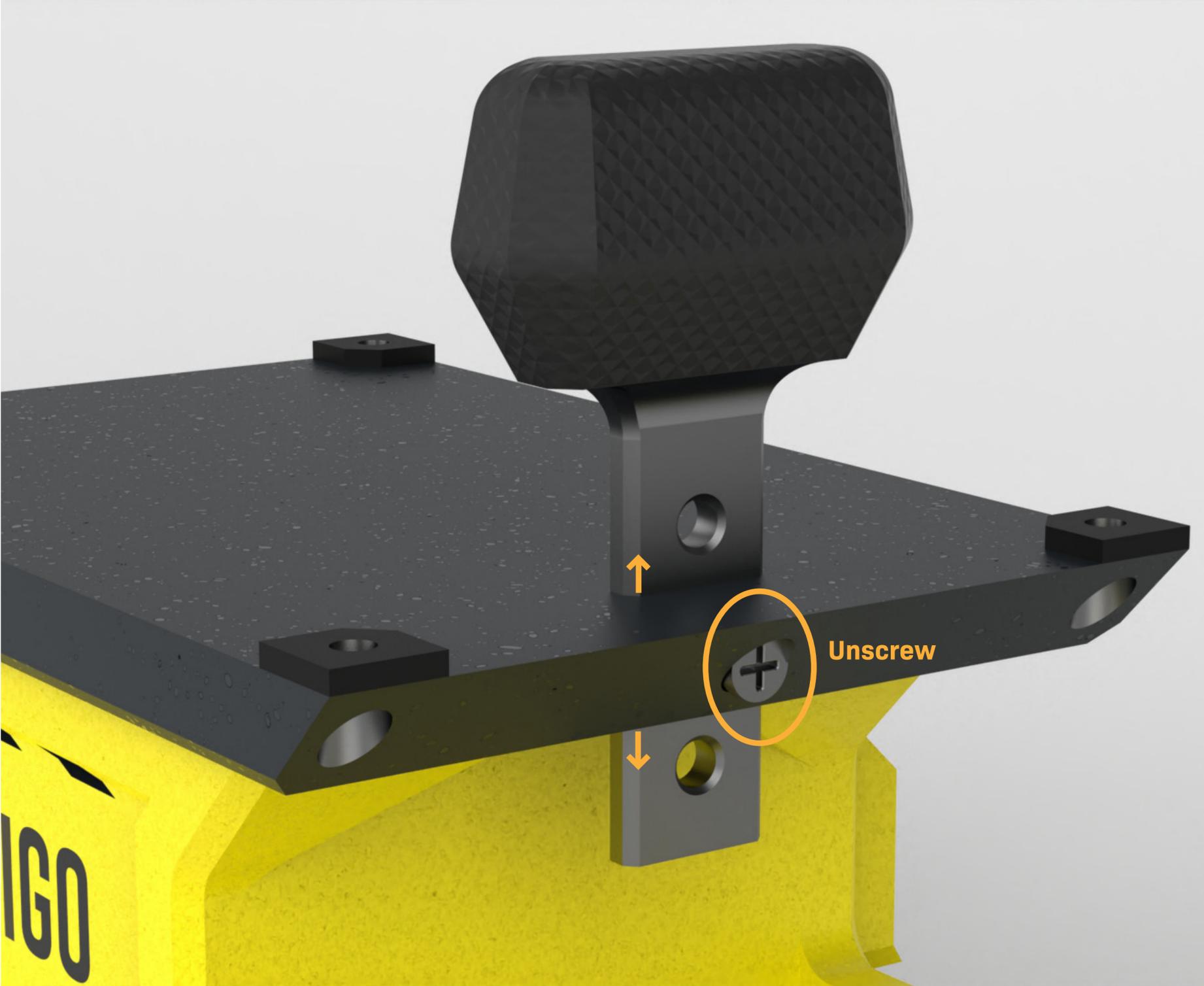
REDIGO

Reduce, drive back, lessen

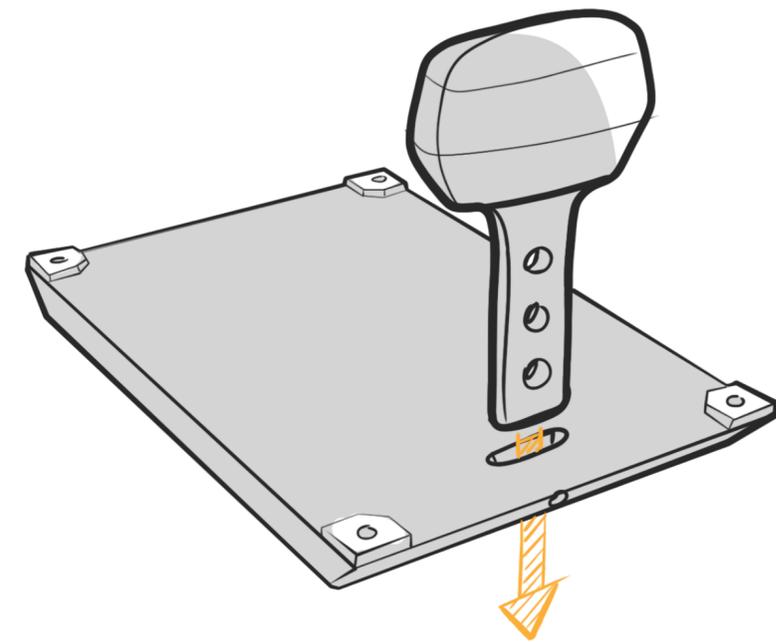
NAME/BRAND

Redigo is a Latin work meaning to **reduce** or make, drive back, realize, get back, or lessen.

Redigo truly means Reduce, in terms of a belt sander sanding away a material, while the product itself reduces waste by being two sanders in one.

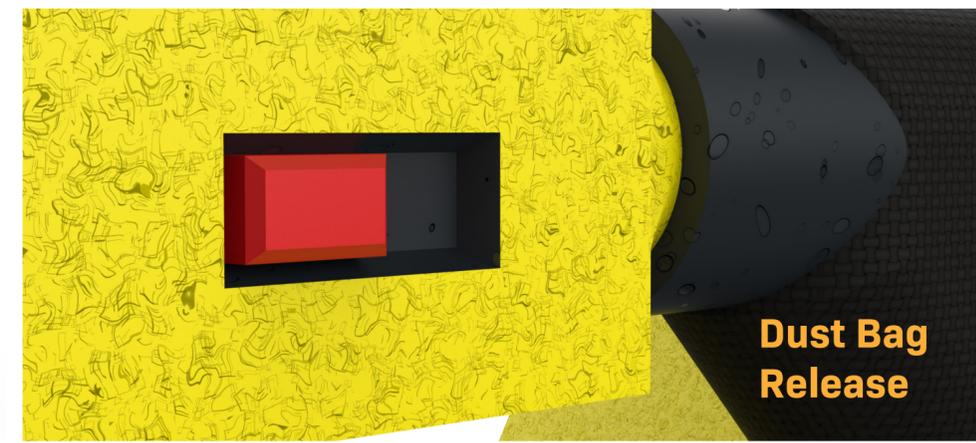
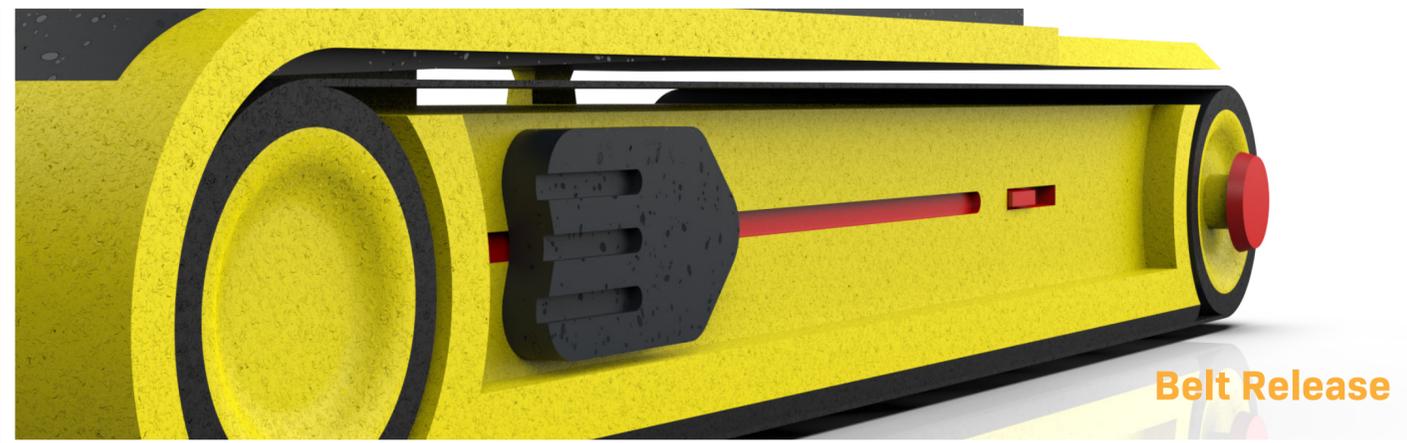


Adjustable/removable grip



ADJUSTABLE GRIP

By simply removing a screw and sliding the grip up/down, the user can easily adjust the height of the grip. Additionally, the user has the option to completely remove or replace the grip with a different type.



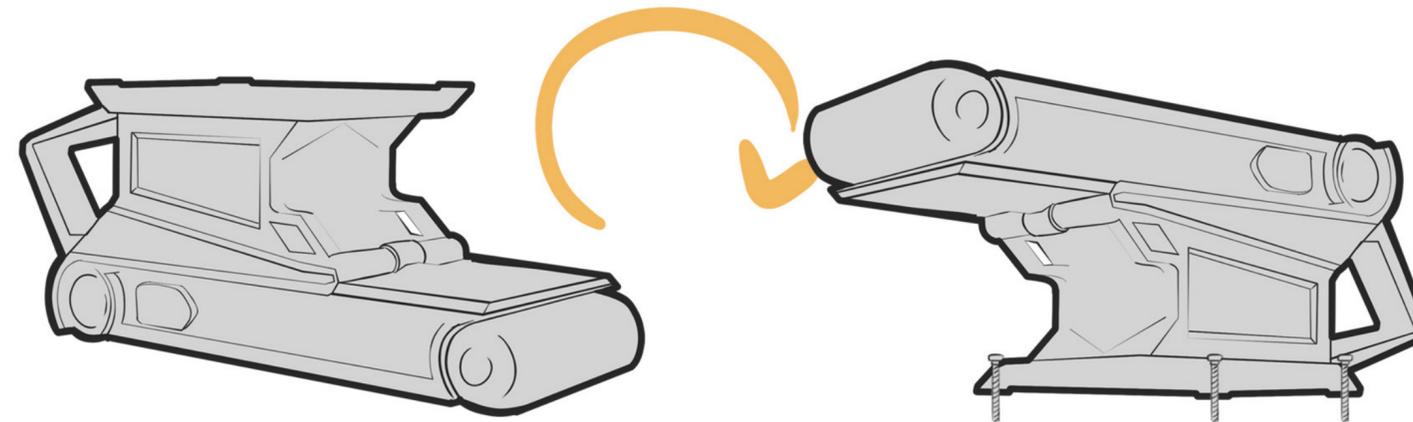
FINAL MODEL

I redesigned the model in Solidworks and attempted to create a more realistic design. The size and scale of the model better reflect the real world proportions that would be needed to house components. Color and form are also more aligned with a typical power tool aesthetic.

Portable Belt Sander



Stationary Belt Sander



Portable belt sander - reversible - Stationary belt sander

DESIGN SOLUTION OVERVIEW

The main feature that sets my belt sander apart is its ability to function as two tools in one. With just a few screws, the Redigo handheld belt sander can easily be configured into a tabletop belt sander.

2 tools in 1 **REDIGO**



FINAL THOUGHTS

Redigo is a practical design solution that offers an alternative product in place of purchasing both a tabletop and handheld belt sander.

Although there are some features included in a tabletop sander that might make difficult to substitute with Redigo, most hobbyists and occasional users would not have a need to own a heavy duty multi-use table sander.



