

LiveFeed

A New Way to Experience Nature

LiveFeed is an interactive, affordable bird feeder that encourages shared experiences between humans and nature by providing encounters with wildlife that are intimate, safe, and accessible. Wild bird feeding is considered to be the most prominent form of human-wildlife interaction across the globe, yet the use and design of the bird feeder have gone largely unchanged since its inception. The Ornithology Department at Cornell University estimates that in the U.S. alone, 57 million households provide supplementary food for wild birds, spending upwards of \$4 billion annually on birdseed. LiveFeed reenvision the way people interact with bird feeders by using simple and affordable technology to promote and preserve positive nature experiences.

Designed By Andrew Tebeau



Nature Experience

Encouraging interaction between humans and nature

Wild Bird Feeding

People in the United States spend \$4 billion annually on bird food

Improving Daily Life

Nature is proven to provide mental health benefits and increase overall happiness

Technology

An opportunity to create a more personal form of interaction with nature, while keeping a safe distance between users



Research

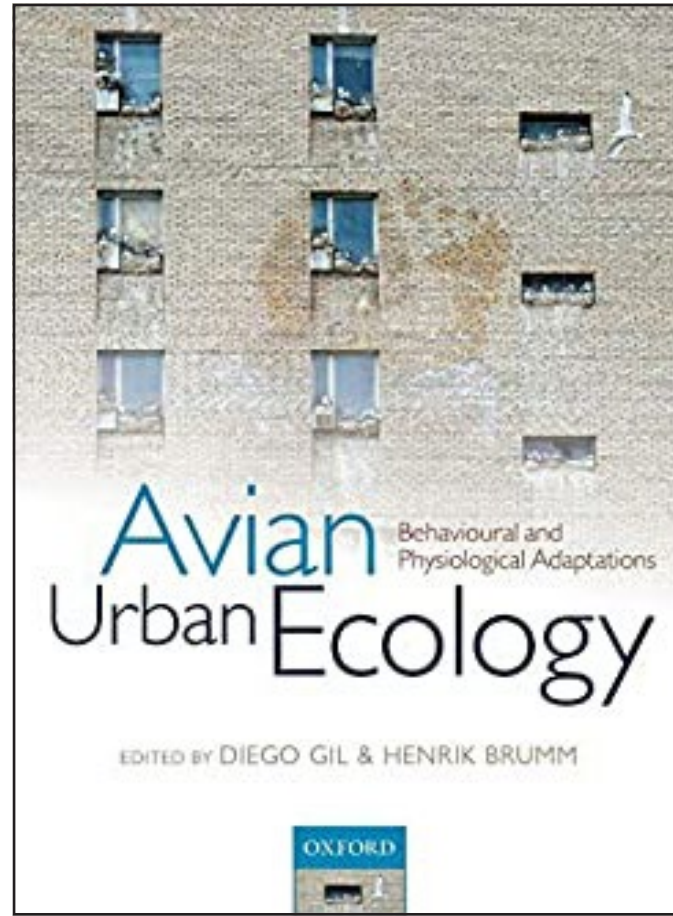
Ornithology, Design, & Shared Experiences

In order to ensure an educated approach to my design process, my preliminary research was focused on ornithology, the study of avian species. More specifically, how providing supplementary food for wild birds may affect avian species. Similarly, it was important to understand the relationship/interaction that humans have with wild bird feeding. An understanding of both of these provided me with an opportunity to alter the way wild bird feeding is approached, to strengthen human-wildlife interaction.



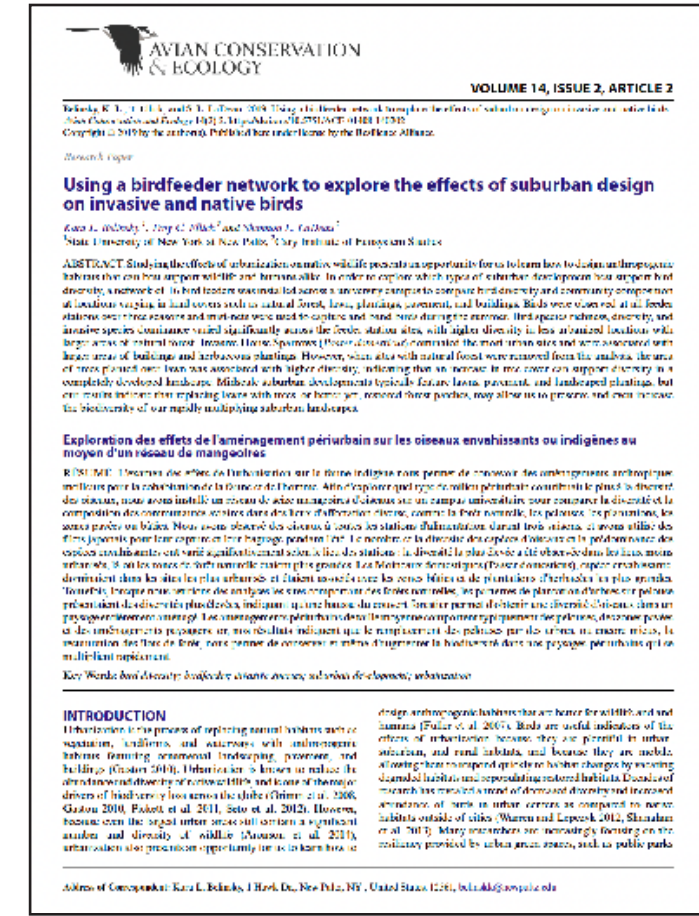
Study Finds People Who Feed...

- Wild birdfeeding is “becoming more important than ever because it is becoming the only form of wildlife interaction most people will have.”
- “People in the U.S. spend \$4 billion annually on bird food”
- “feeding birds is one of the most intimate, private, and potentially profound forms of human-wildlife interaction.”
- “people who feed birds are more apt to aspects of nature and the effects it has on wildlife.”



Avian Urban Ecology

- “... some people gain experiential knowledge from observing the birds on their feeders.”
- “wild bird feeding is probably the most widespread and popular form of human-wildlife interaction throughout the world.”
- “Surveys found that 43% of households provide supplementary food for birds in the in the USA.”
- “Cornell Laboratory of Ornithology recommends feeding birds for promoting nature conservation.”
- Feeding also increases birds’ productivity. Research shows “that birds in most cases, their laying dates, hatching success, have increased as a result.”



Avian Conservation & Ecology

- “Bird feeders... a potential tool for assessing foraging habitat preferences or tolerances for songbirds that use feeders.”
- Supplementary bird feeding is a common recreational activity that is increasing in popularity. A number of researchers have studied how and why people feed birds, and how bird feeders may be affecting the birds themselves, but fewer researchers have used bird feeders as a method of studying the ecology of birds more generally. A network of bird feeders may be used to measure habitat suitability across variable habitats, such as those in urbanizing landscapes.



“Flyer”, Nicholas Baker, 2018

- Flyer was created using 3D printing technology. One of my primary goals for IP was to diversify my skillset. Making functional 3D prints, using CAD was a skill that I lacked and knew would be necessary post-graduation. Similarly, it was an opportunity to give me a better understanding of how to design for manufacturing.
- This project was open-source, meaning anyone with access to a 3D printer could download and print this birdhouse for free. This really struck me as a powerful way to encourage nature experiences and is something that I am still interested in doing with my project.



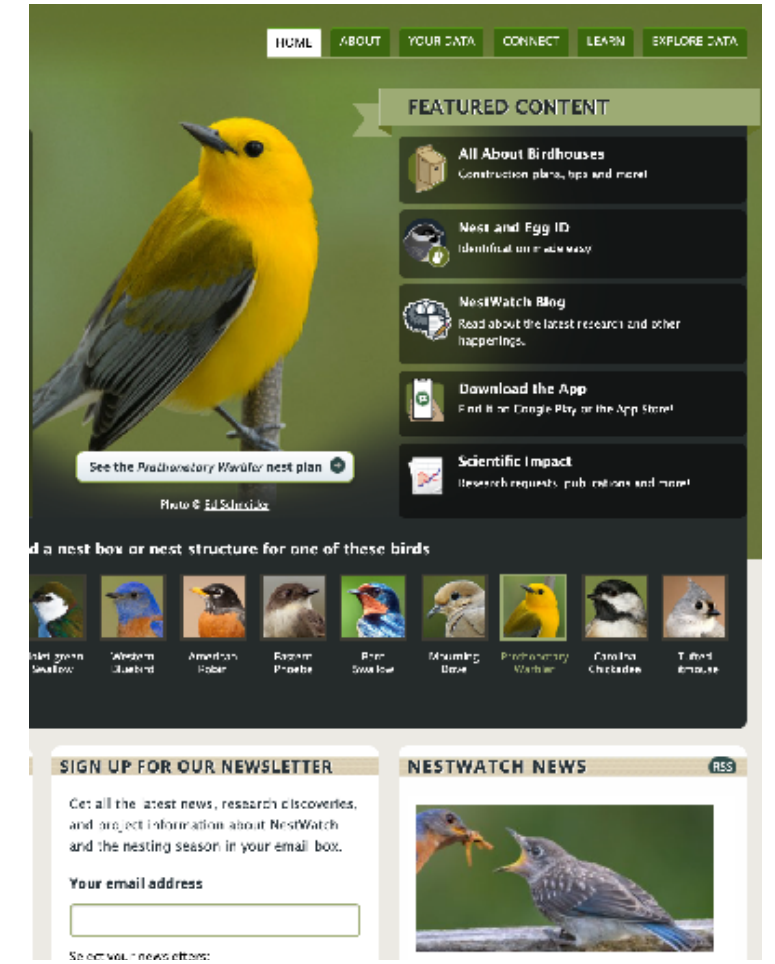
“Maverick”, Julia Kononenko, 2020

- This project had an immense impact on the art direction of my own project. I was immediately drawn to it because of the photography used to present the project. I found that the existing market for bird feeders lacked the allure that “sexy” imagery provided.
- Imitating the imagery used in “Maverick” led me to make a connection with Jocelyn Anderson, a wildlife photographer whose work predominantly focuses on wild birds. Jocelyn took the photos that would eventually be the hero shots for my project and ultimately give LiveFeed the professional aesthetic I desired after discovering “Maverick”.



“MyNatureWatch”, GUL & RCA

- A multidisciplinary design research project conducted by the Interaction Research Studio at Goldsmiths University and the Design Products Program at the Royal College of Art.
- This project was also an open-source project that used a camera module to teach people how to build makeshift trail cameras to observe wildlife.
- I was drawn to this project by the way it encourages interaction with wildlife.



“NestWatch”, Cornell University

- Nationwide social engagement/educational project, conducted by the Ornithology Department at Cornell University, encouraging participants to monitor and record observations of avian species.
- What attracted me to this project was while it was centered around the conservation of avian species, it offered people who participated a lot of experiential knowledge on birds. At the time, I didn’t realize how interesting and exciting observing birds could be. “NestWatch” is a great way to become more involved with nature and does a wonderful job of getting people interested, which I believe is the biggest challenge.

Washtenaw Audubon Society

In order to synthesize what I had learned through my initial research, I got involved with the Washtenaw Audubon Society. I participated in a bird-watching event, at Nichols Arboretum, where we scouted, observed, and discussed the species we saw. This experience provided me with an opportunity to conduct primary research and strengthen my understanding of how people observe and interact with wild birds.