TSD

THE SPAGHETTI DETECTIVE

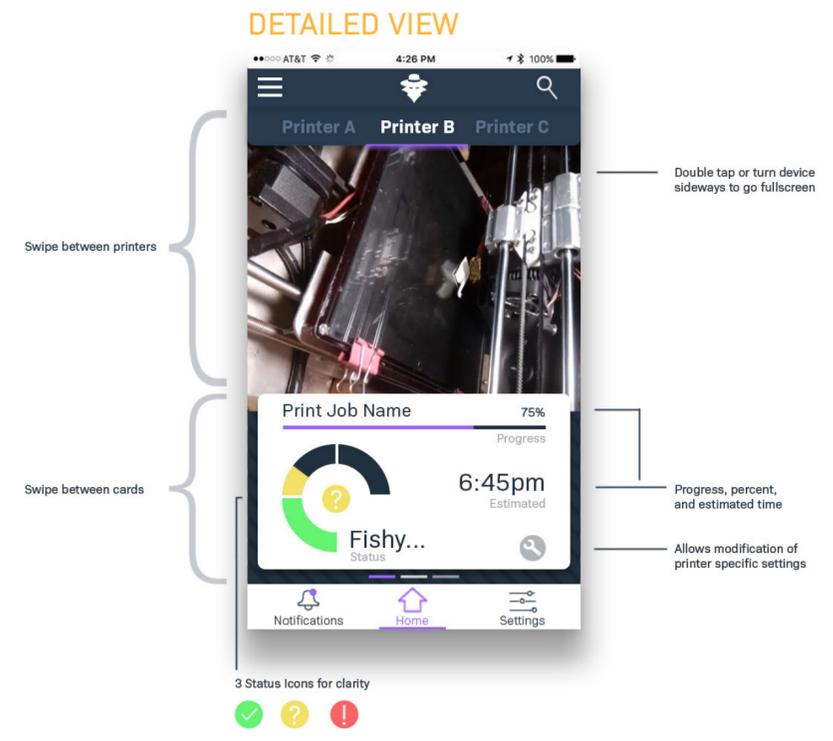
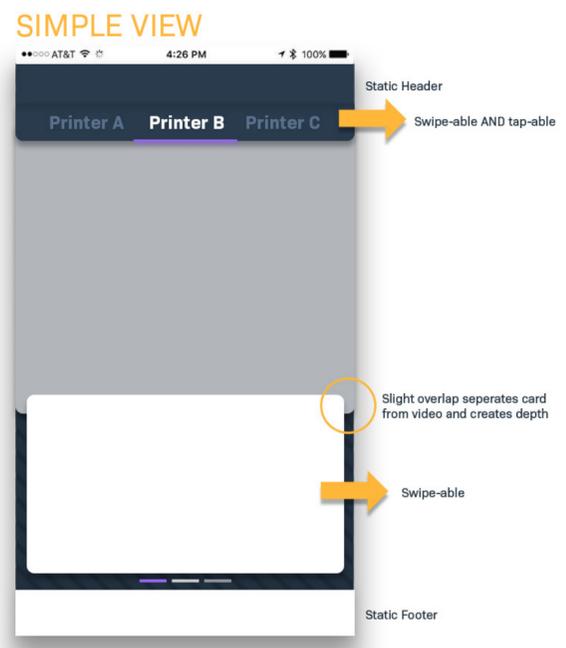
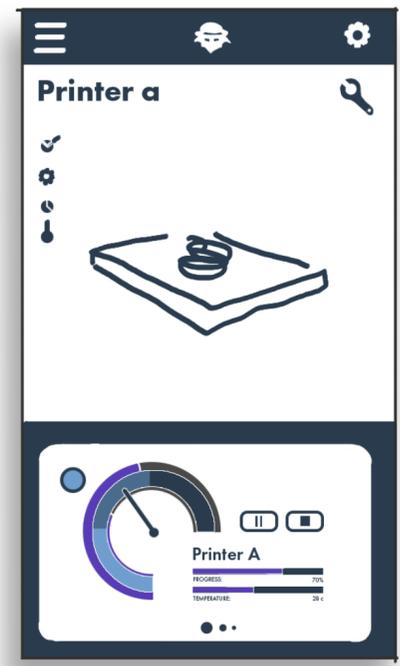
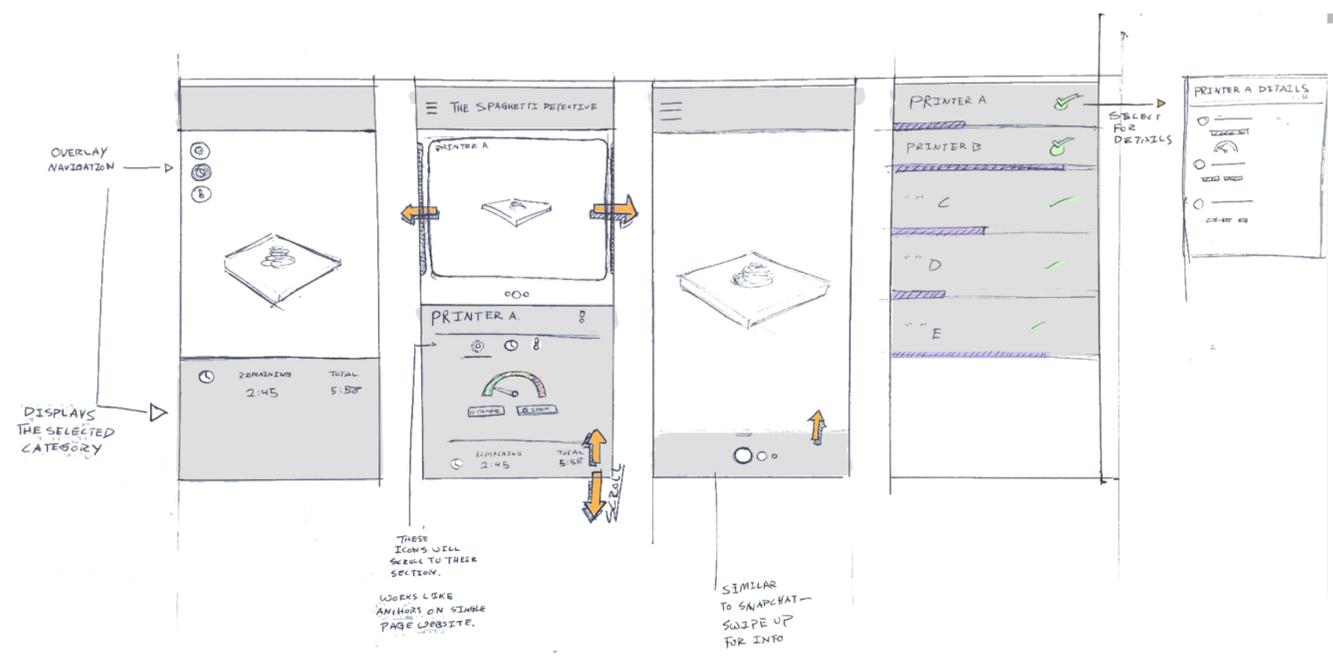
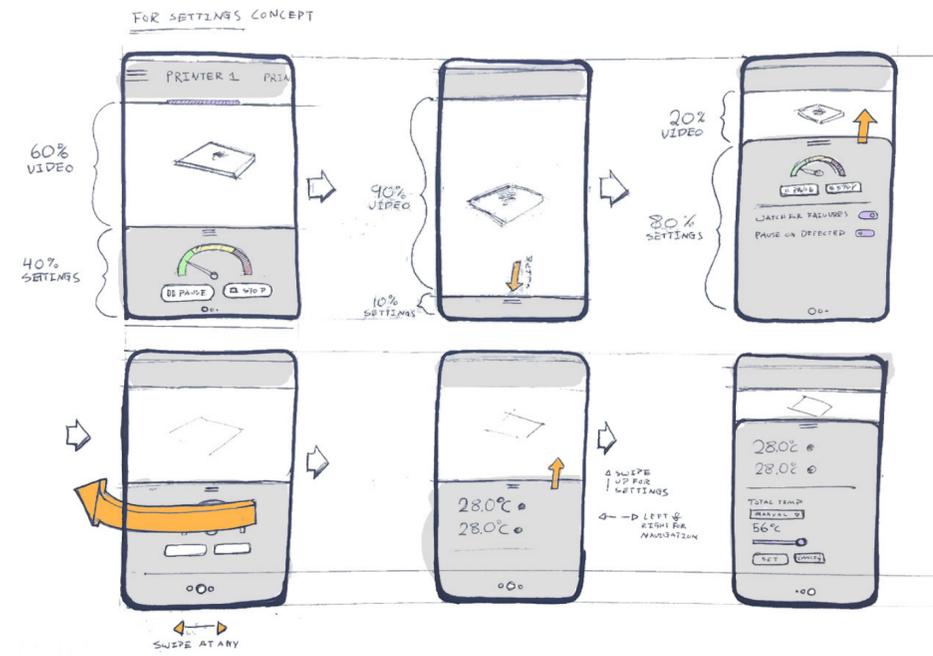


The Spaghetti Detective is a plugin for Octoprint that uses machine learning to remotely monitor their 3D prints with ai.

The plugins main function is to detect failures and alert/pause the print.

My task for TSD was to create an app that supports all current and future features, while maintaining the existing design styling of the website.

I worked directly with the founder, Kenneth Jiang to design the mobile application.



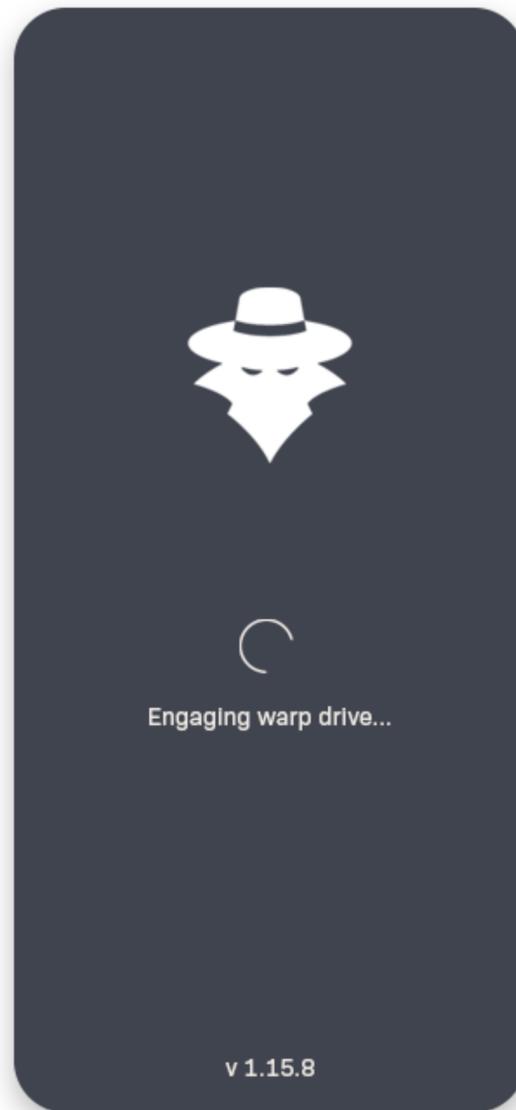
OVERALL APP UI/UX

At the beginning of the project, I set out to design the app in a way which allowed the user to navigate easily between different “cards” which would display various data and functions such as Temperature, Printer control, and Detective settings. Using a “card swipe” design gave the user control over what they wanted to see, without feeling overwhelmed

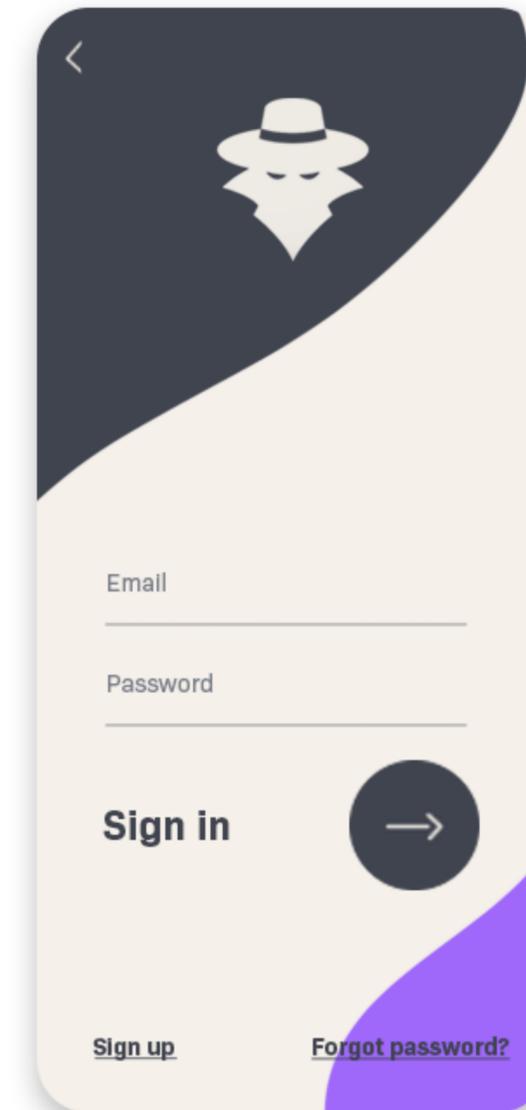
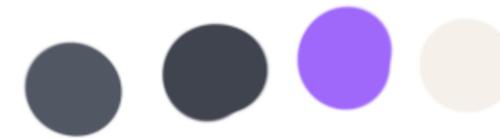
Logo fades from bottom to top while loading

Loading icon, maybe a fun rolling text-line?

Version Number?



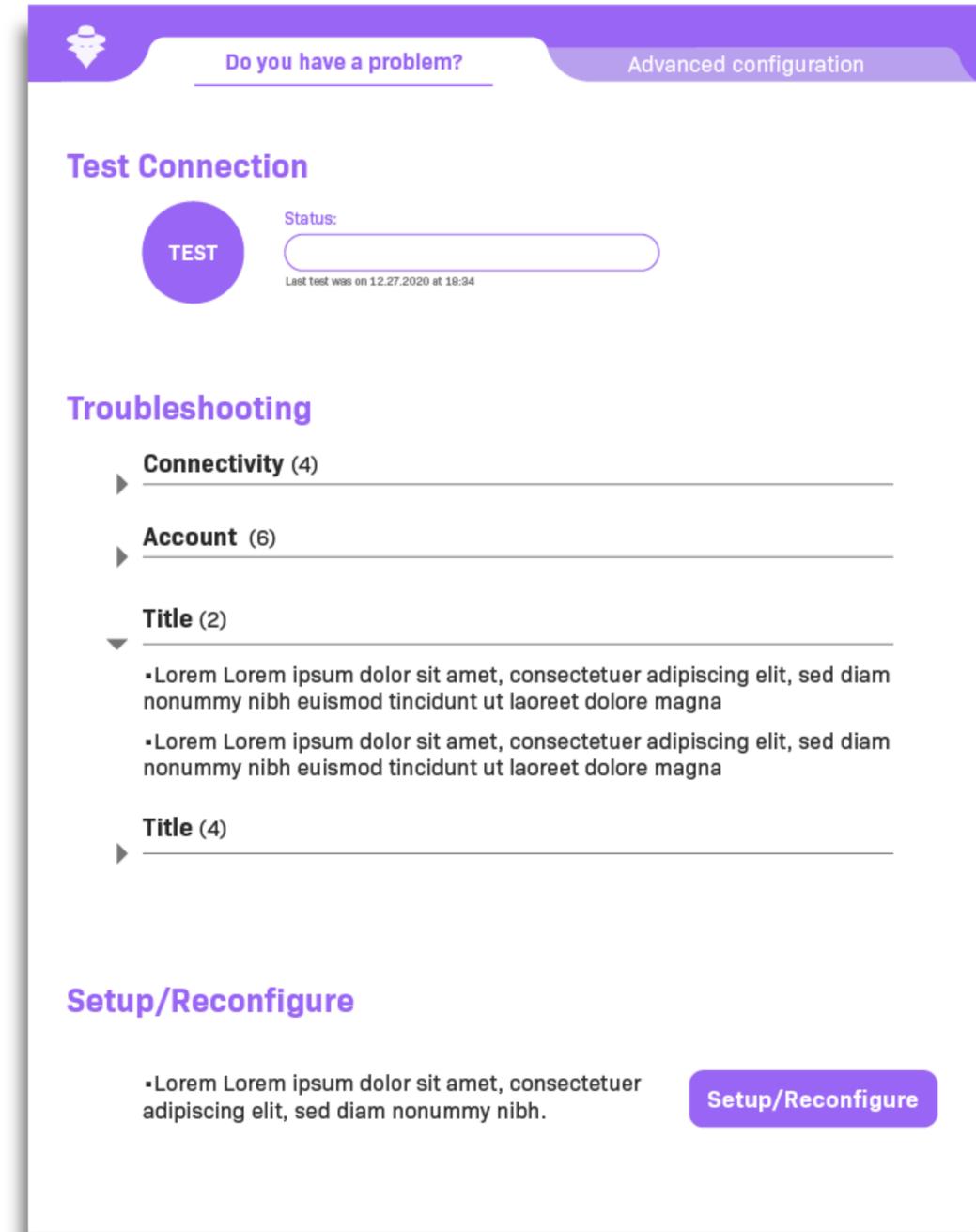
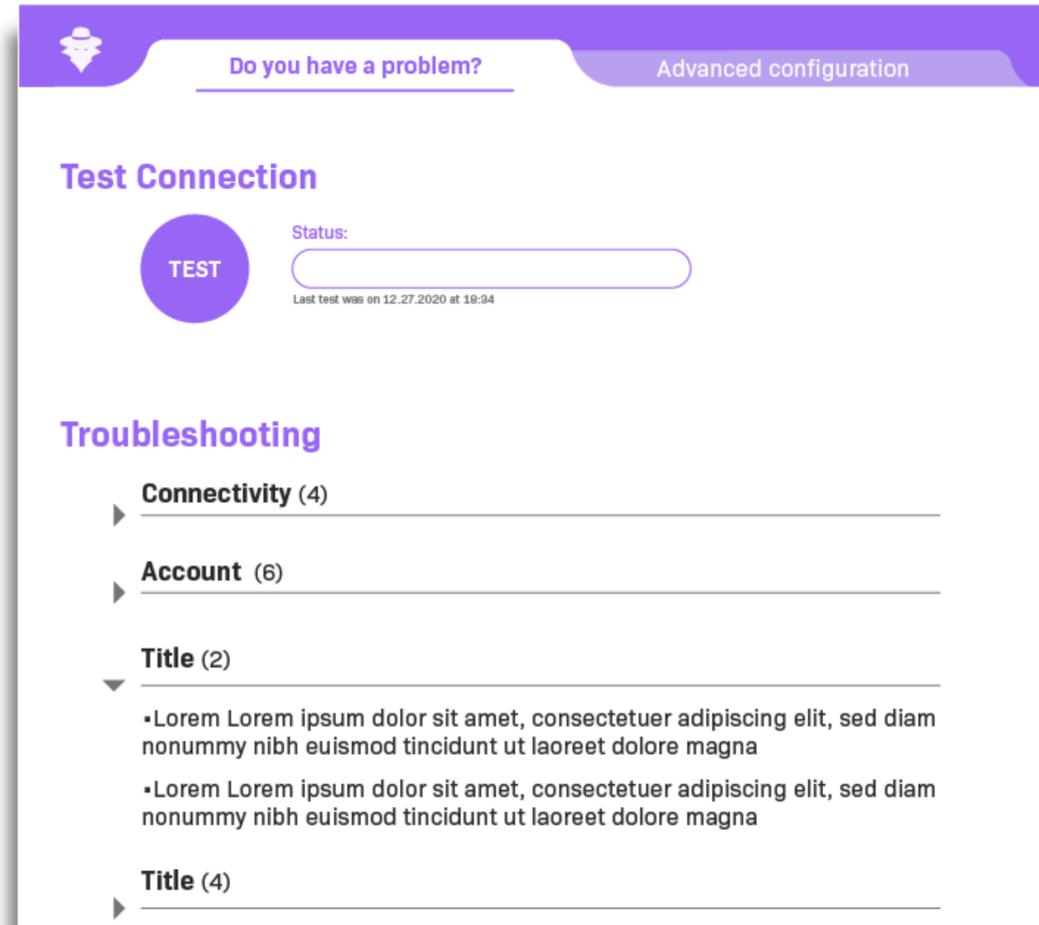
UI slides in from bottom