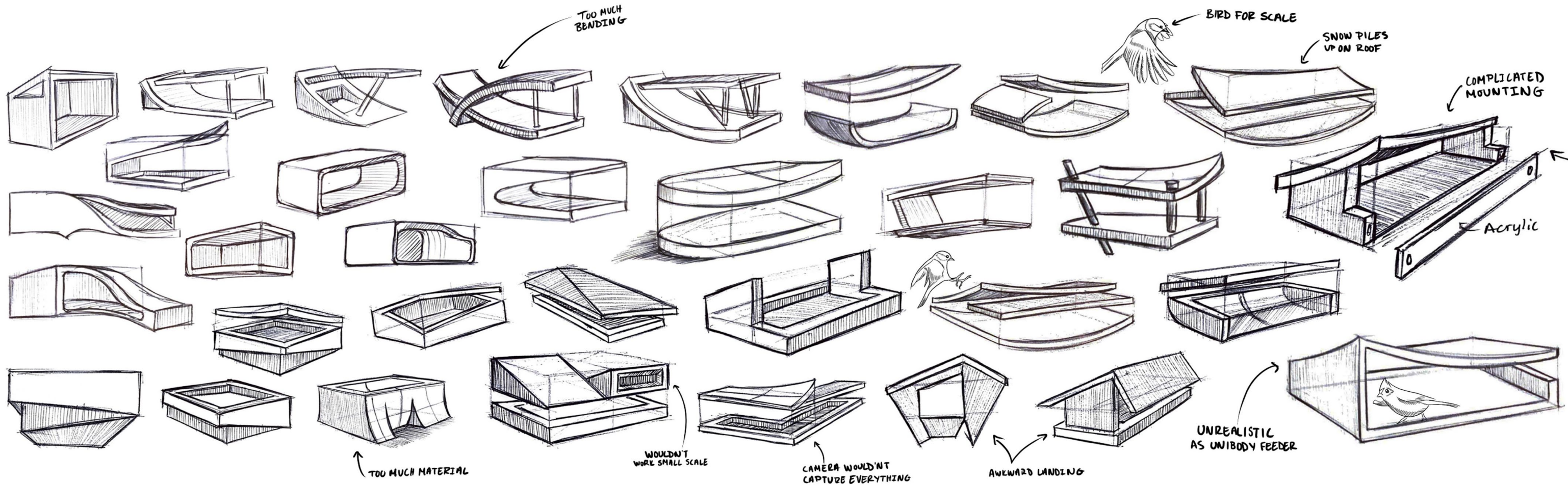


Process

The Evolution of LiveFeed

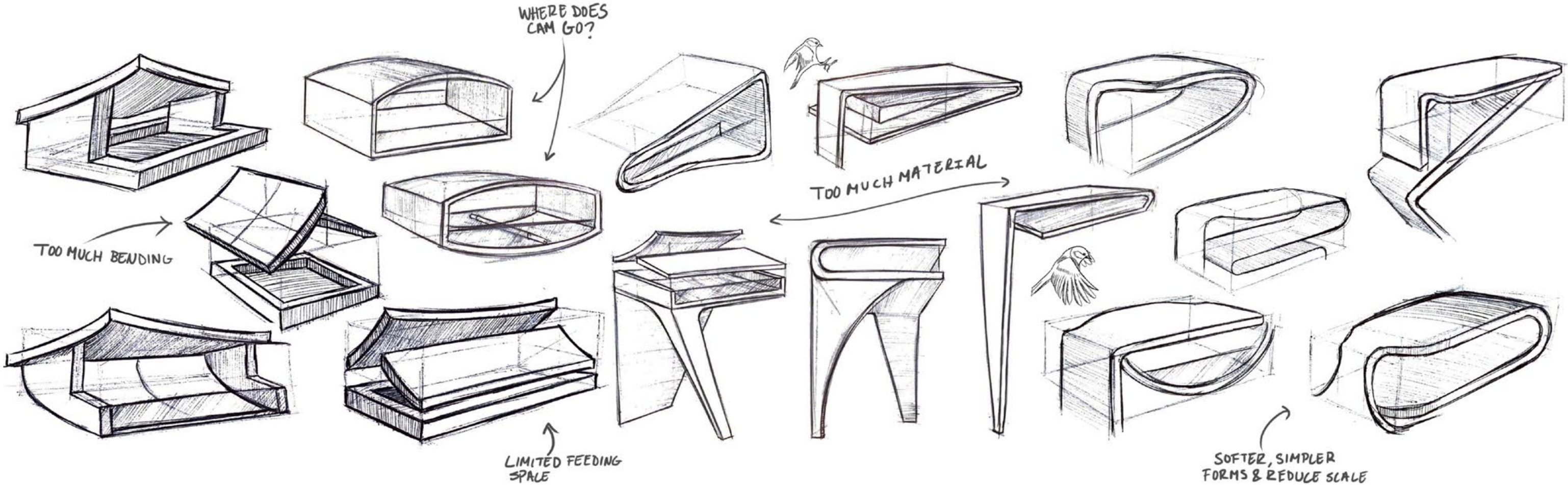
LiveFeed was a heavily iterative process full of mistakes, reflection, and learning. Not only was it a process that taught me hard skills, but a process that taught me about myself and my identity as a designer.

Form Exploration Phase 1



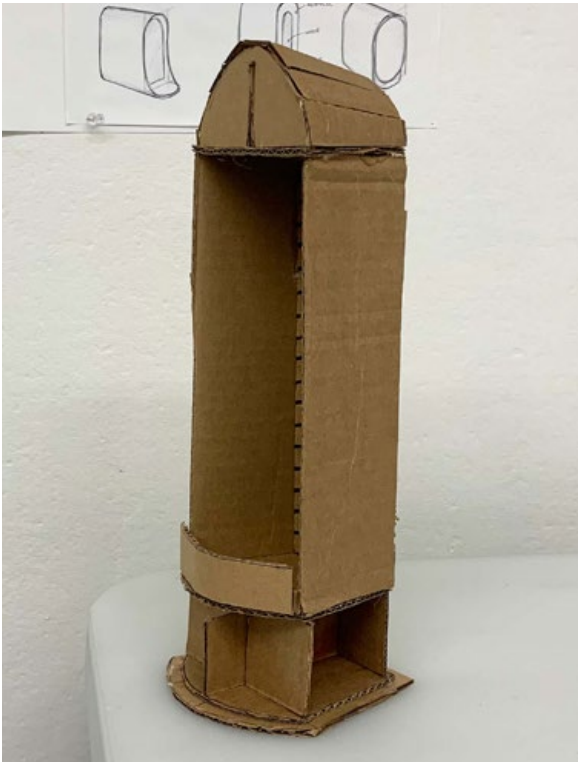
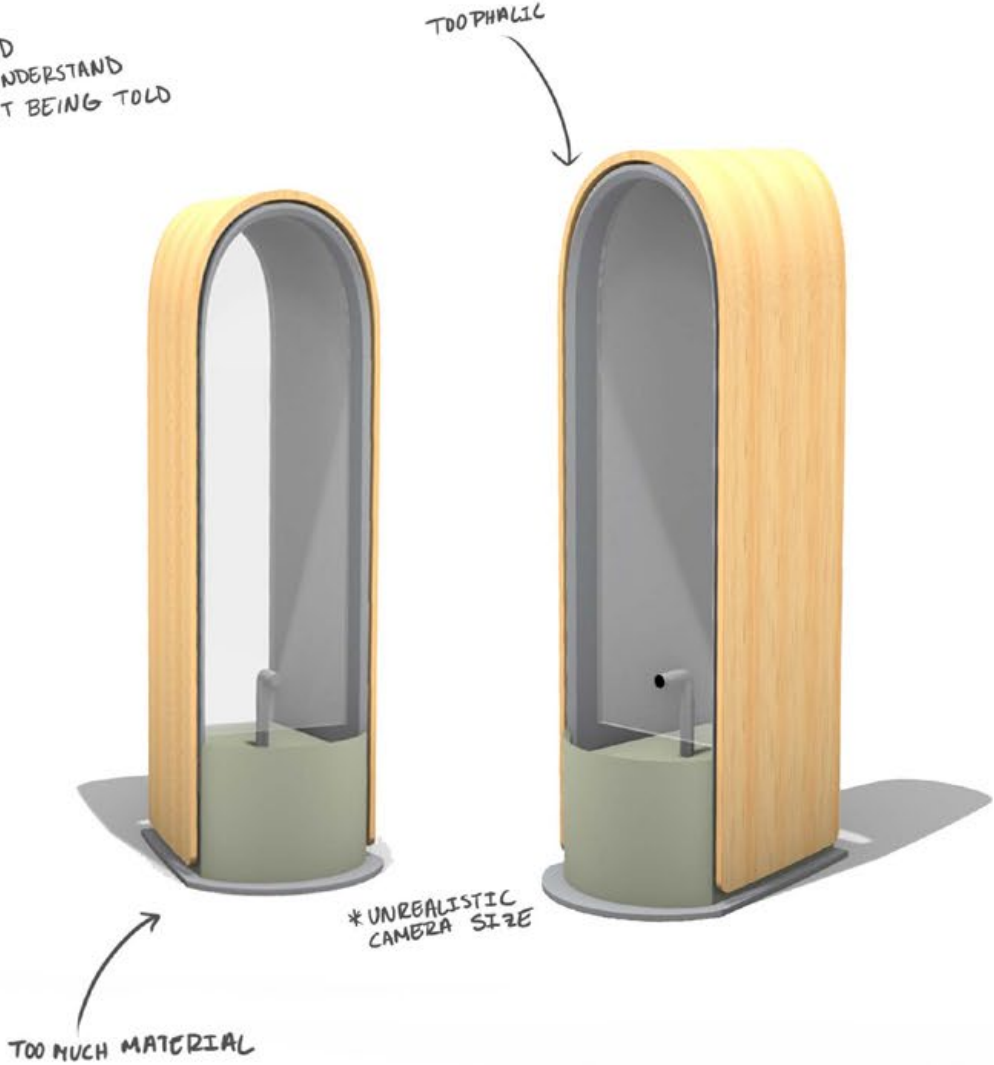
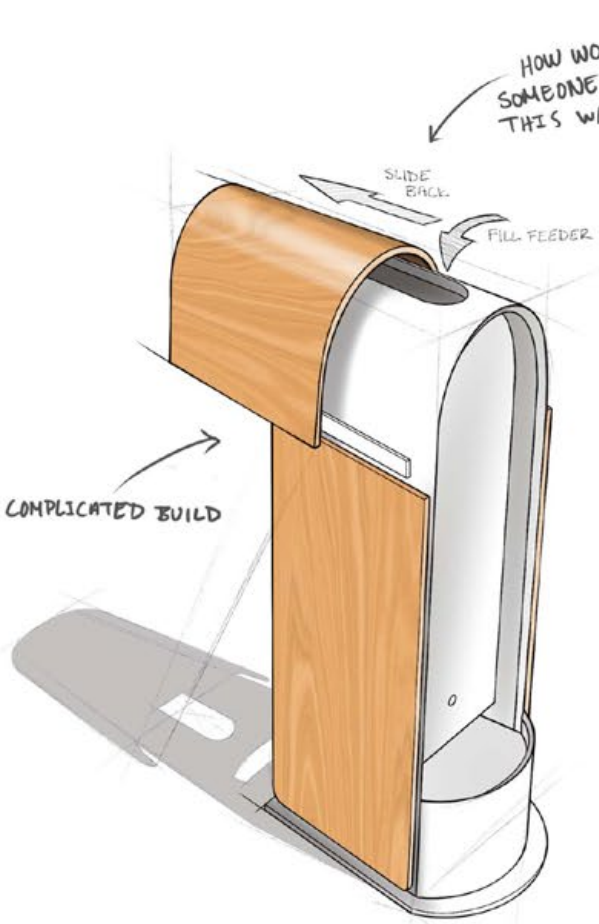
My initial form exploration was inspired by contemporary Japanese architecture. During this phase of the process, I was interested in warping wood to create an elegant balance between organic and geometric forms.

Form Exploration Phase 2

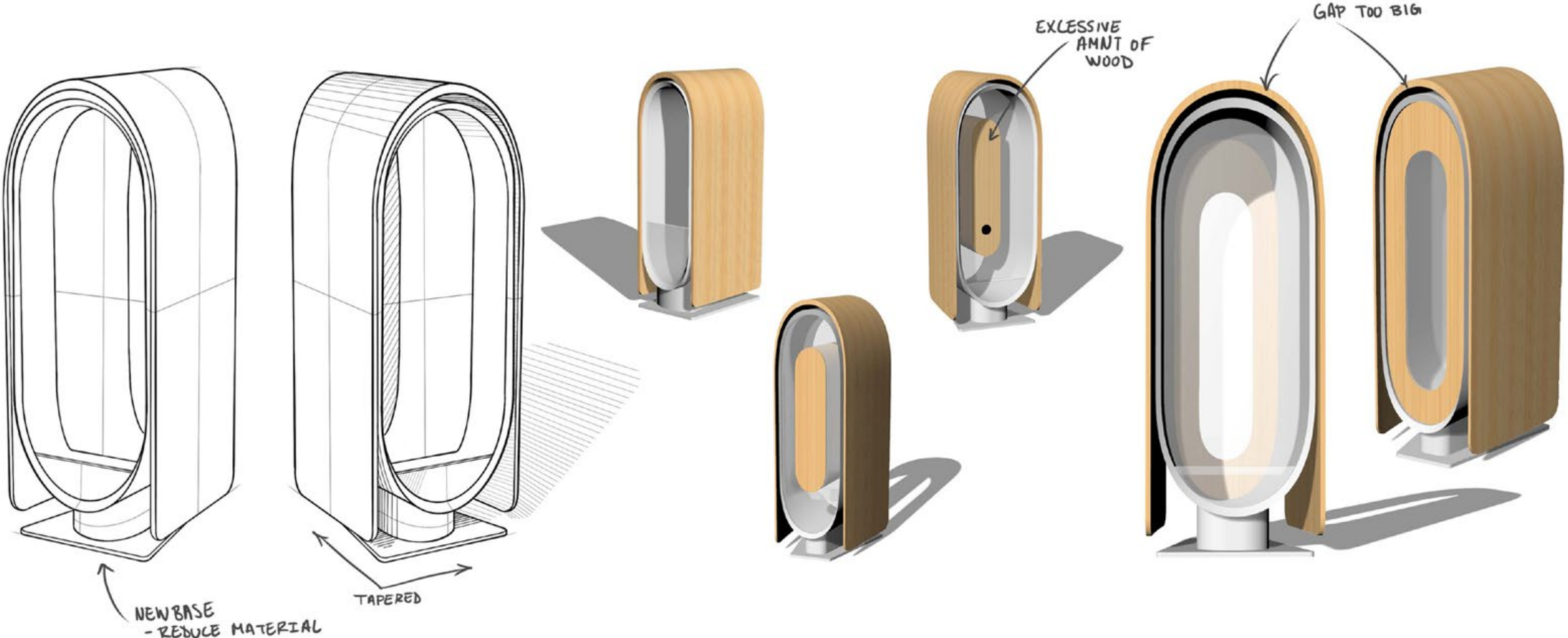


As I began thinking about the functionality, assembly, and maintenance of the feeder, the forms became simplified. Simplifying the feeder ensured that the emphasis remained on the interaction that it encourages and helps to visually communicate to a prospective user that it's a user-friendly product.

Refinement Phase 1



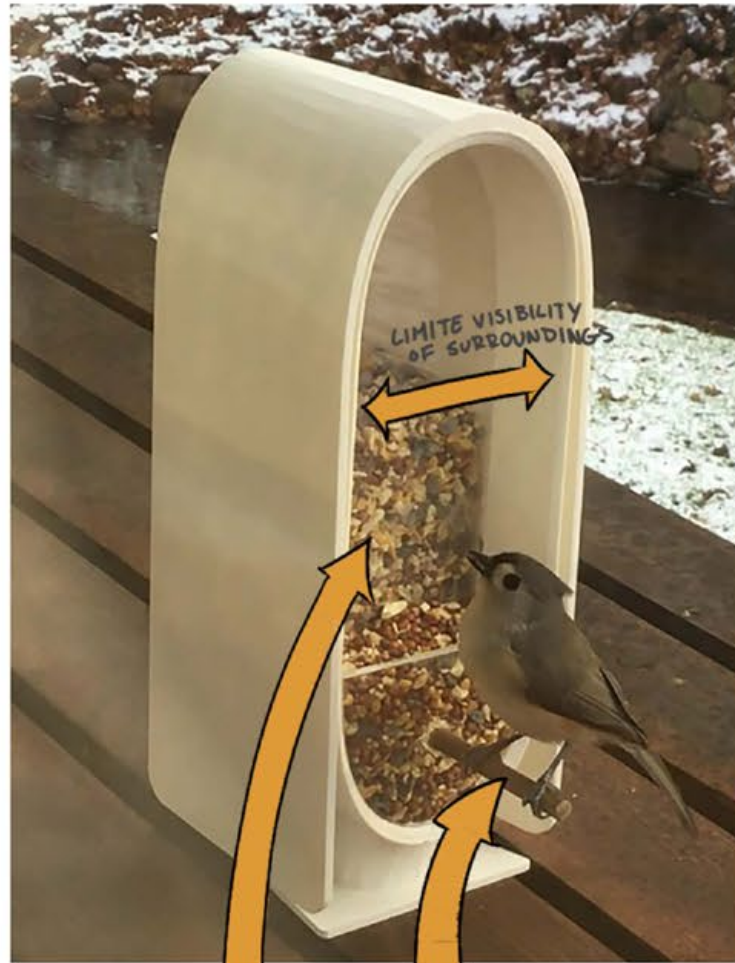
Refinement Phase 2



Testing & Learning



• SITTING ON ELEVATED BALCONY
• LIMITING THE APPLICATION



• ACRYLIC
- CONFUSING FOR BIRDS
- GETS DIRTY QUICKLY

• PERCH ADDED
- STILL AWKWARD FEEDING POSITION



ROUNDED ROOF IS HARD FOR BIRDS TO LAND ON

NO PROTECTION FROM THE ELEMENTS



ELEVATED OFF GROUND & "MOUNTED" ON RAILING
- MORE BIRDS CAME

NEED TO BACKTRACK

Process Phase 2

Shifting My Approach

Backtracking

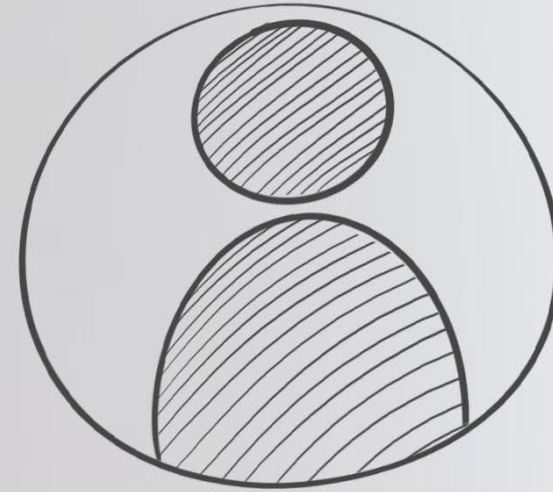
Results from the testing showed I was designing with a form over function approach

Designing For Birds

What are the features of a bird feeder that birds require and appreciate?

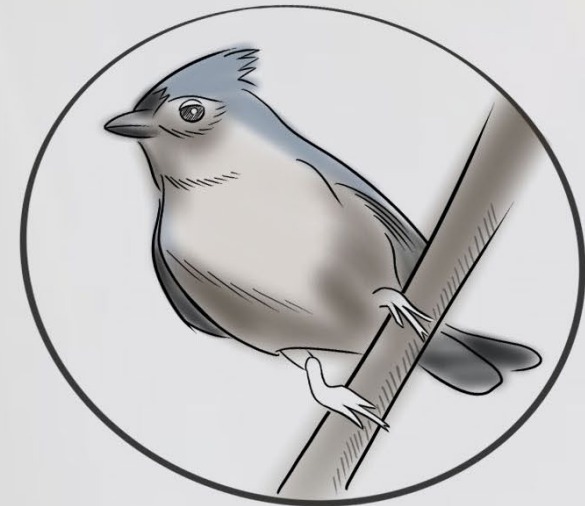
Designing For People

What does a person need and look for in a bird feeder?



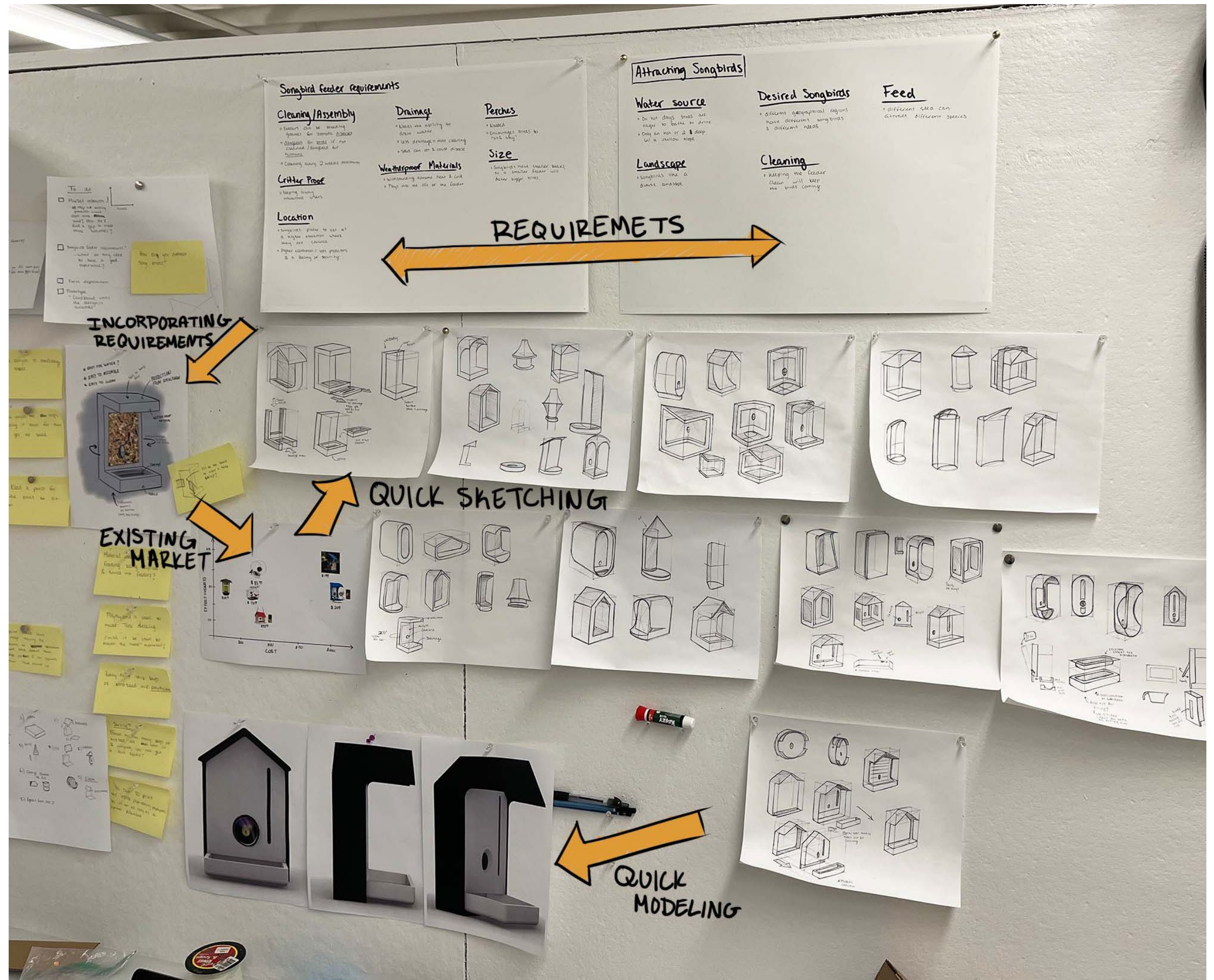
PERSON

- EASY ASSEMBLY
 - SIMPLE TO PUT TOGETHER & TAKE APART
- EASY TO CLEAN
 - DIRTY FEEDERS ARE DANGEROUS FOR PEOPLE & BIRDS
- DRAINAGE
 - DRAINAGE PREVENTS BACTERIA GROWTH
- LOCATION
 - DIFFERENT OPTIONS FOR APPLICATION