Dimmed until input has been detected in Email and password

LANDING SCREEN

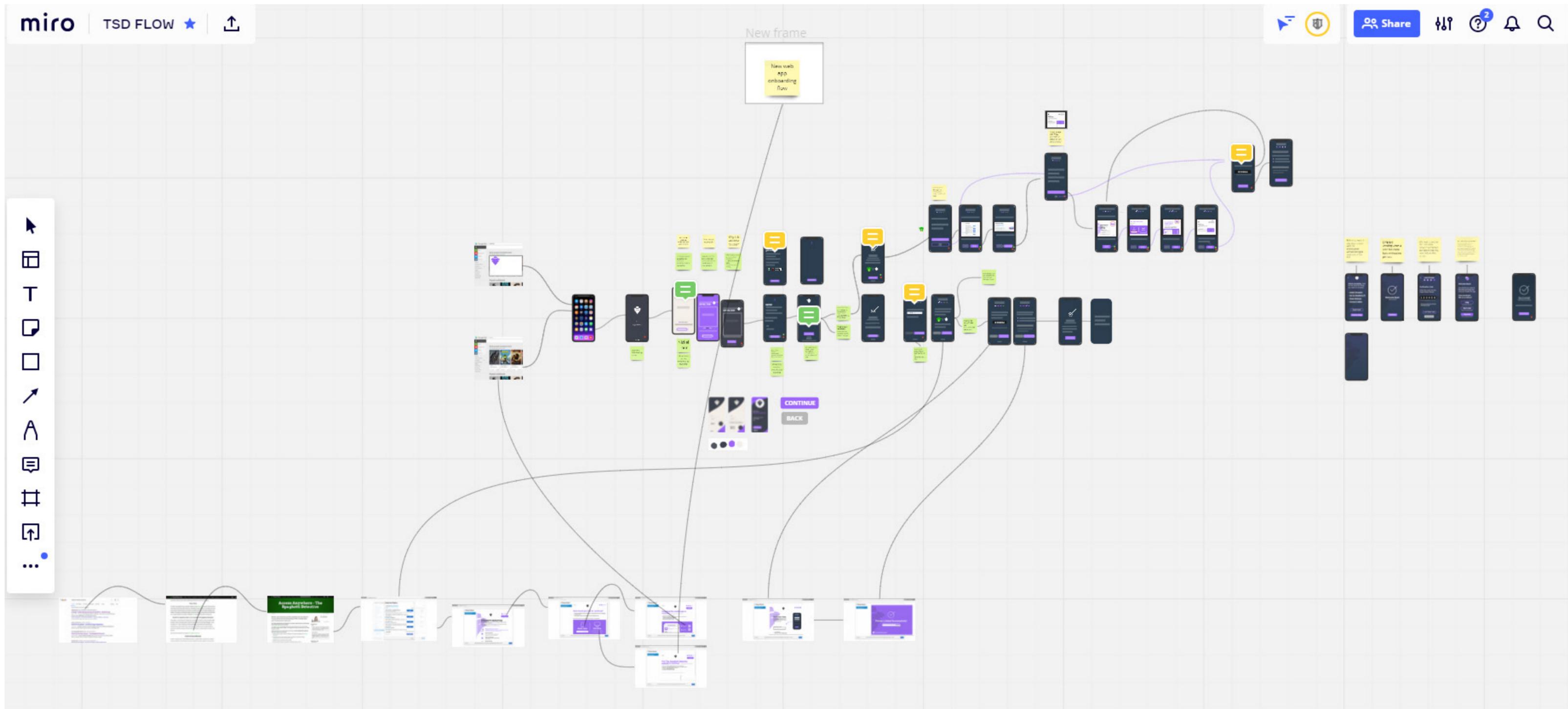
When the user first launches the app, it's important that they get a good first impression. I created several mockup designs showing possible loading icons and landing screens to grab the attention of first time users.



WEB APP PLUGIN

This design is for when the user accesses the plugin from the Octoprint UI on their computer.

I applied the existing visual language to the Plugin Wizard to create a seamless identity between the app and the web page.

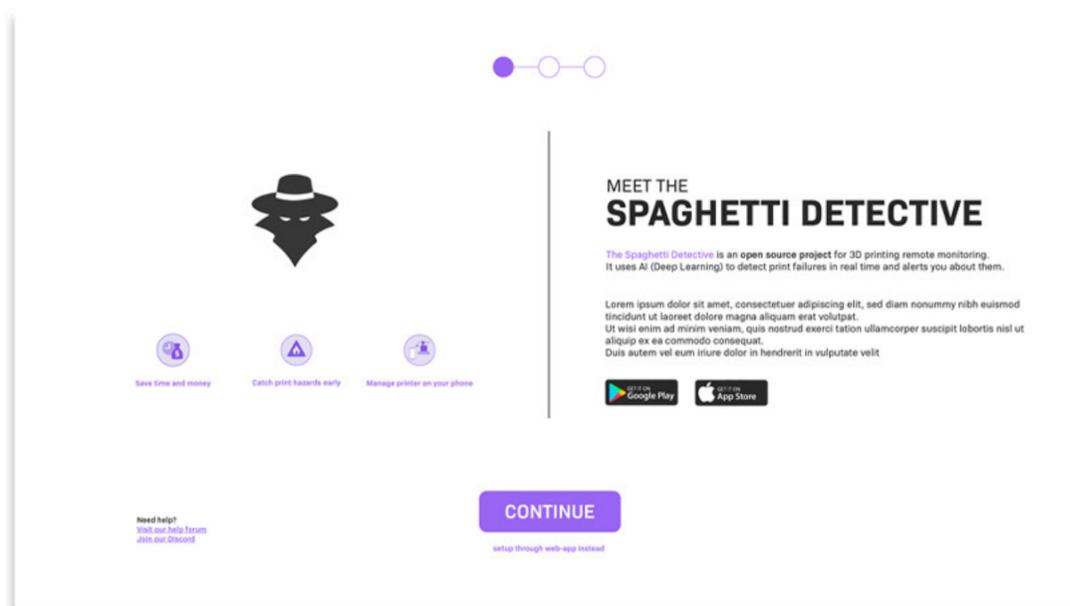
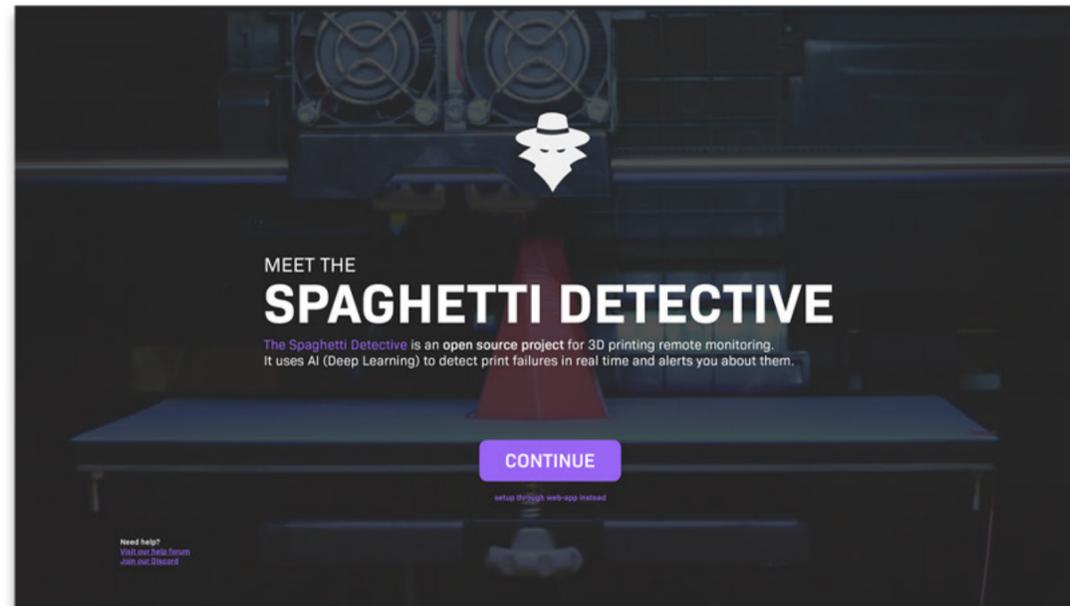


USER ONBOARDING PT. I

The Onboarding experience was a major focus for the design process. Using several “checkpoints” I allowed experienced users to skip parts of the setup that they were comfortable with, while offering hand-holding for new users.

The onboarding involved both the use of the mobile app and the website at different points, creating a complicated situation to design the experience around.

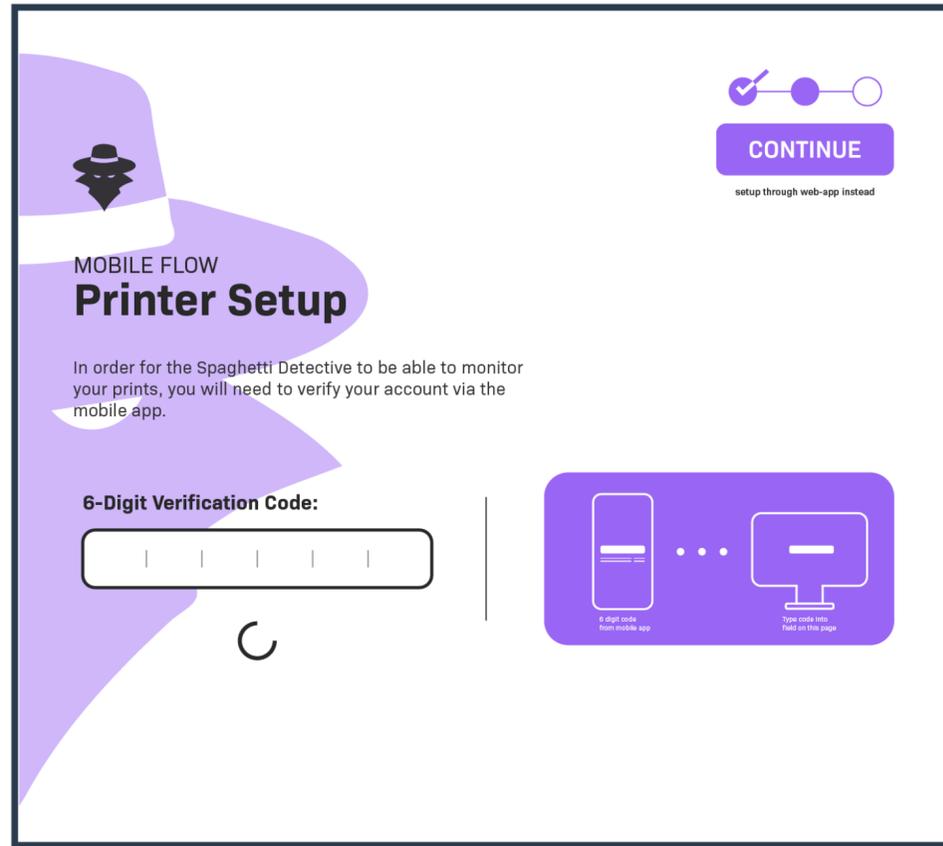
LANDING SCREEN VARIATIONS



ONBOARDING PT.II

The design of the web app had to revolve around using the mobile app simultaneously.

A large part of the design challenge was to provide enough information, without creating visual clutter.