TITMOUSE

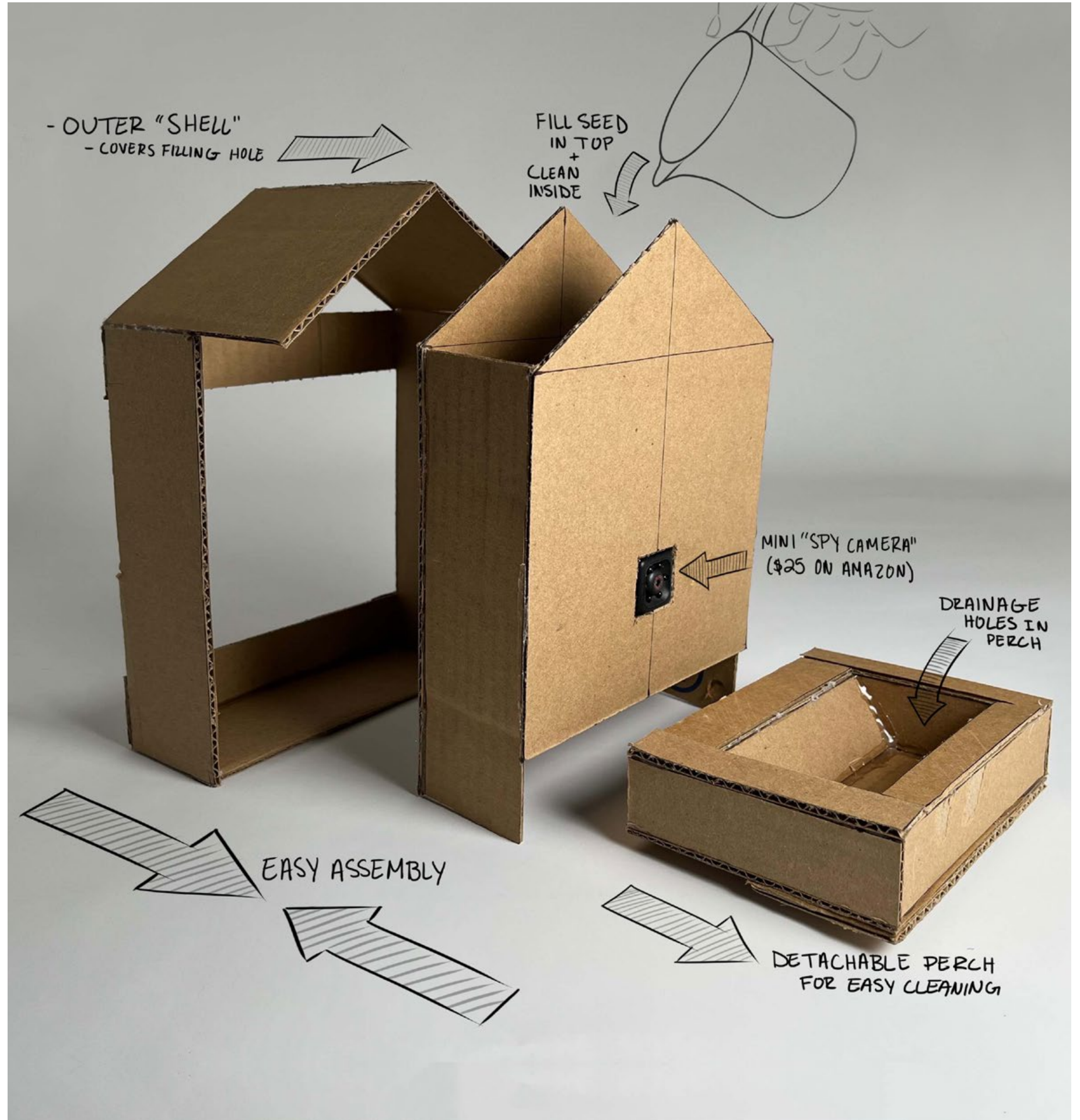
- PERCH
 - ENCOURAGES BIRDS TO VISIT & FREQUENT FEEDERS
- SIZE
 - THE SIZE OF THE FEEDER DETERMINES THE TYPE OF BIRDS THAT VISIT
- LOCATION
 - ELEVATED FEEDERS PROVIDE COMFORT
- ROOF
 - PROTECTION FROM THE ELEMENTS
- VISIBILITY
 - ABILITY TO SEE SURROUNDINGS & WATCH FOR POTENTIAL PREDATORS



Taking a few steps backward, I restructured my approach, focusing on what the features birds and humans look for in a bird feeder. I also explored the small, existing market. Taking this information, I simplified my design down to the simplest possible form, then iterated on that.

After changing my approach to designing LiveFeed, I began by focusing on the basic necessities that are required for an effective bird feeder. What I found was how important it is, for both users, to be able to clean the bird feeder easily and frequently. This ultimately was the main driver for the assembly of the feeder and had an influence on functionality. Furthermore, I aimed for the iteration of this part of the process to be done, mostly, through physical prototyping. This ensured that I was actually implementing the necessary requirements, rather than simply making assumptions.





Testing

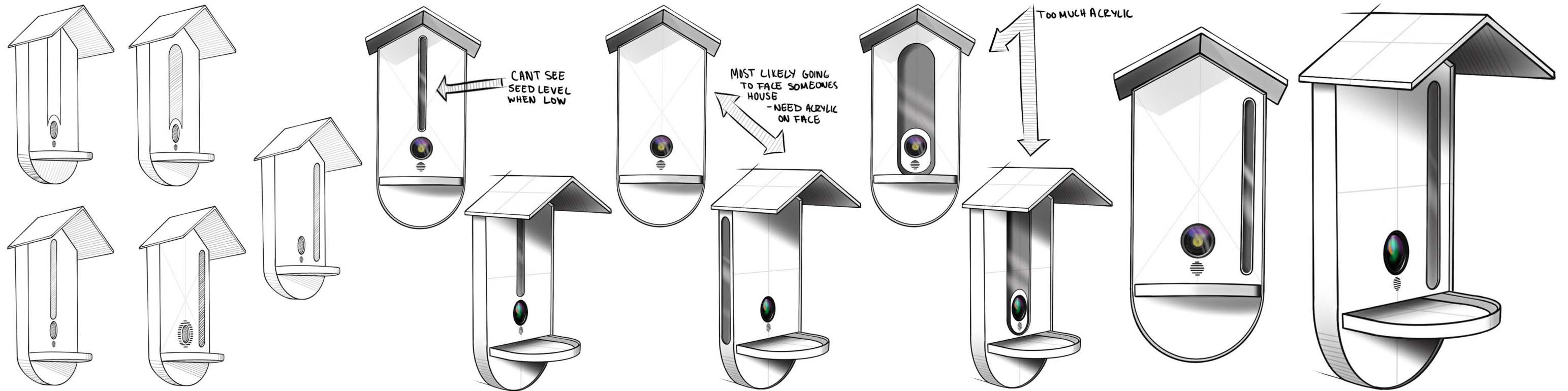


Iterating on the Basics

Following the testing with the stripped-down prototype, I began iterating on the form. Focusing on aesthetics in this stage, I remained aware of the importance that including the necessities had on the overall success of the design.

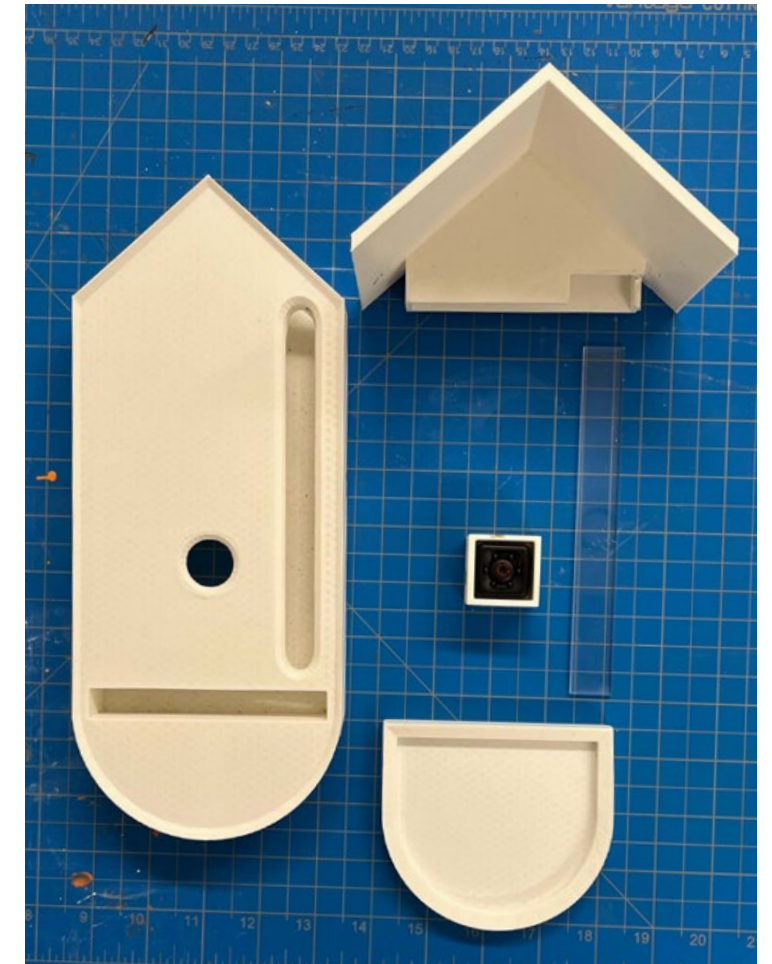
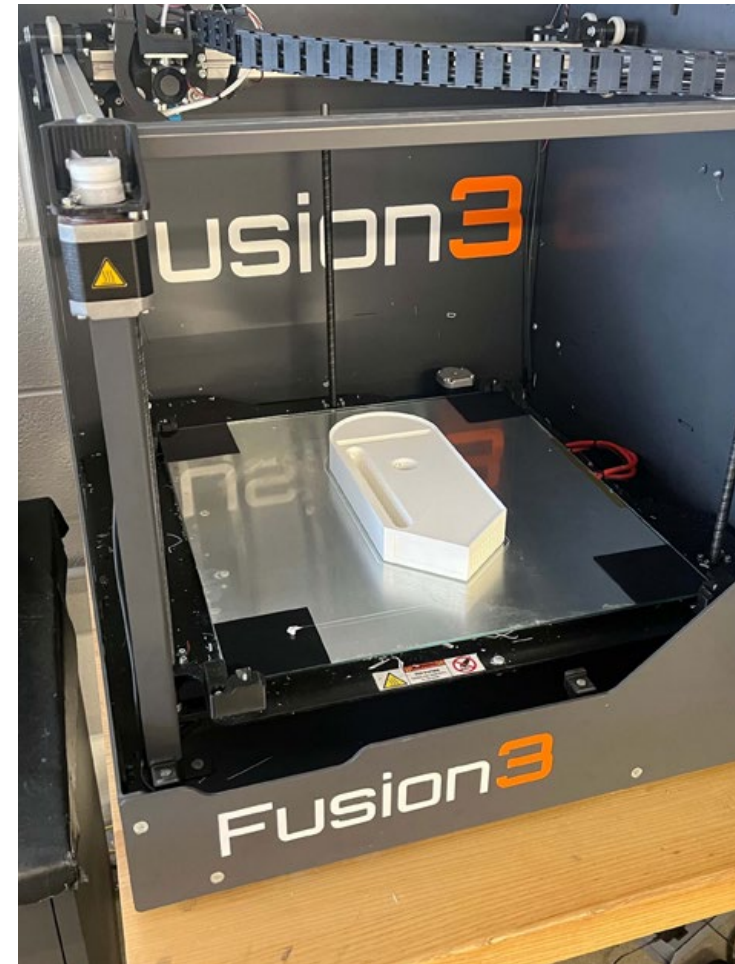


Refinement



After stripping the design down to its most basic form, to incorporate all of the features that make a bird feeder successful, I focused on the placement of the acrylic window and camera. The acrylic window allows human users to assess how long until the next fill, but too much acrylic confuses the birds who can't feed through it.

Prototyping

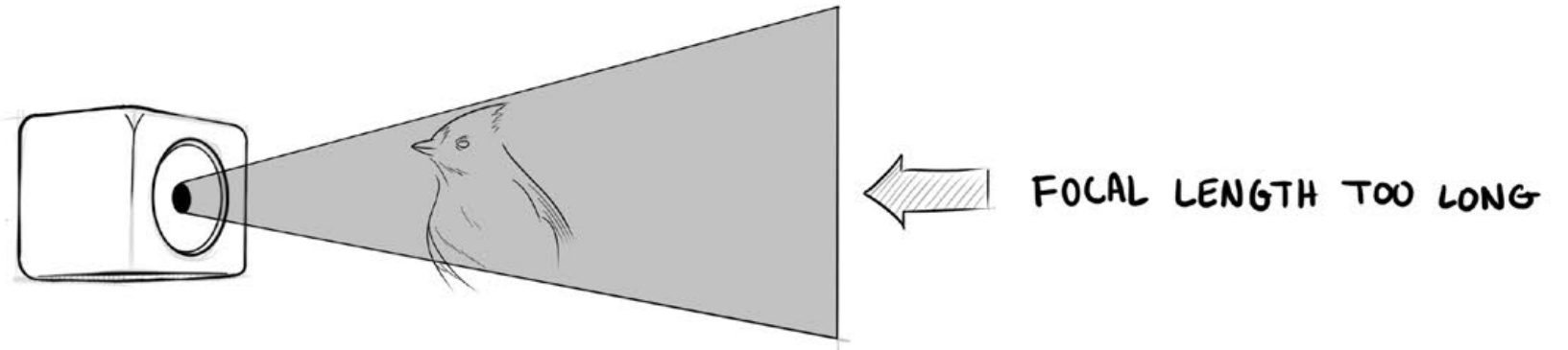


After deciding on a design, I brought the model into the physical world, refining it in multiple stages to ensure that it was worth pursuing. The model that would be used for testing was modeled in Rhino and 3D printed using PLA filament.

Testing

The 3D printed prototype was set up on a pole mount for testing to analyze the functionality. This round of testing presented some critical issues with the camera module that would later need to be addressed.

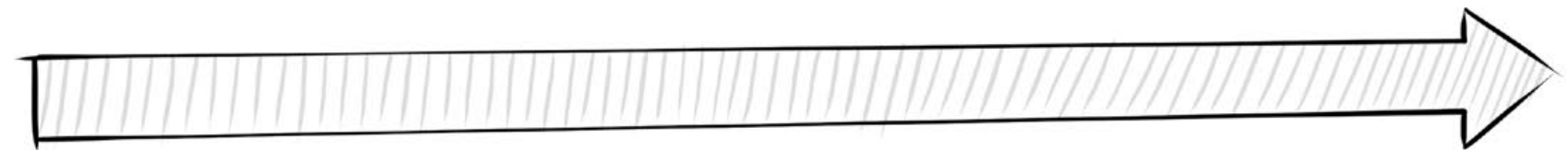
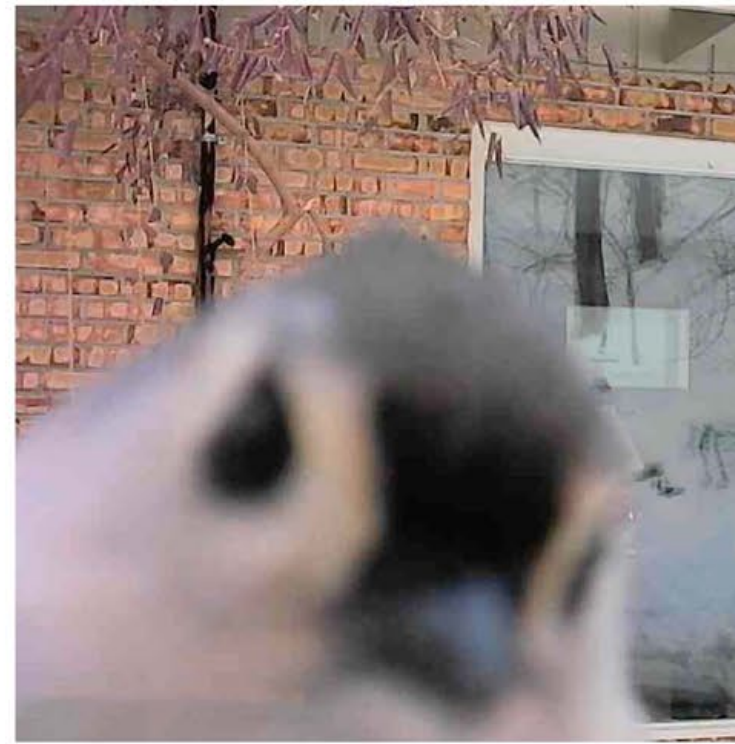




COMFORTABLE PERCH



MOUNTING = STEADY CAMERA



CHEAP CAMERA (\$25) → FIXED FOCAL LENGTH → A.) USE NICER CAMERA (RAISES COST)
 OR
 B.) MODIFY DESIGN
 OR
 C.) WOULD A MINI LENS COVER BE ABLE TO ALTER THE FOCAL LENGTH?



MINI MACRO LENS COVER
- \$7 ON AMAZON
- SHORTENS FOCAL LENGTH

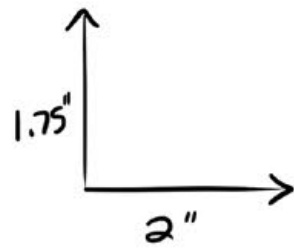
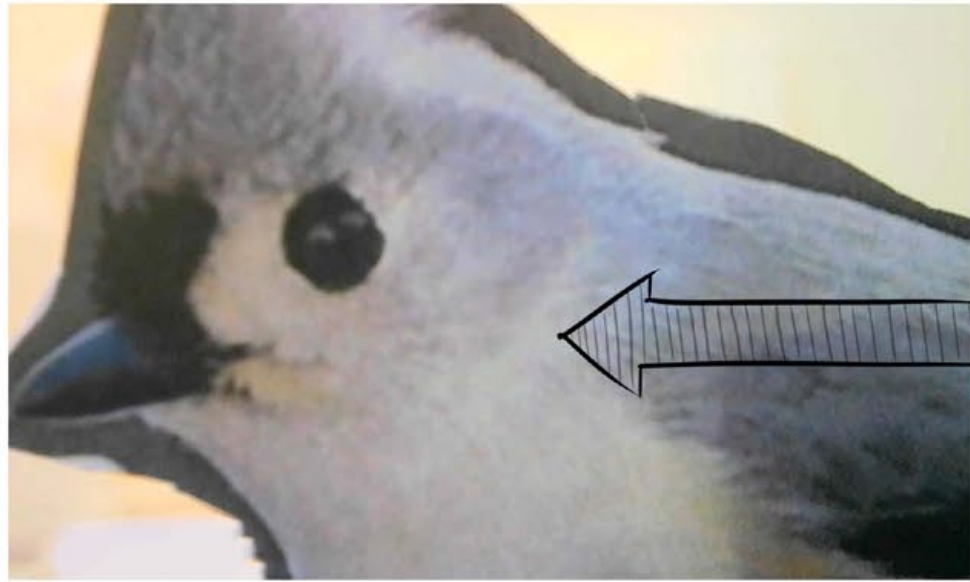
CLIP TO SECURE LENS (JUST FOR TESTING)



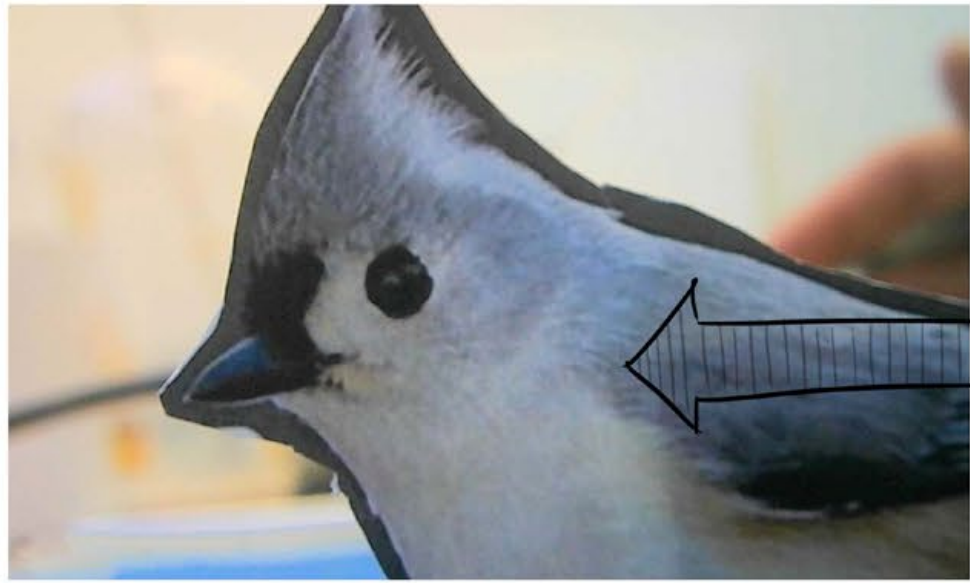
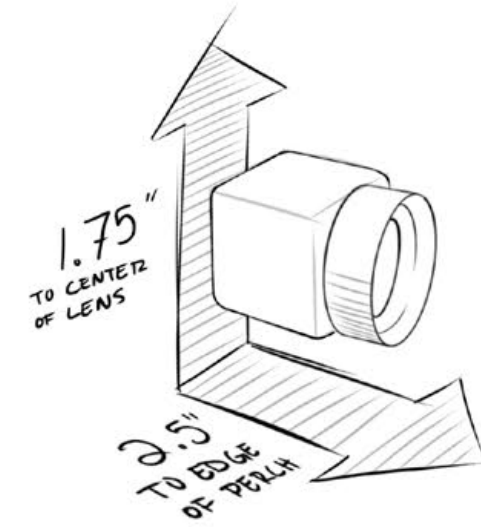
FITS OVER CAMERA