700x625

6-Digit Verification Code:

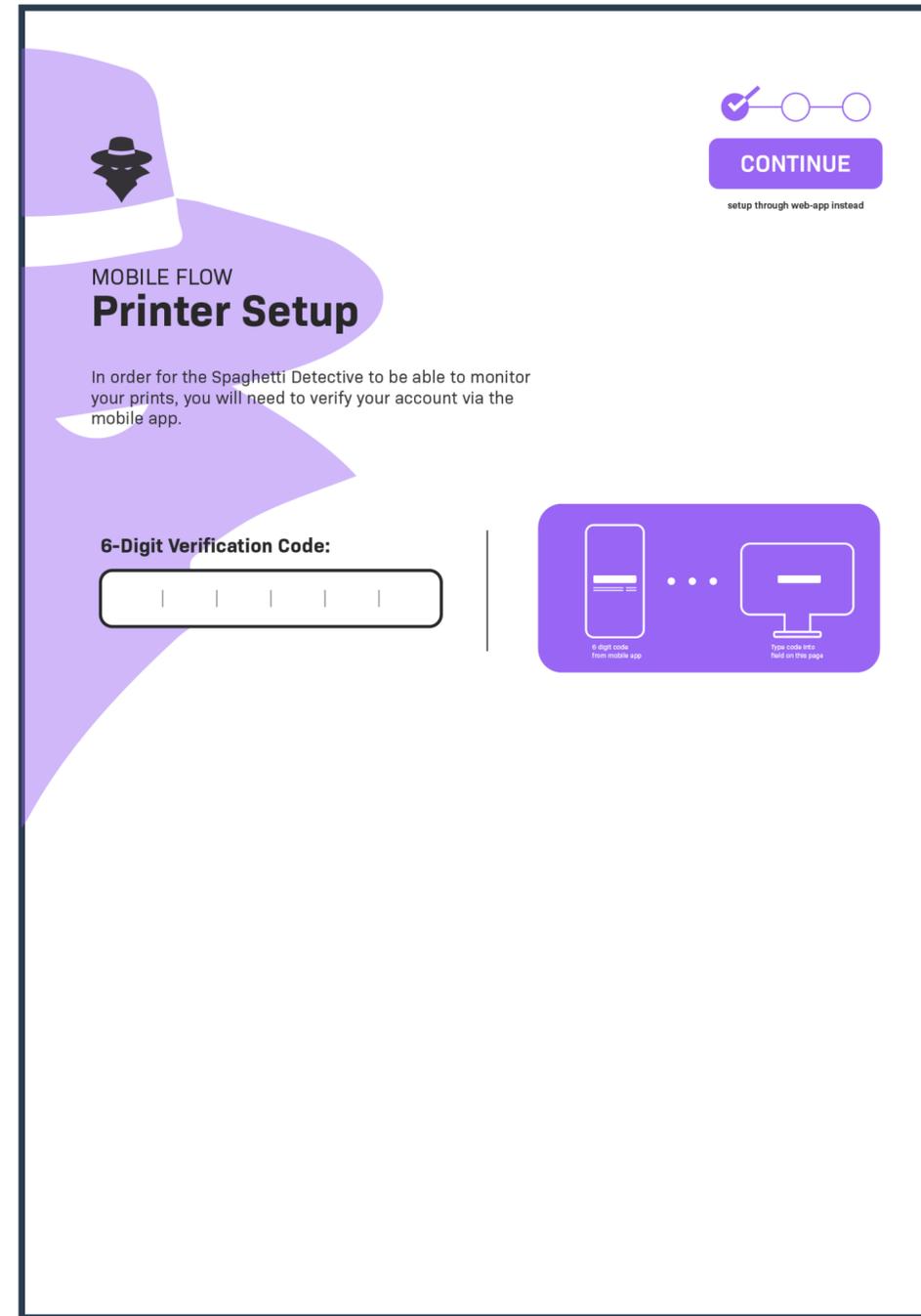
6-Digit Verification Code input field with a red border.

Sorry, that didn't seem to work.
Try again with a new code on your mobile device.

6-Digit Verification Code:

6-Digit Verification Code input field with a purple border.

Success!
Printer successfully paired.



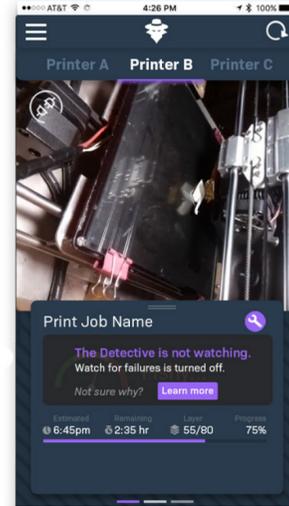
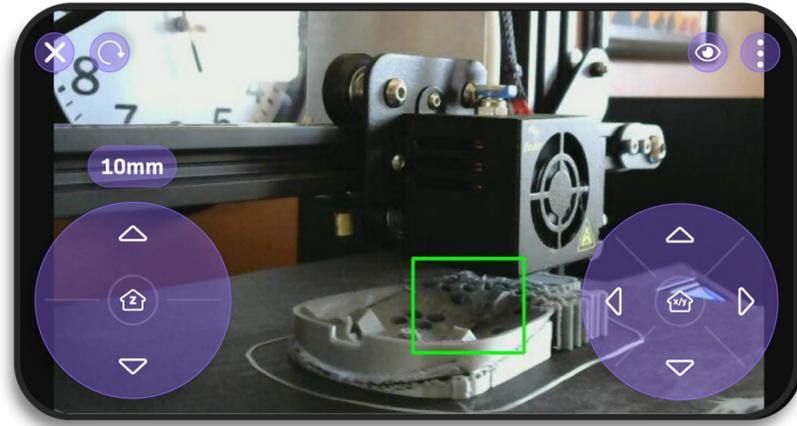
700x1000

ONBOARDING PT.III

This is a detailed look at how the web app plugin was designed, for use while setting up the app.

Infographics give additional instructions to users who might become confused, while the app also gives assistance if needed.

Alternative Sensitivity button Placement →



Color Palettes

Big Major notifications or alerts.	Medium (This is probably the format we will use the most)	Small Stuff like "settings saved!" and so on

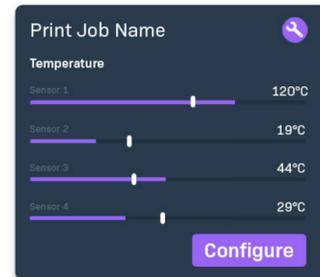
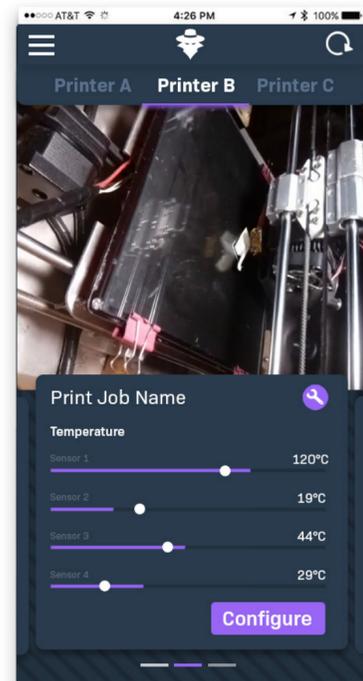
Use Cases:

Notify user of action that needs to provide visual feedback.

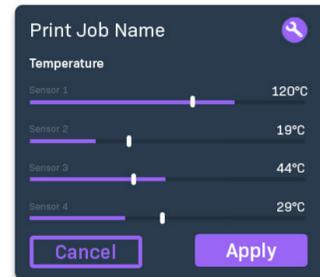
Use to inform user that their intended action was successful.

- Light grey b5b5b5
- Original Purple
- Dark grey 282828

Temperature Card



Sliders can be adjusted after pressing



When "configure" is pressed, buttons will change to apply or cancel

- #9965f4
- #f4c765



Each "gauge" has its own "edit" button.



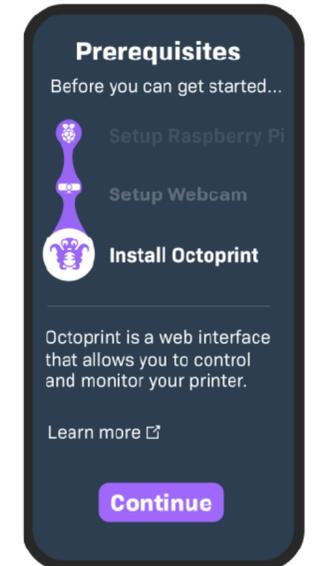
Same, but sensor names moved above the gauge. (slightly resized "167" to fit better)



Only 1 edit button, at the top left.



Color change, added dark circle behind gauge

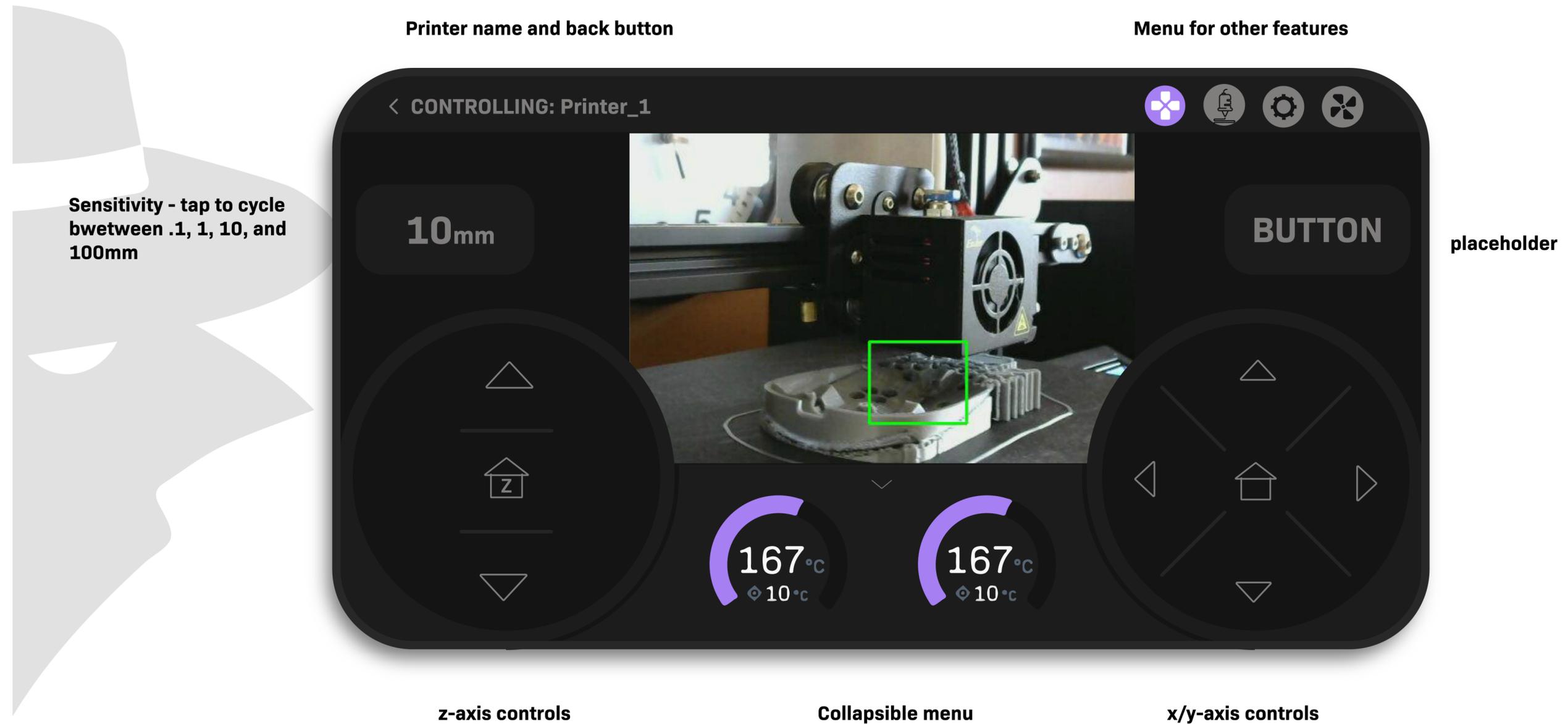


Alternative "vertical" "NOTE" Page Design

APP FEATURES

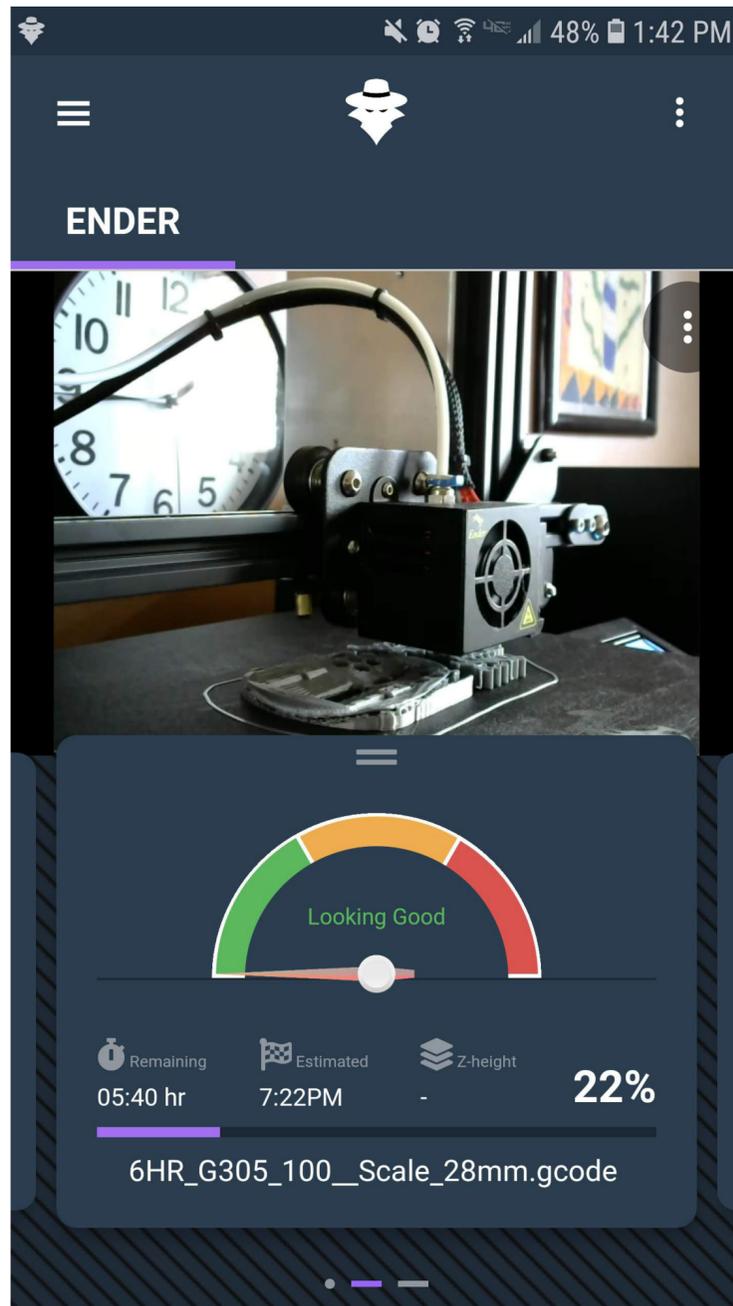
Many parts of the app had to be newly designed. Temperature display, on-screen controls, and pop-up notifications were all new for The Spaghetti Detective. I had to do research on these areas and find an elegant solution for each.

DESIGN a



CONTROLS DESIGN

Within the mobile app, the user is able to control their printer. Moving each part, controlling sensitivity, and fan speeds to name a few functions. This design was made to be very simple, and to be expanded on in the future. Multiple designs were offered to the community, where they were voted on and eventually implemented.