TESTING FOR HEIGHT + DISTANCE





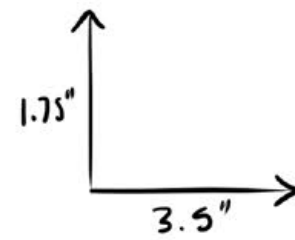
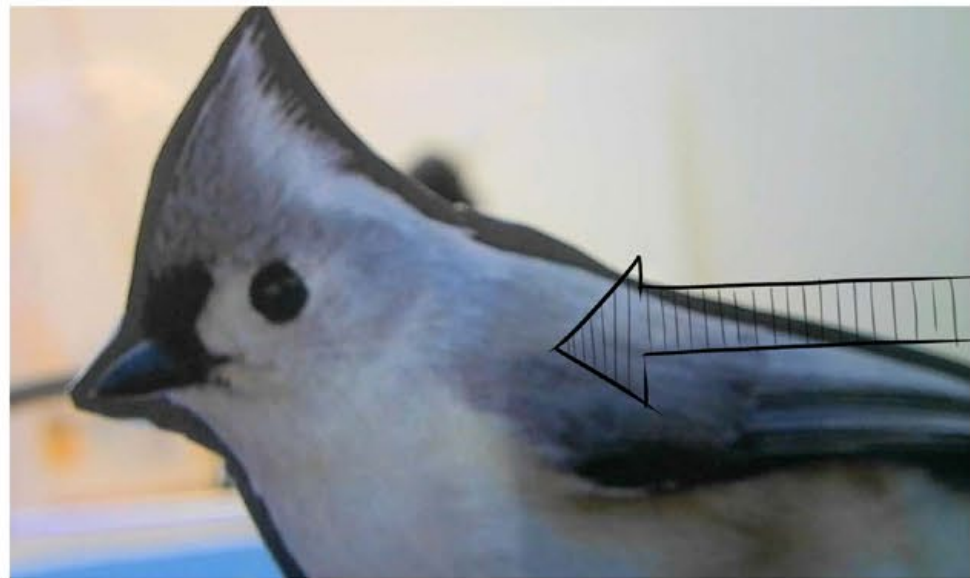
- TOO CLOSE
- STILL BLURRY



- GOOD DISTANCE
BUT STILL A
LITTLE FUZZY



NEW LENS SHOW MORE DETAIL



← TOO FAR AWAY,
STILL BLURRY

Incorporating Lens Cover

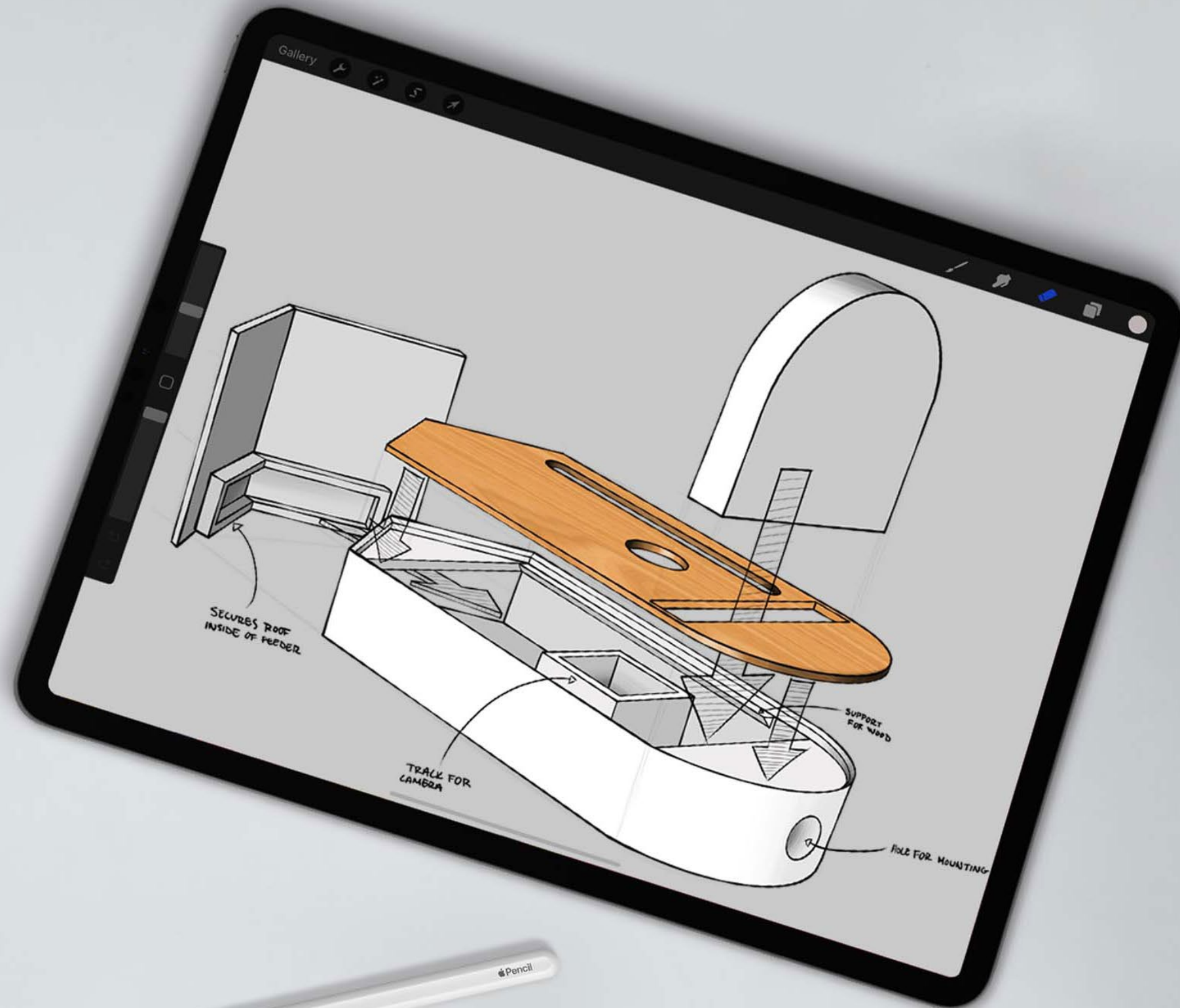
The addition of the lens cover increases the width of the feeder by roughly a quarter inch.

Assembly

Rough prototyping was done to figure out the best way to construct and assemble the feeder.

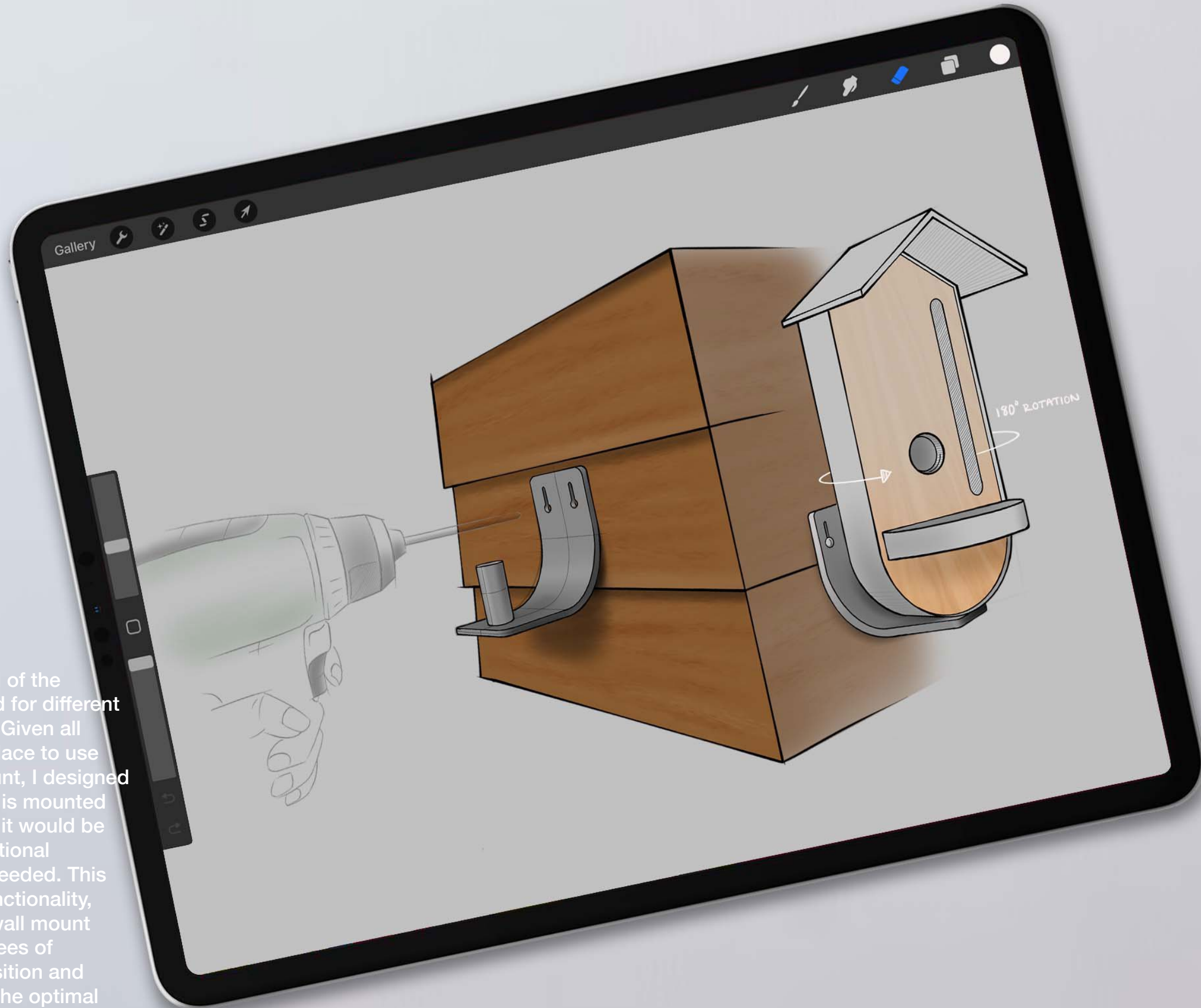
Minimizing Materials

Rough prototyping was also done to locate where excess material can be cut.