The Spaghetti Detective for OctoPrint (Beta)

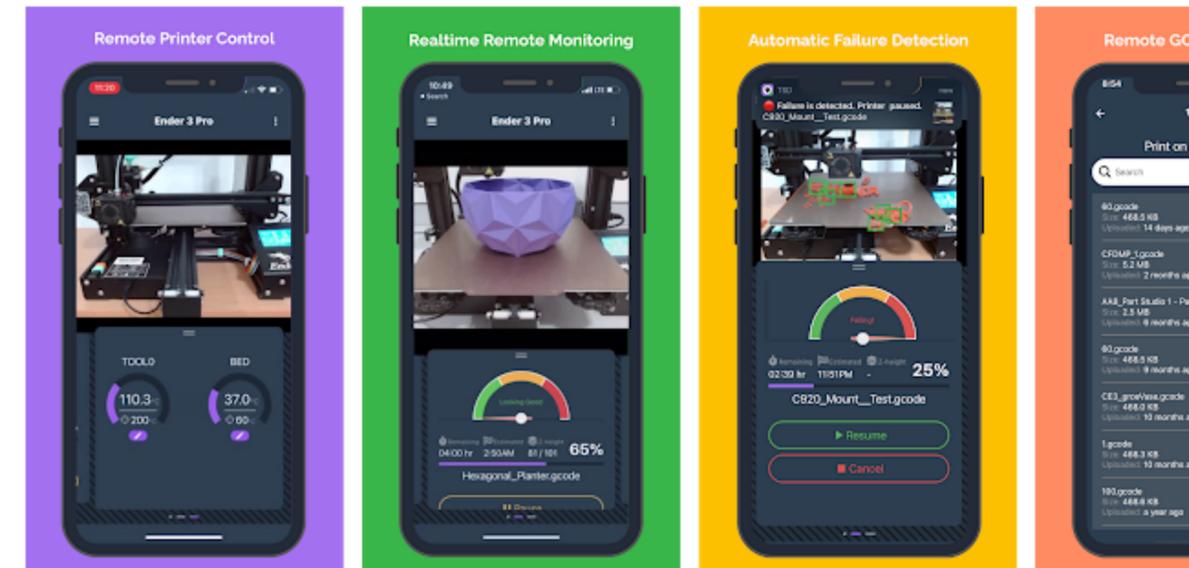
TSD Technology Productivity

★★★★☆ 44

Everyone

- You're a beta tester for this app. Awesome!
- This app is available for some of your devices

Installed

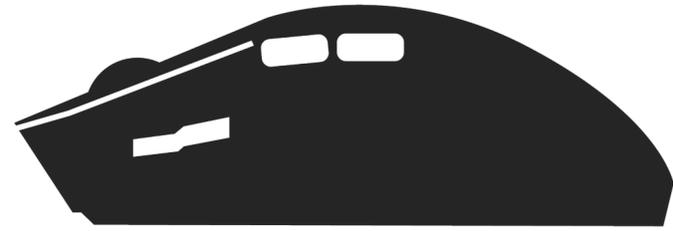


The Spaghetti Detective's OctoPrint Remote Access lets you access, monitor, and control your OctoPrint enabled 3D printer from anywhere, even outside your home network. Our AI powered failure detection algorithm will diligently watch and automatically pause your 3D print in the event of a catastrophic failure. Let our app extend the life of your 3D printer, save you time and filament, and let you print remotely or overnight with added peace of mind.

FINAL THOUGHTS

Working with the Spaghetti Detective team was a privilege and an amazing opportunity. I learned so much about UI/UX, and some of the challenges of working with a team of diverse specialties.

To this day I continue to help out and design new aspects of the app. As of 4.27.21 the app is in Beta, and getting ready for a full release.



E-99

GAMING MOUSE



The E-99 Gaming Mouse is an ergonomic mouse that includes a more modular design than existing mice.

Throughout my research I found that the main reason users upgraded to a new mouse was simply because their current one broke, and they were unable to fix it.

My design is split into two main components: the top shell and the bottom body. By splitting the two, the user has access to the internals where they can swap out the hot-swappable switches.

Unique Selling Point:

The ability to fix and customize the mouse, rather than buying a new one as often.
Sustainable concept.



Age | 26

Biography

Felix is a rowdy, high intensity, streamer/pro gamer. He streams while he trains for Valorant tournaments. With an extremely high income and sponsorships, he also has a high expectation for the products he uses. Hardware needs to perform perfectly over long periods of intense use. Games are a fun pastime for some, but to Felix they are a lifestyle and career.

Felix

Gaming intensity



Time spent gaming



Income



Motivations

Pro Gamer and Streamer, spends 14 hours a day gaming in front of live audience in competitive games. No time for mechanical problems, no budget, only wants peak performance gear that can hold up. Generally gets free equipment from sponsors.

Occupation

Streamer/Pro Player

Most played genres

FPS, MOBA

Hobbies

Weight lifting, competition

Brands I love

Intel, Nvidia, ASUS, Glorious, CORSAIR, BenQ, Sennheiser, Shure, Auralex, Razer, Herman Miller, EVGA, SONY

Pain Points

Uncomfortable - spending so much time with hardware, he is picky about what he likes. Hardware breaks fairly often (sometimes due to slamming). Is very heavy on hardware and keeps 2 backup mice/keyboards nearby.



Age | 21

Biography

Mia is a 4.0 GPA University student in a STEM field. She Doesn't have much time to game, but plays a variety of games whenever she gets the chance. A BioMed degree means she can't work much, and as a result doesn't have the income to buy gaming hardware very often.

Mia

Gaming intensity



Time spent gaming



Income



Motivations

Wants a mouse that matches her desk/room. Something that's cozy, cute, and has RGB

Occupation

Student/Retail

Most played genres

MOBA, Sandbox, MMO-RPG

Hobbies

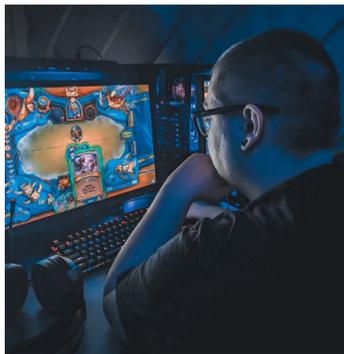
Painting, cooking, live-music, crafts, anime

Brands I love

Samsung, Razer, Target, IKEA, Pentel, Nintendo, Sanrio

Pain Points

Old mouse broke, needs new mouse to be able to game and work. Not many gaming brands make mice that fit her style preference.



Age | 35

Biography

Adam spends most of his time in front of a screen. There are two main purposes for this, one being his job (programming) and the other being his favorite hobby - gaming. He prefers to play relaxing, slow paced strategy games to wind down after a 9-5. Adam enjoys learning complex games and playing with online friends.

Adam

Gaming intensity



Time spent gaming



Income



Motivations

Adam doesn't care for the ultra-performance, high-end gaming hardware. Rather, he enjoys the more subtle and luxurious brands. He also has a passion for mechanical keyboards, and even built his own.

Occupation

Programmer

Most played genres

MMO-RPG, Turn Based Strategy, Flight Simulators

Hobbies

DnD, reading, modding games, browsing reddit, mechanical keyboard enthusiast.

Brands I love

Apple, Ducky, HyperX, Nintendo, Dell, Star Wars, LOTR, Blizzard

Pain Points

Often feels fatigued after long work days in front of a screen. Improved ergonomics for work and play would improve both parts of his life. Subtle attention to detail is important.

PERSONA MAPS

“Gamer” is a broad term. Through my persona maps, I narrowed down who my target audience was.

The main factors I considered were:

- Gaming intensity
- Time spent gaming
- Income

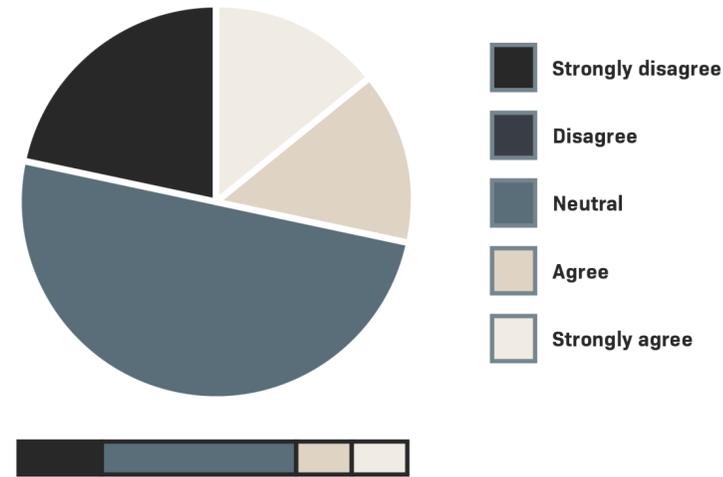
My mouse design is intended to appeal to all three of these types of gamers; boasting reliability above all else, which in turn lowers overall cost/time.

The form of the mouse doesn't need to be revolutionary, but it does need to be comfortable over long periods of time.

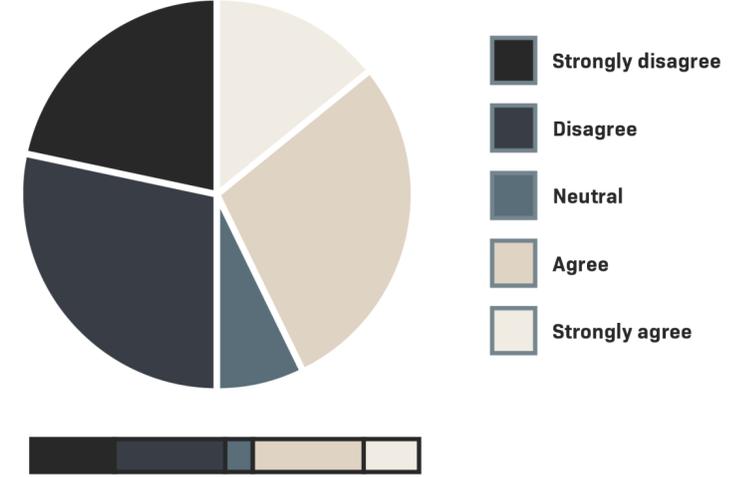
KEY FINDINGS

Users prefer their mice to be wireless.
Wireless mice should be usable while charging via a lightweight braided cord.
RGB lighting isn't a big selling point.
Many users are annoyed by sweaty palms; even those with high-end gaming mice.
Shooters are most popular genre by a landslide.
Average lifespan of mouse was 1.5 years.
High DPI is useless. (above 10k)
Lightweight mice are popular, and allow for ADDING weight.
Users interact with their mice 10+ hours a day.
Average pricepoint is \$91.

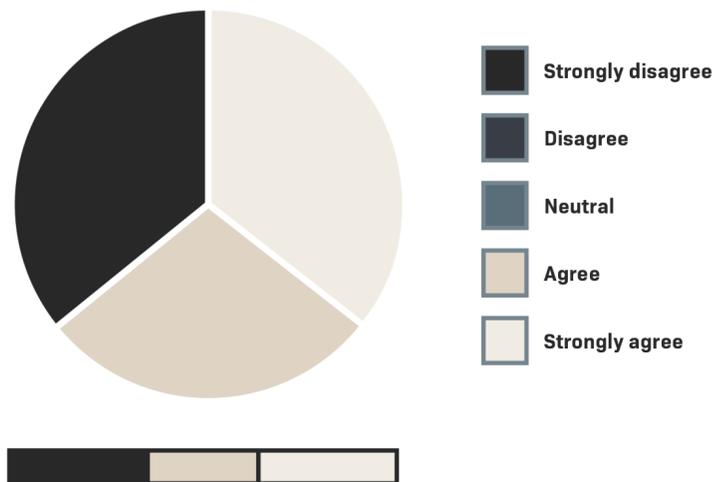
Mouse lighting (RGB) is important to me.



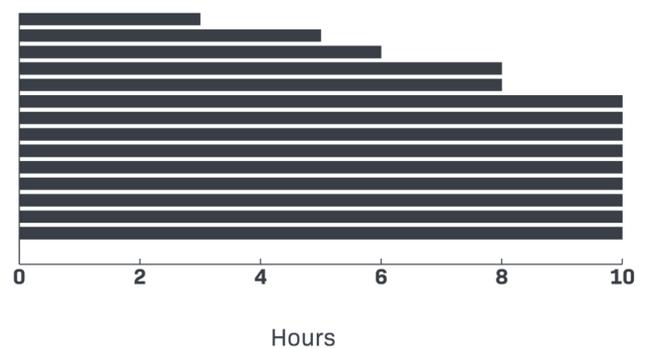
Annoyed by sweaty palms while gaming?



DPI switching buttons are useful.



64% of respondents said they spent 10 hours or longer using their mouse per day.



Questionnaire maxed out at 10 - this was a flaw in the design of the question, as I didn't expect so many people to answer with 10 or more. In retrospect, I should have increased the maximum answer size to be much higher.

USER RESEARCH

I gathered research from various gaming discord communities which I am a part of to identify the needs of my users.