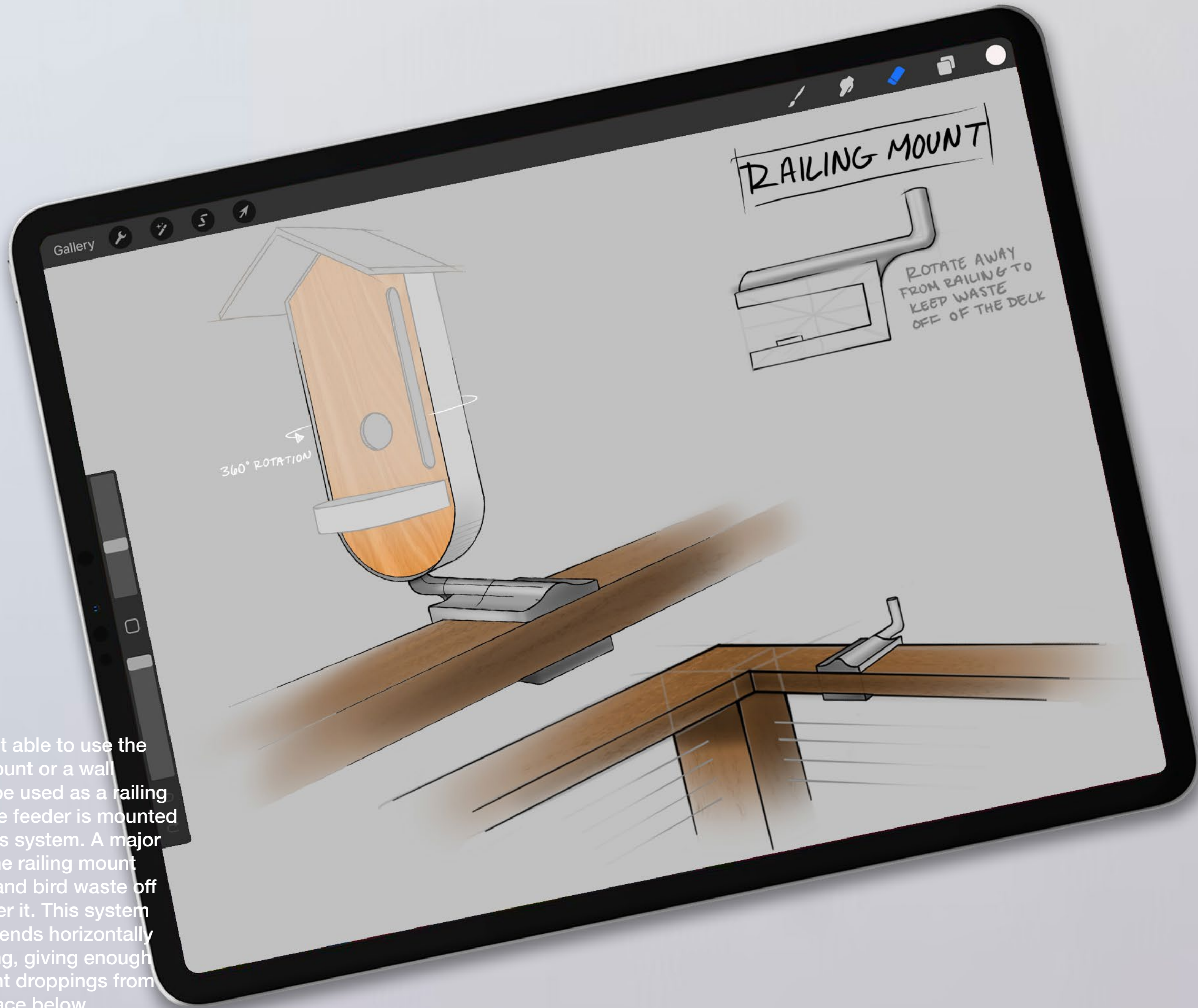
Wall mount

While designing the build of the updated model, I planned for different use cases for the feeder. Given all users might not have a place to use this feeder as a pole mount, I designed a wall mount. The feeder is mounted on the plate the same as it would be on a pole so that no additional structural elements are needed. This keeps manufacturing, functionality, and design simple. The wall mount plate allows for 180 degrees of rotation so users can position and adjust its orientation for the optimal viewing experience.

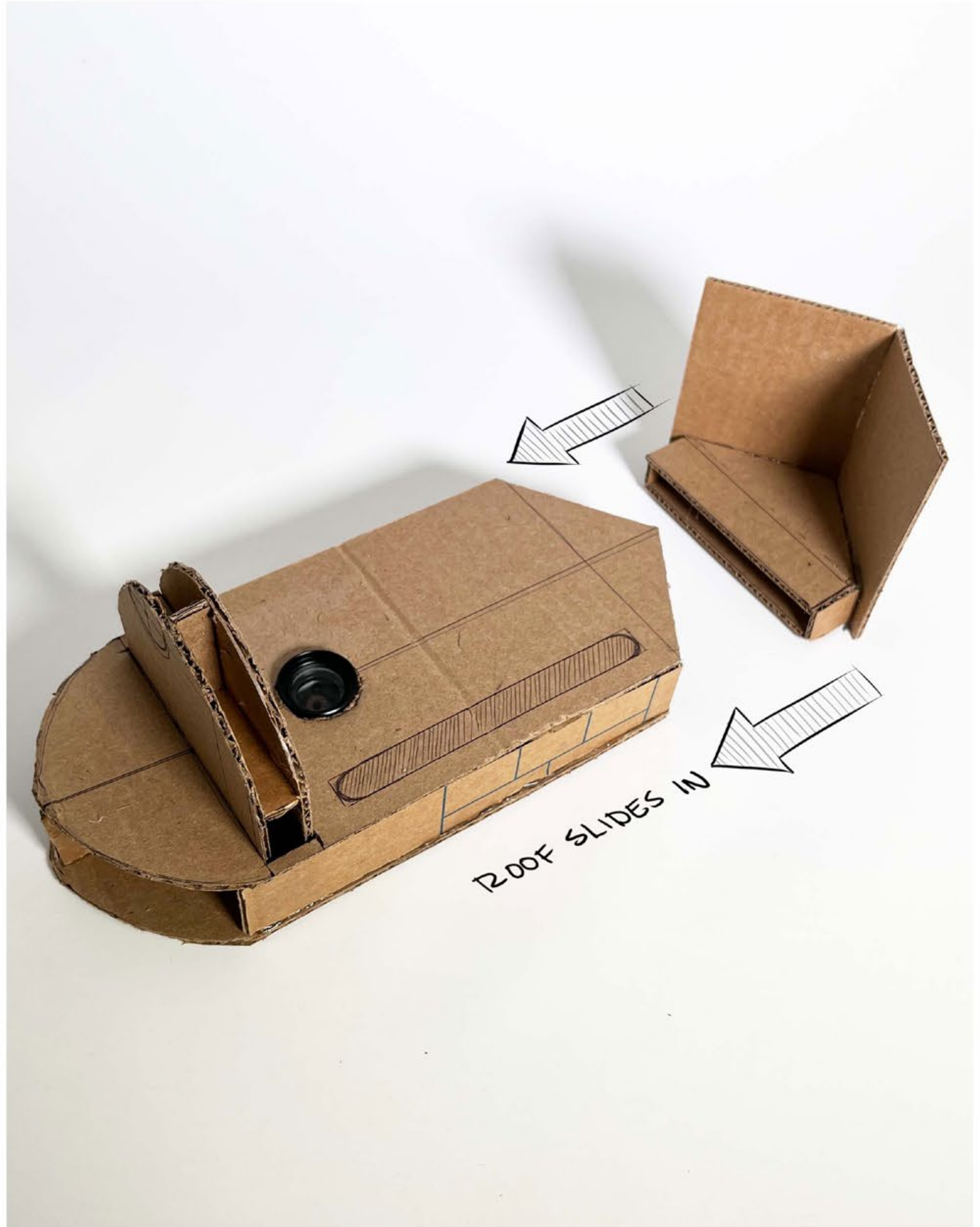


Railing mount

For users that aren't able to use the feeder as a pole mount or a wall mount, it can also be used as a railing mount. Similarly, the feeder is mounted the same way in this system. A major consideration for the railing mount was keeping seed and bird waste off the deck/patio under it. This system has an arm that extends horizontally away from the railing, giving enough clearance to prevent droppings from landing on the surface below.



Rapid Prototyping





Refined Prototyping





After rough prototyping, I started creating some more refined prototypes for testing. To keep costs at a minimum, I used PLA filament to print the parts. Similarly, I used scrap wood and acrylic to laser cut the wood face and window.

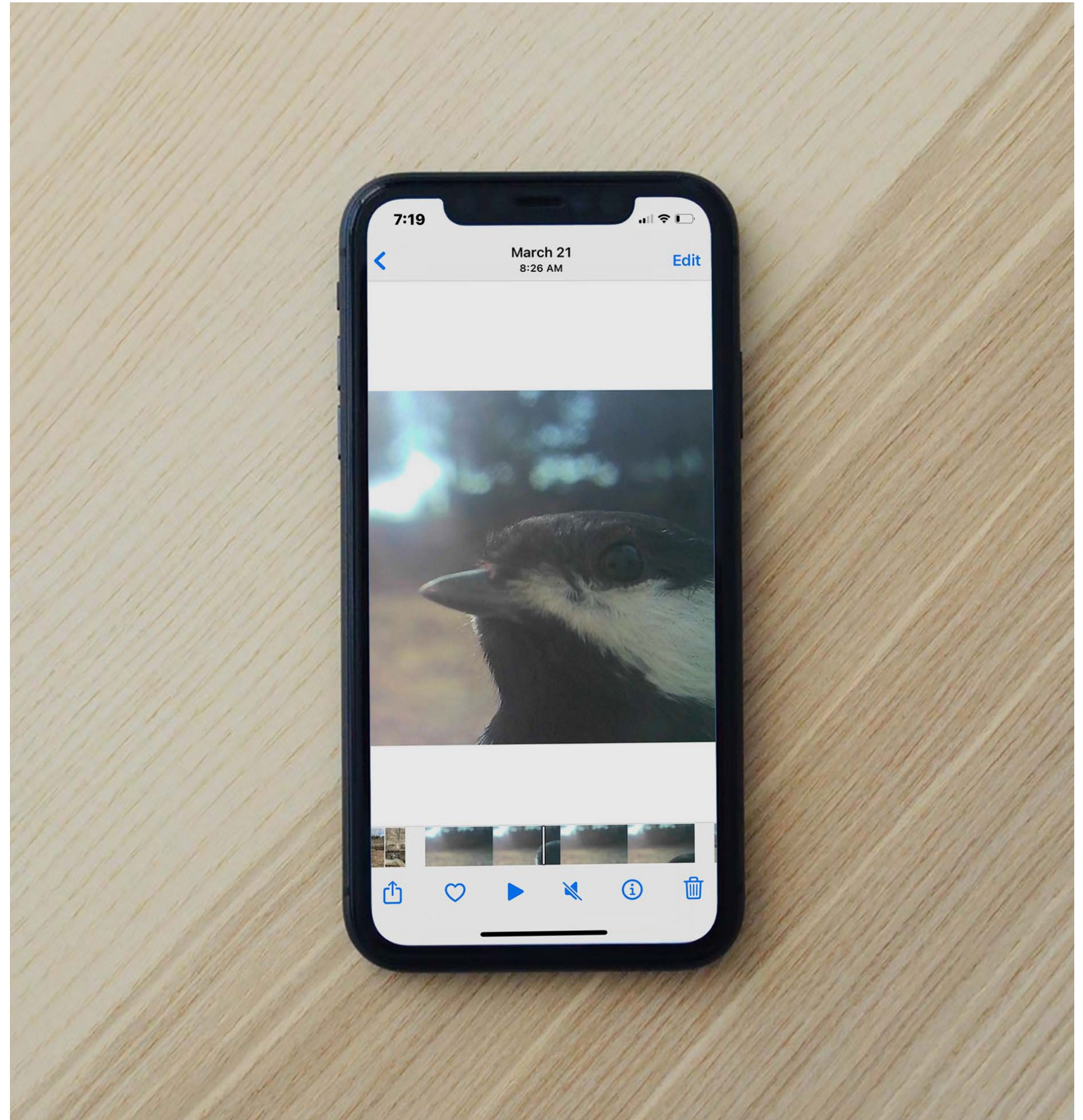


Testing





During this round of testing, the focus was on functionality, specifically with the incorporation of the new camera lens. The lens acted as expected, providing more detailed shots of the birds.