2-part design



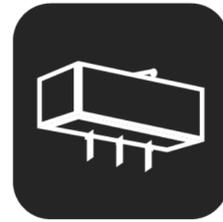
Pinky/Ring
finger support



Repositioned
Screws



Anti-Perspiration
texture



Hot-swappable
Switches



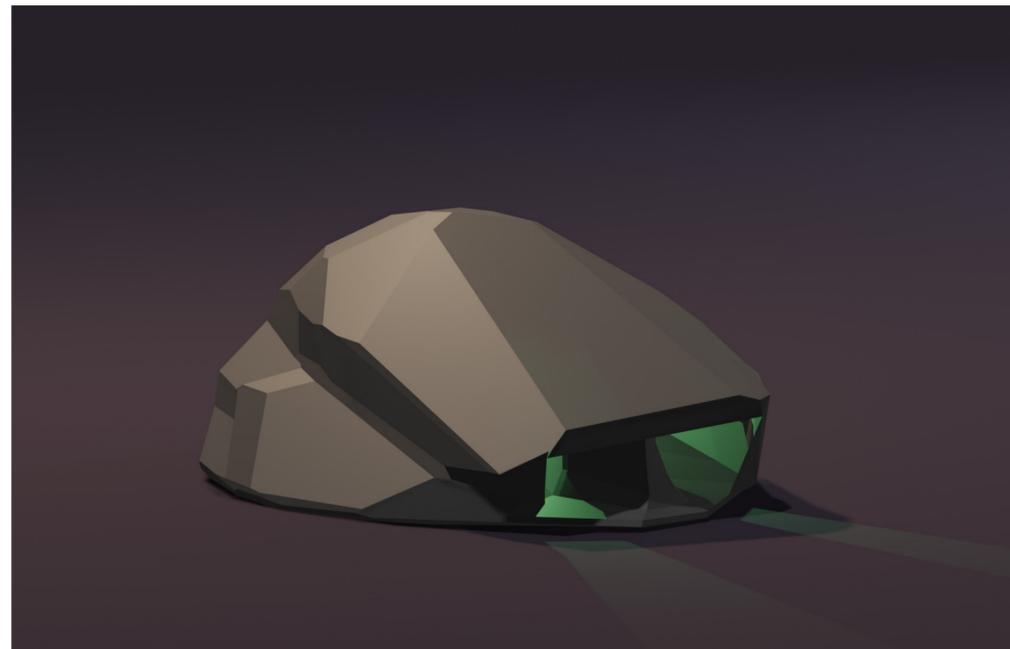
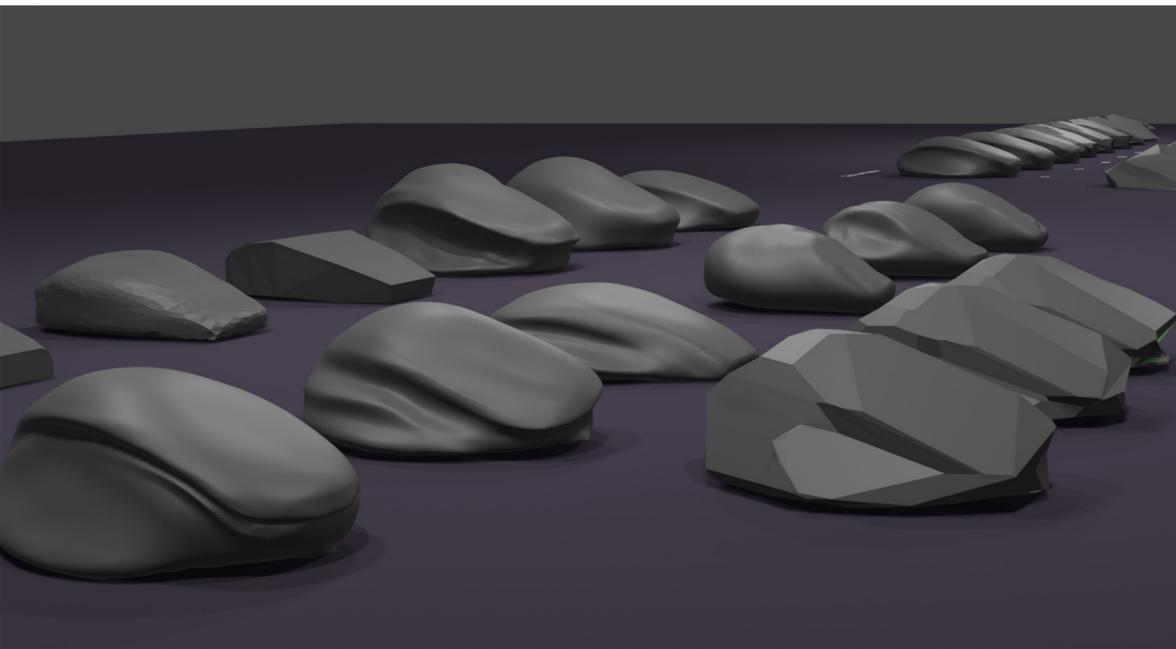
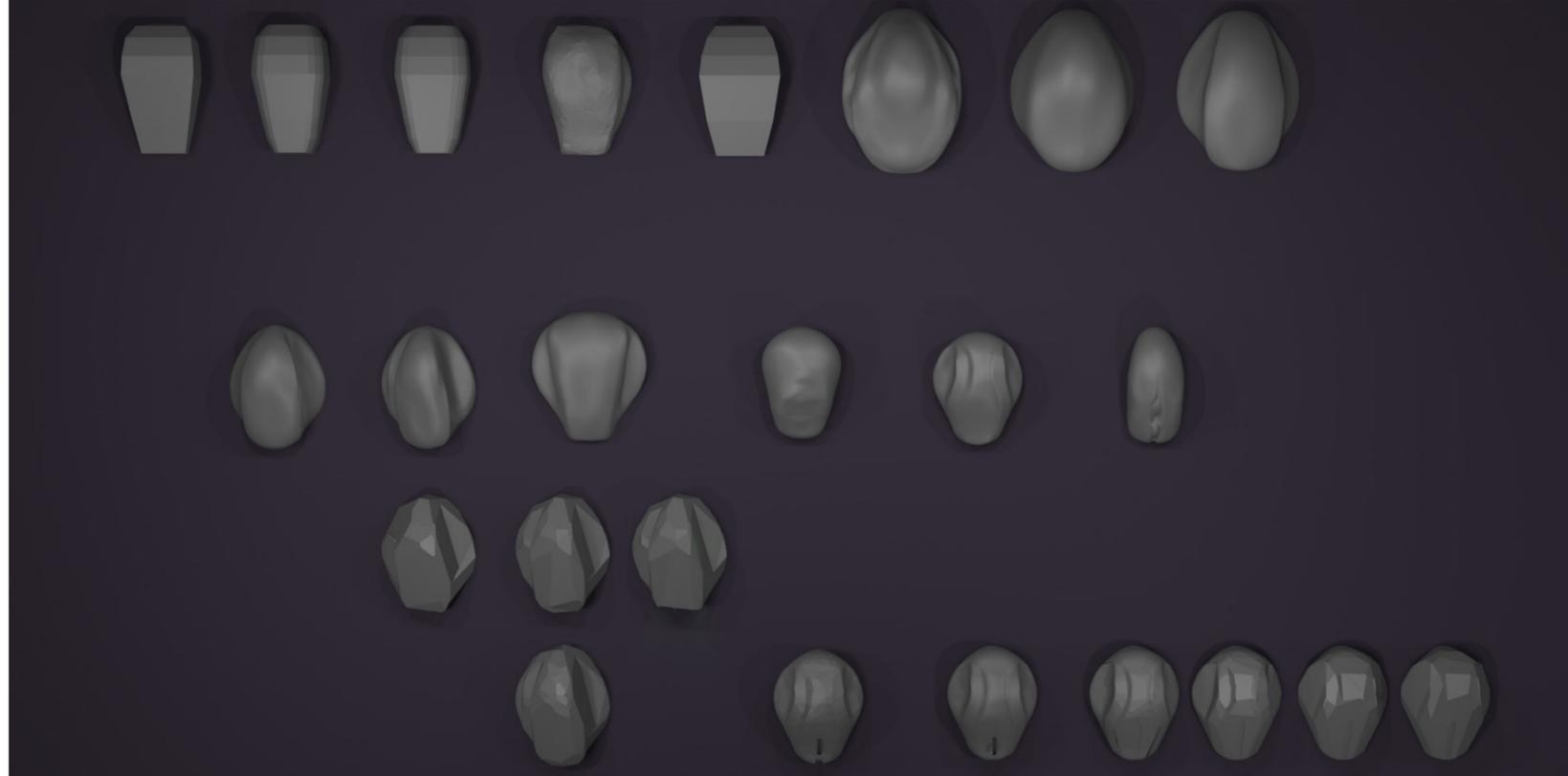
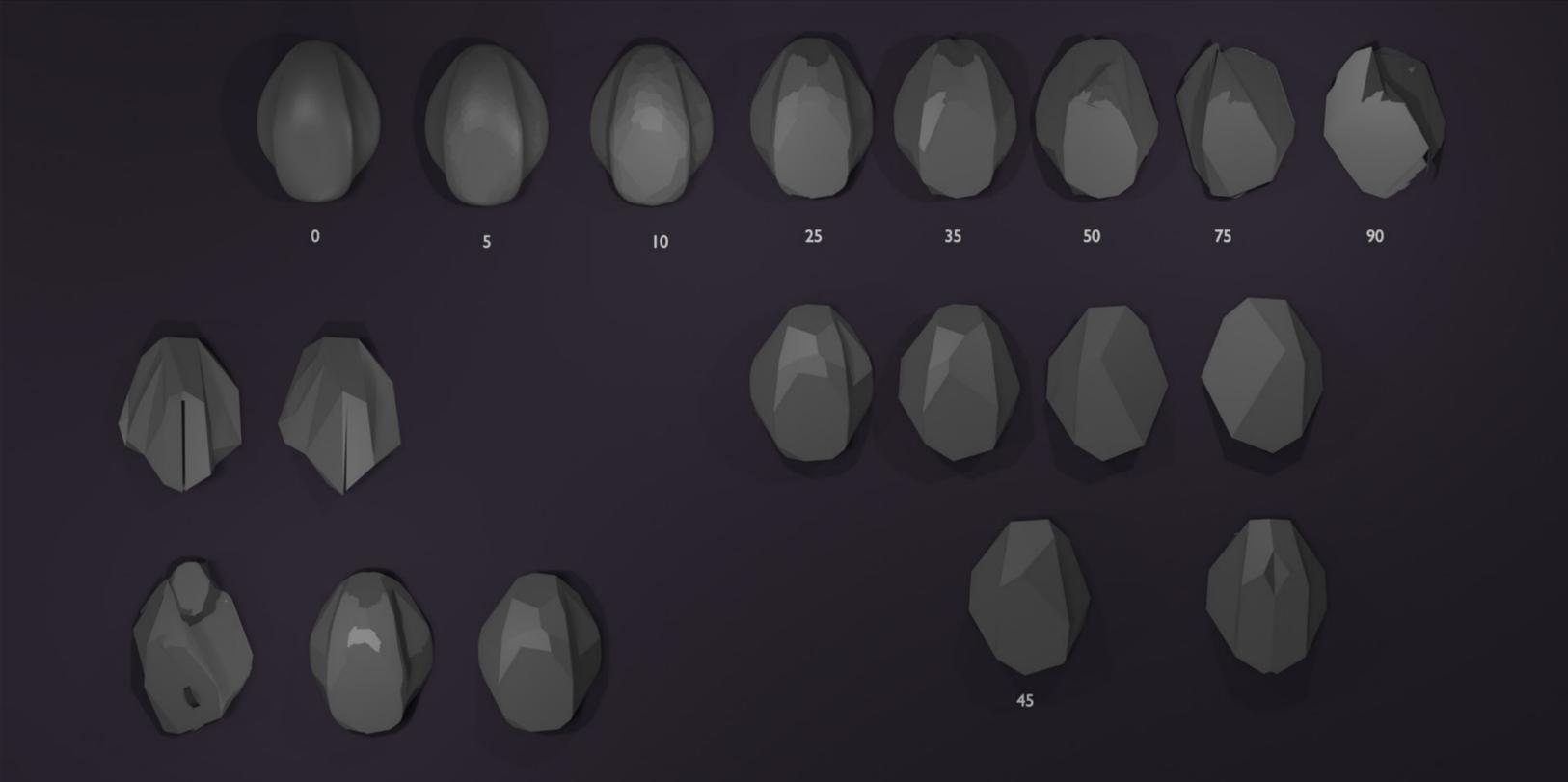
Symmetrical
Design Angle

Design direction:

The **E-99** is an **ultra-lightweight** gaming mouse. Features include **hot-swappable switches** and **easy access to internals** - allowing for convenient cleaning and maintenance

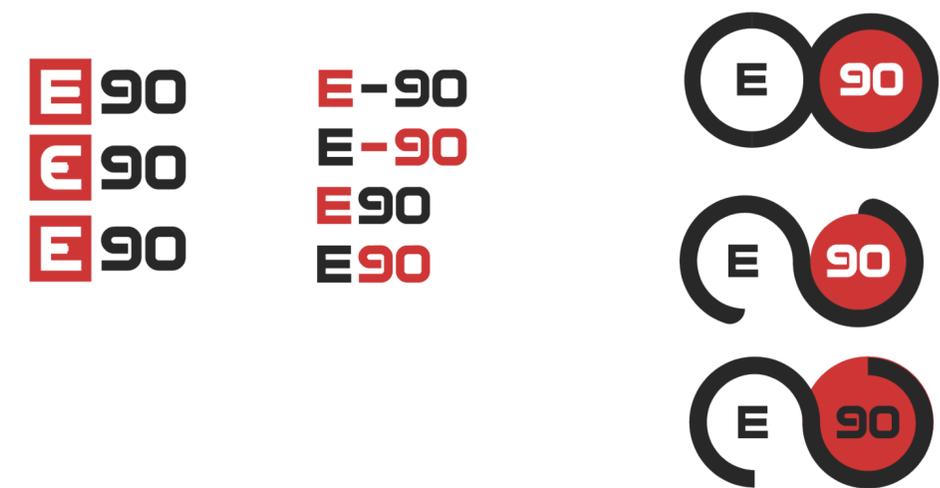
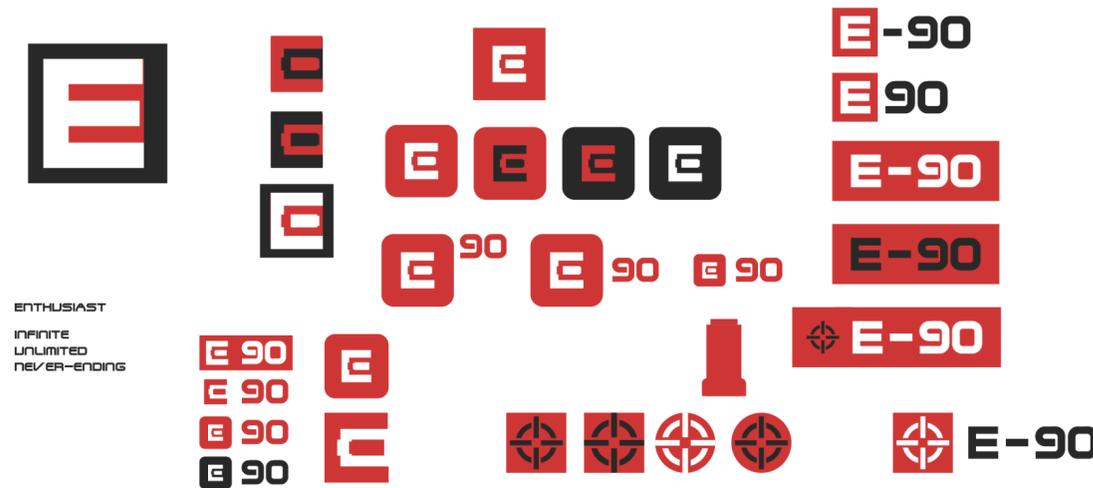
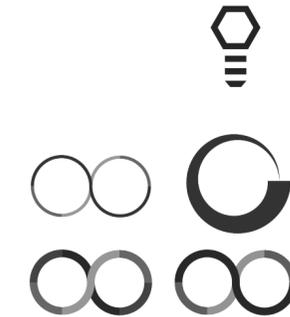
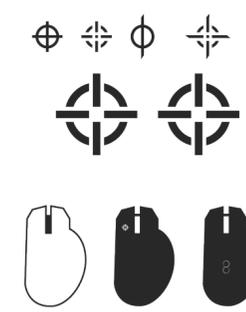
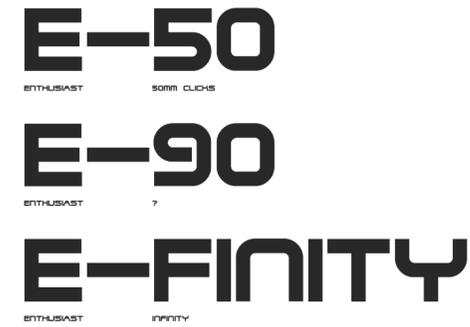
Additionally, the **ergonomics** promote good hand posture, and allow for customization of the palm grip.

The form is designed to keep the **palm cool**, reducing perspiration and increasing overall comfort.



BRAINSTORMING - CAD

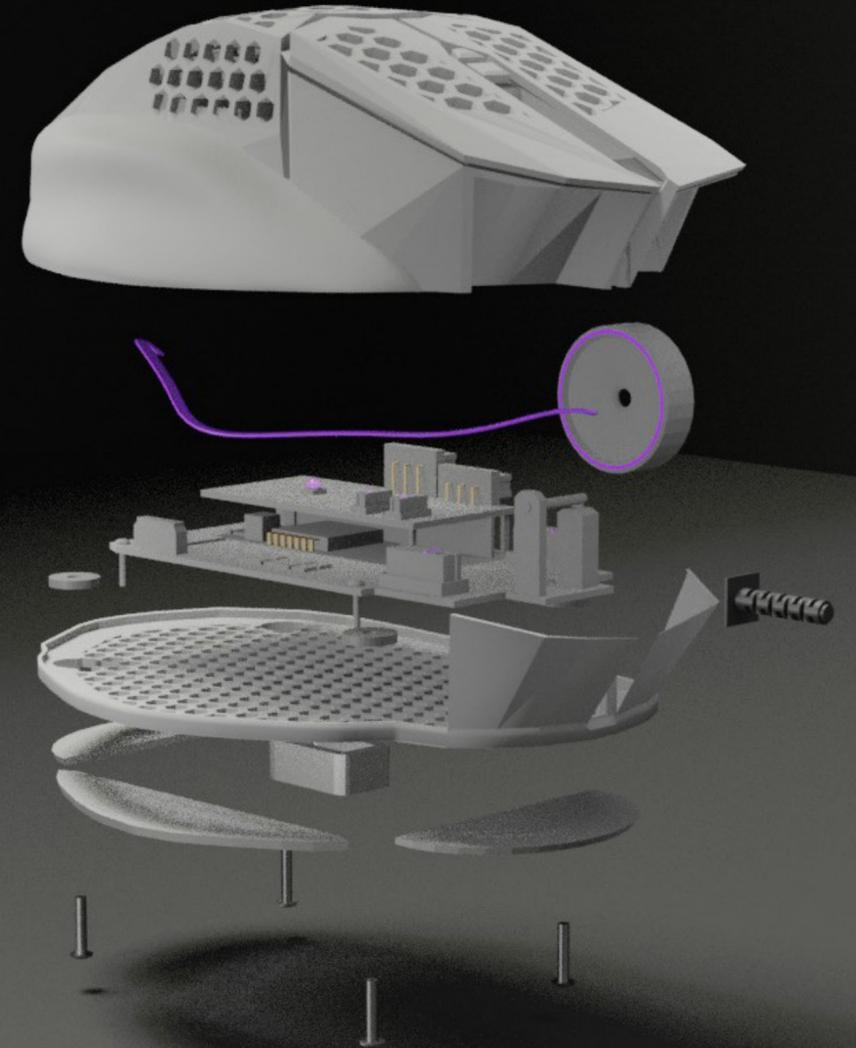
Sculpting the organic forms in Blender gave me some good rough drafts to move forward with.



LOGO DESIGN

The meaning behind “E-99” is that the E stand for Enthusiast, and 99 is to symbolize the long lifespan of the product. (In video games, 99 is often a significant number, as player level often caps out at this number)

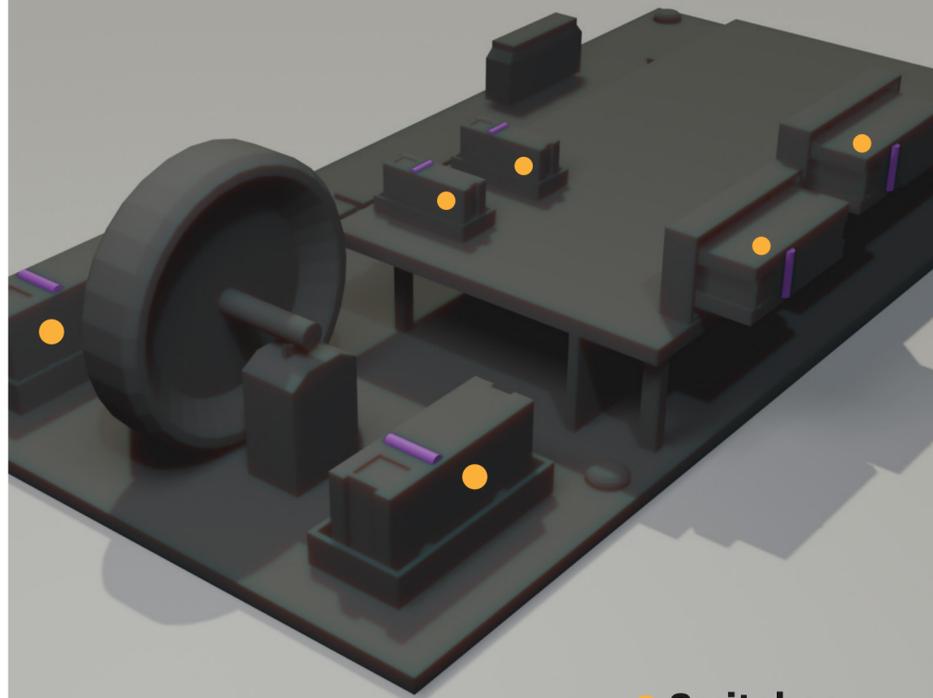
The “E” itself is designed after the hot-swappable switch; the middle line in the E signifies the switch and the outside reflects the shape of the casing.



SKETCH MODELS

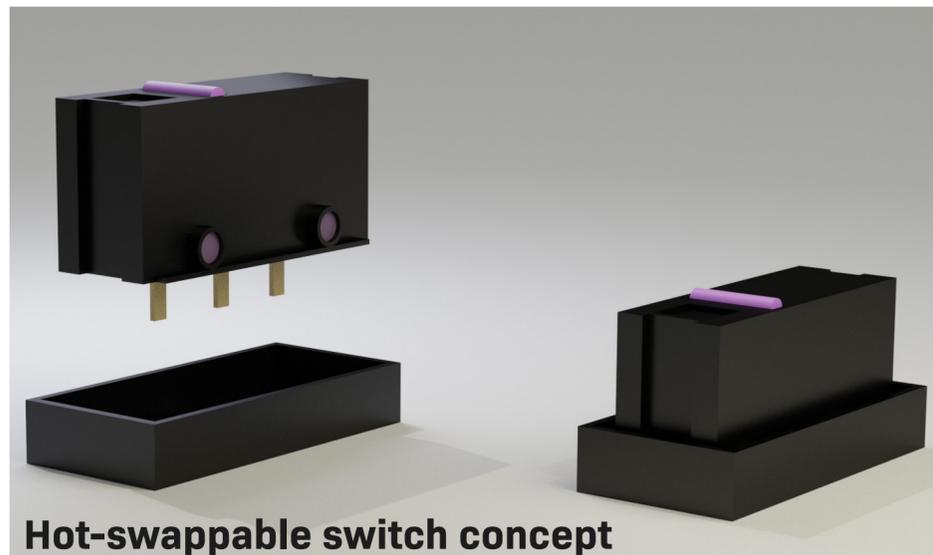
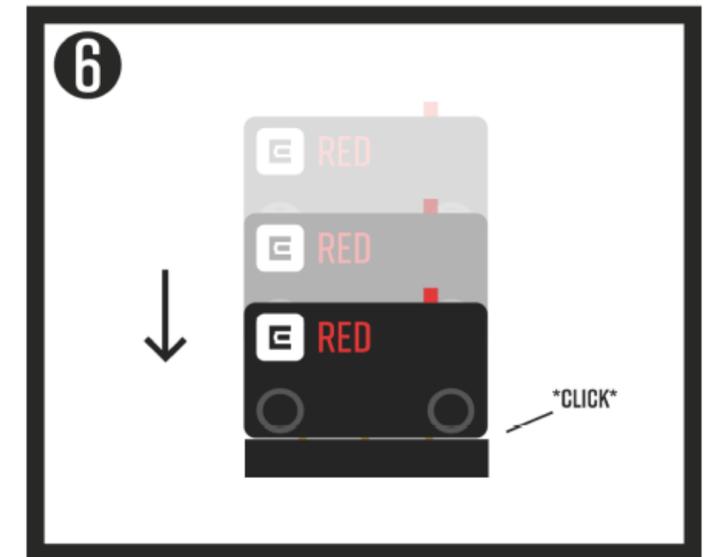
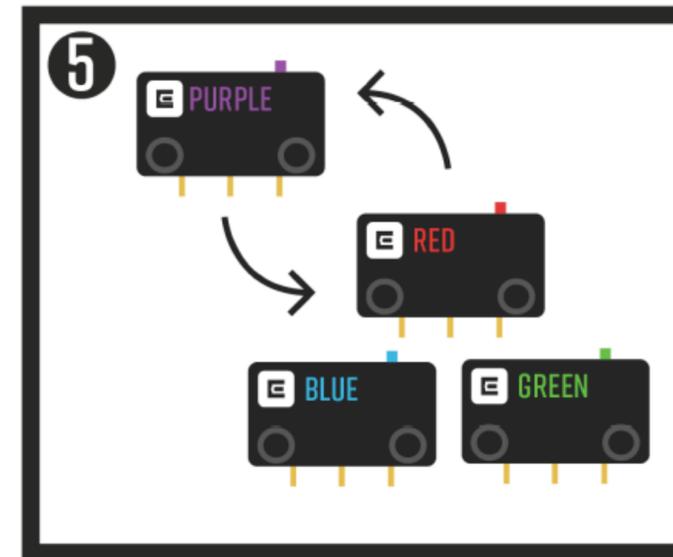
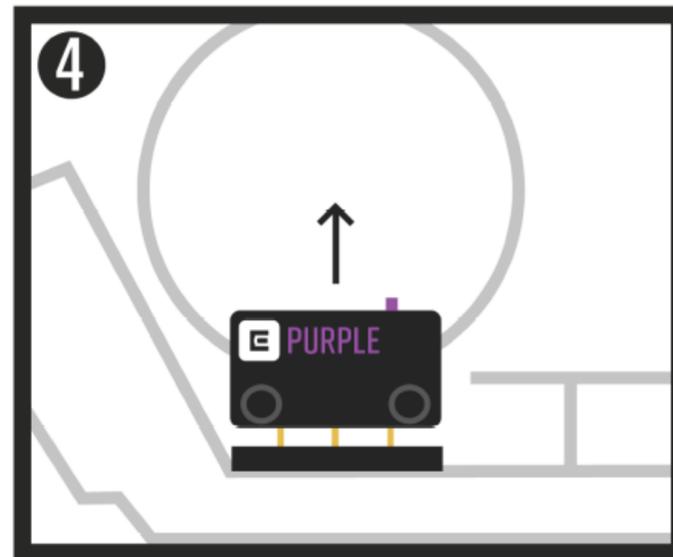
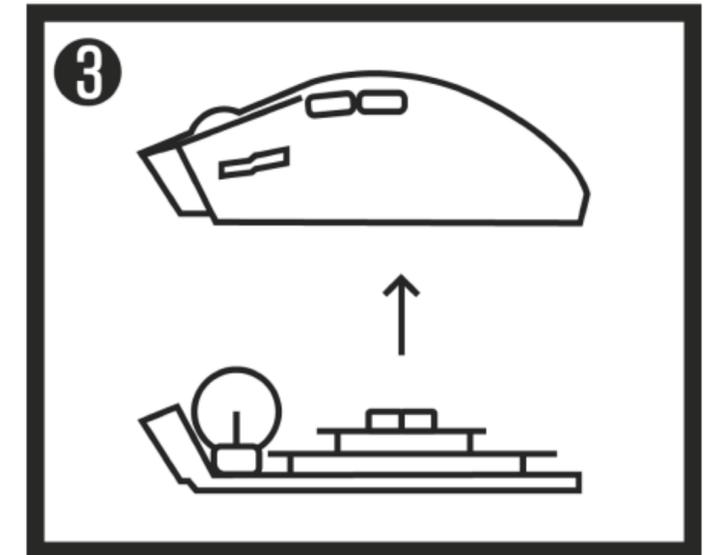
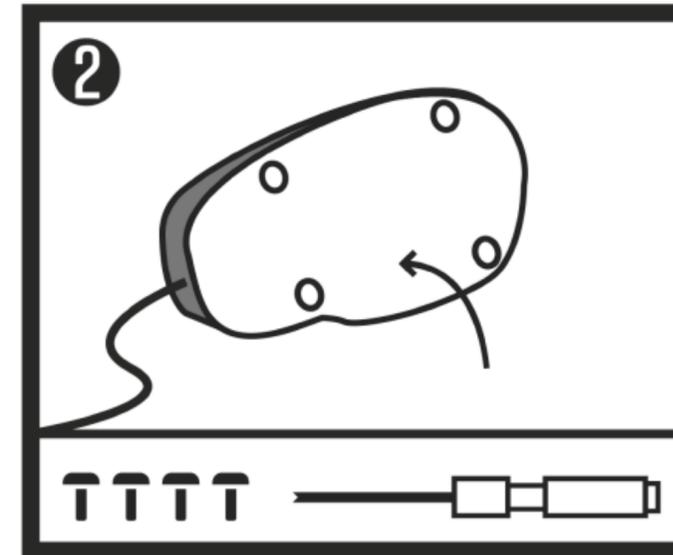
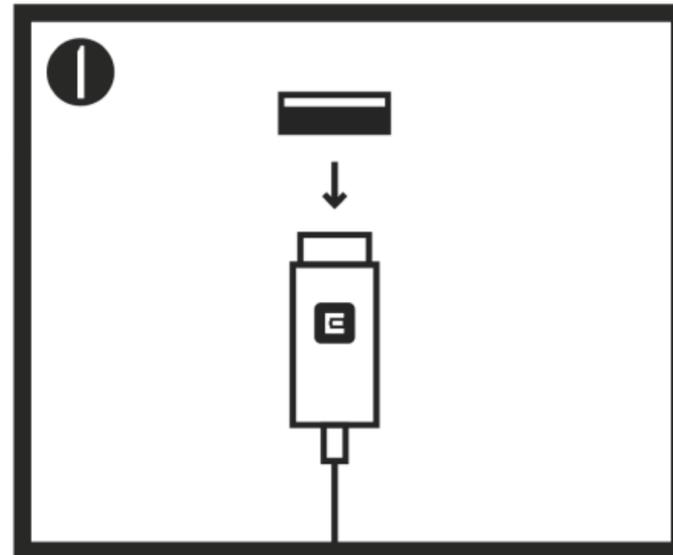
This first version of the E-99 had a large top shell, with a smaller bottom piece. In later revisions I changed the design the position more of the mass towards the bottom, and reduced the size of the top shell. This design included honeycomb cutouts to reduce weight and increase airflow to the palm. I found that while the honeycomb design is effective in these ways, some users don't like the texture/feel of the cutouts.

Mouse PCB model



● Switches

USER EXPERIENCE STORYBOARD - REPLACING SWITCHES



Hot-swappable switch concept

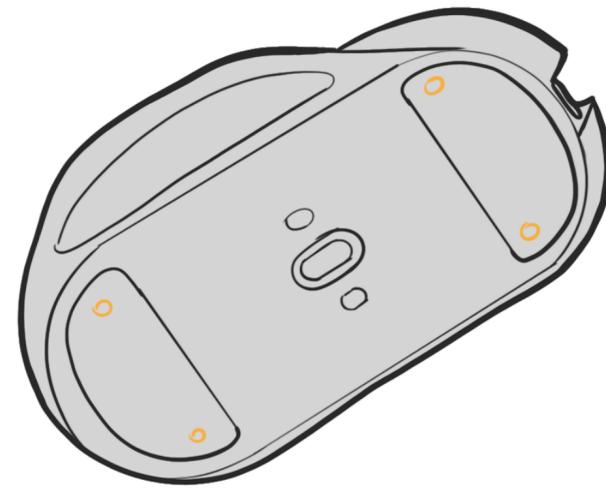
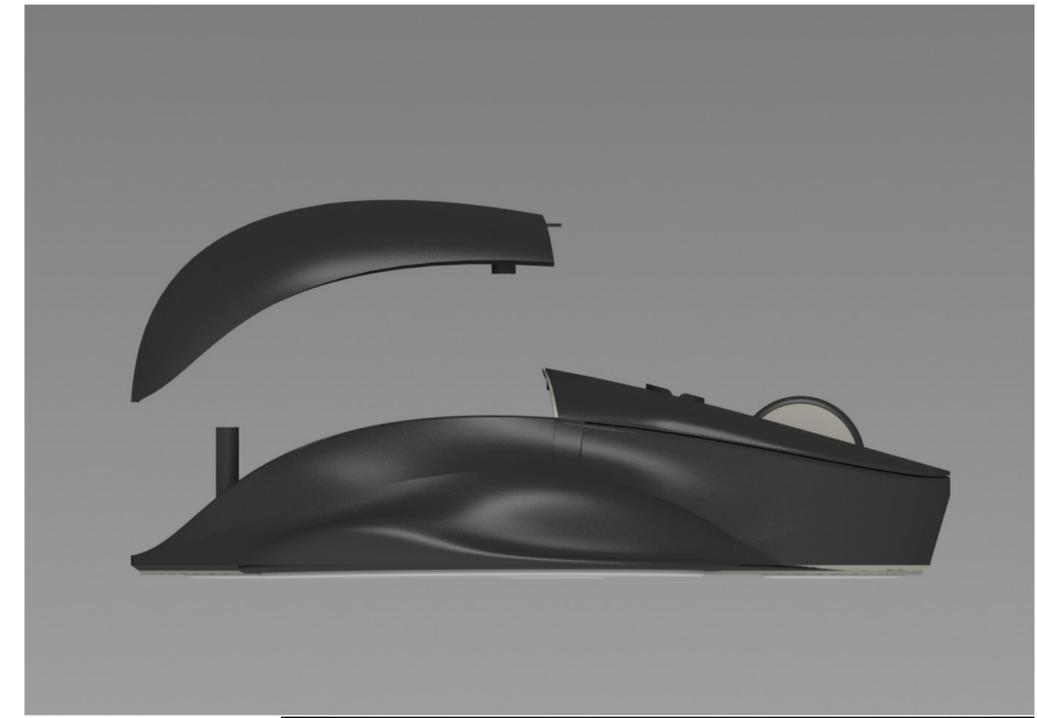
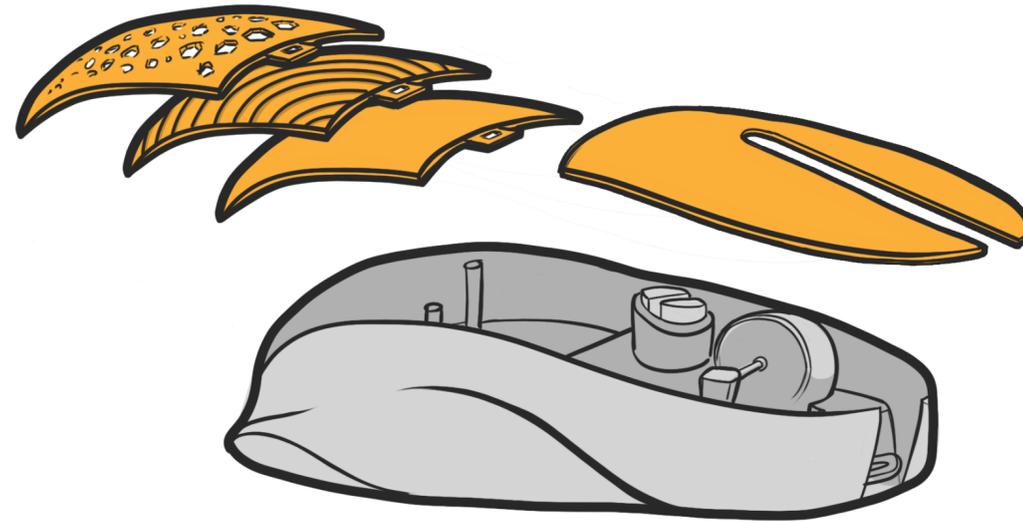
HOT-SWAPPABLE SWITCHES

Most modern mice use switches that are soldered onto the PCB, making them difficult for users to replace.

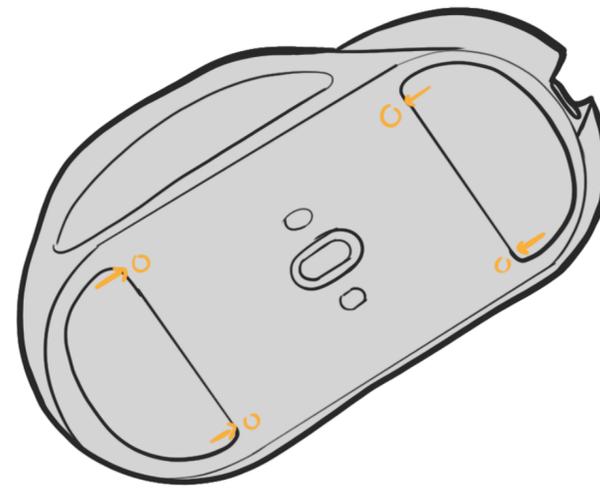
My design features hot-swap switches, which snap into a slot that is soldered to the board - meaning when the switches get worn down over time, the user can conveniently replace them without hassle. Additionally, users can select from several types of switches to customize their click.



Swappable palm and trigger pieces



Most gaming mice hide their screws underneath the skates



Repositioned screws means ease of access to internals



FORM REFINEMENT

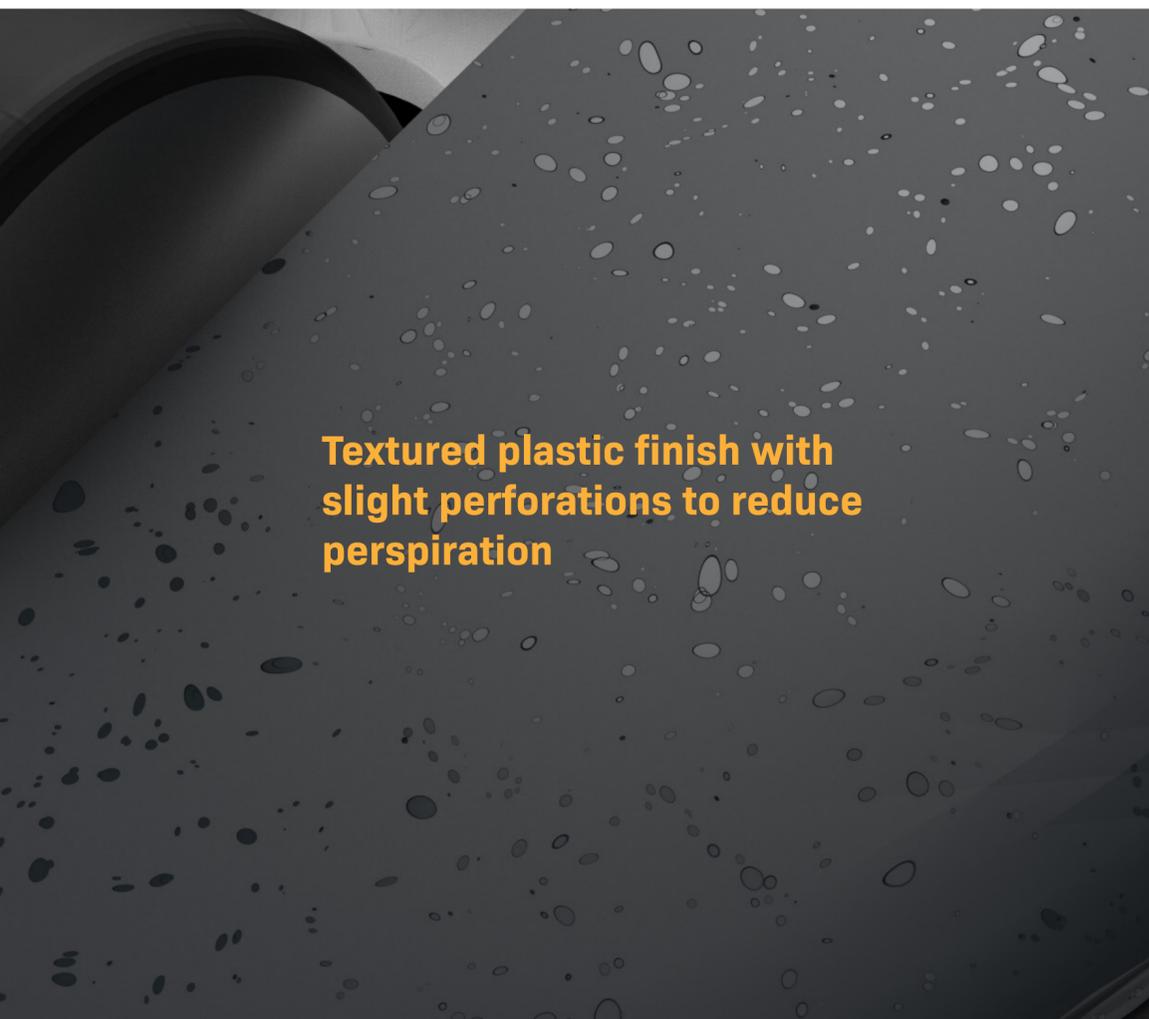
I redesigned my model in Solidworks and created a much cleaner and more ergonomic form. The form has a symmetrical angle (not leaning right/left) and has a comfortable position for the thumb and pinky+ring fingers. A slightly rubbery material surrounds the lower body, offering extra grip comfort. The top shell has slight perforations, meaning less surface area touching the hand and a cooler palm as a result. The palm piece can be removed and swapped out to fit the users preference.



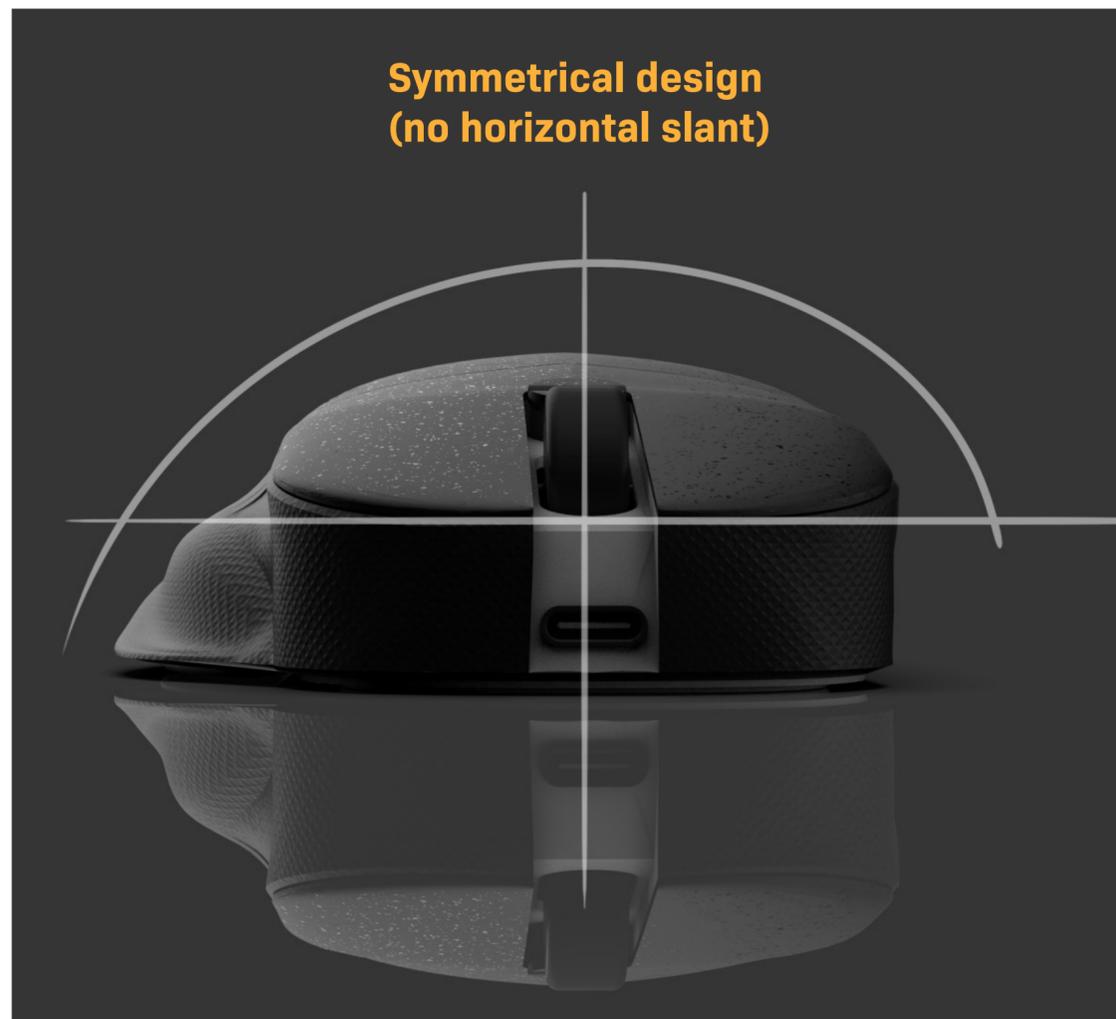
Pinky and ring finger support



Thumb support



Textured plastic finish with slight perforations to reduce perspiration



Symmetrical design (no horizontal slant)



Slightly rubbery material for added grip



2-part design



**Pinky/Ring
finger support**



**Repositioned
Screws**



**Anti-Perspiration
texture**



**Hot-swappable
Switches**



**Symmetrical
Design Angle**



A sustainable gaming mouse design

The E-99 mouse makes several small changes to remedy problems that I identified through my research.

Hot-swappable switches increase the lifespan of the product and offer customization of each click.

Repositioned skates means easier access to the internals, leading to convenient cleaning and maintenance.

Form and material reduce the heat of the palm and increase the level of comfort.



FINAL THOUGHTS

By providing a sustainable solution to gaming needs, the E-99 stands out from traditional disposable gaming mice. Ease of maintenance and customization increase the effective lifecycle of the product.

JAMES BOYDELL

boydelldesign@gmail.com

boydelldesign.com

520.484.3045