PLA PRINT



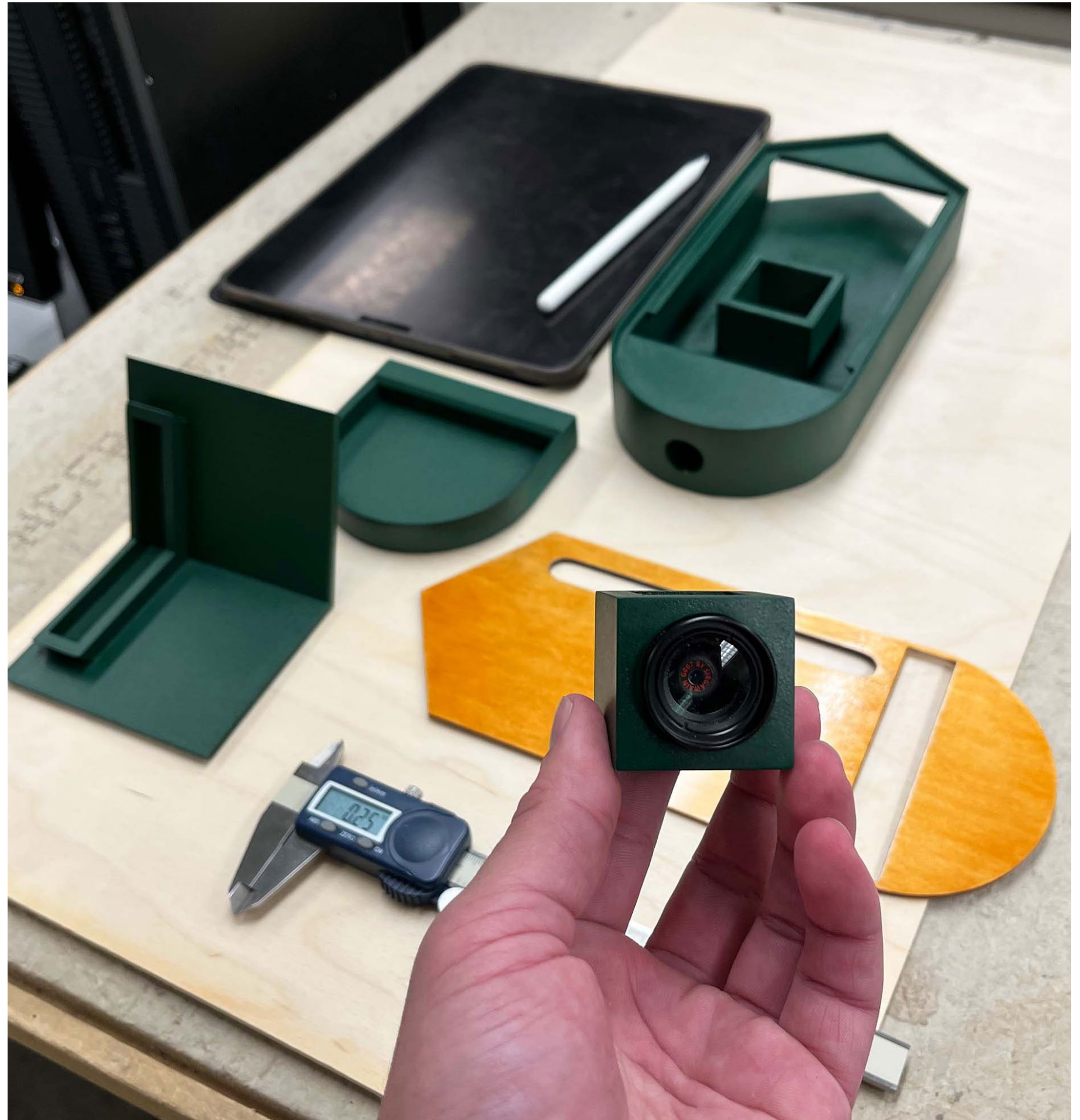
APPLYING POST-CURE RESIN



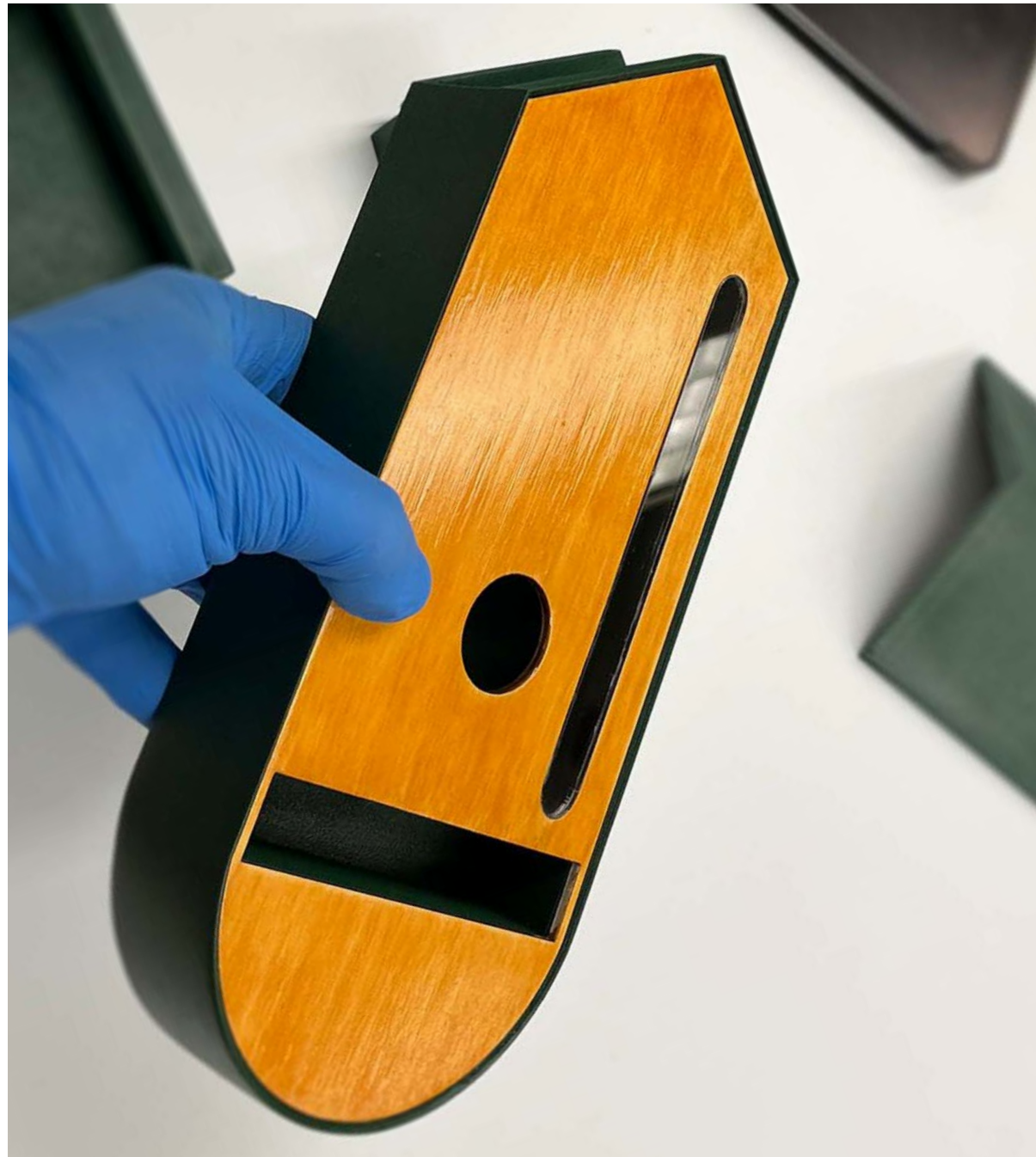
BUILDING UP SURFACE
TO FIX FACETED CURVES



SANDING TO SMOOTH SURFACE



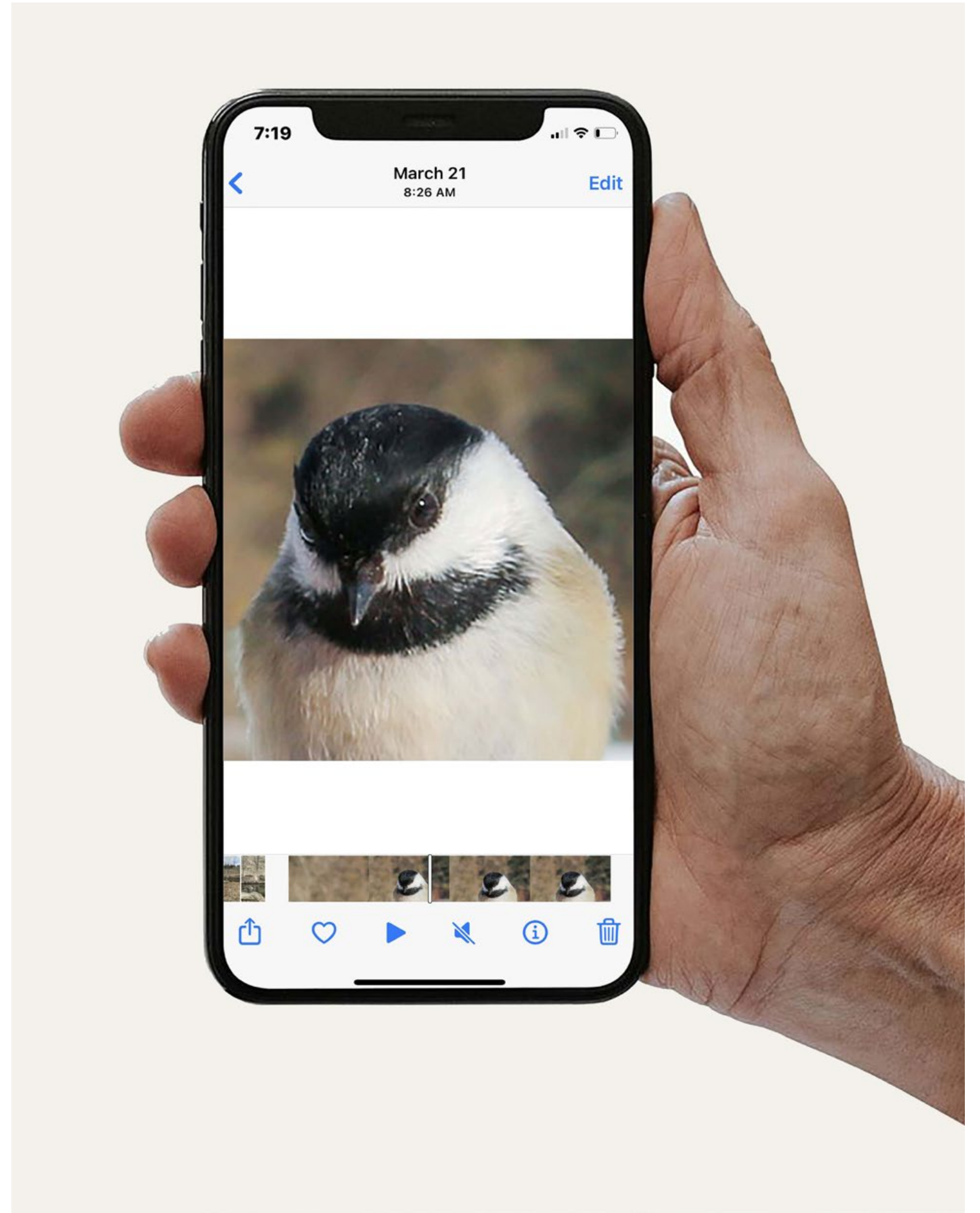
The final model was created from a PLA print. Post cure resin was applied to the print, to fix the faceted surfaces and fill print layers. The model was then primed, wet sanded, and painted. The wood was cut on a laser cutter, sanded, and stained.



A thin layer of wax was applied to the roof, perch, and camera case where surfaces come into contact with the body of the feeder. This allowed for the parts to maintain a tight fit, keep moisture out, and protect the paint. It also helps with a smooth assembly/disassembly.



Photography by Jocelyn Anderson





Exhibition

Showcasing LiveFeed

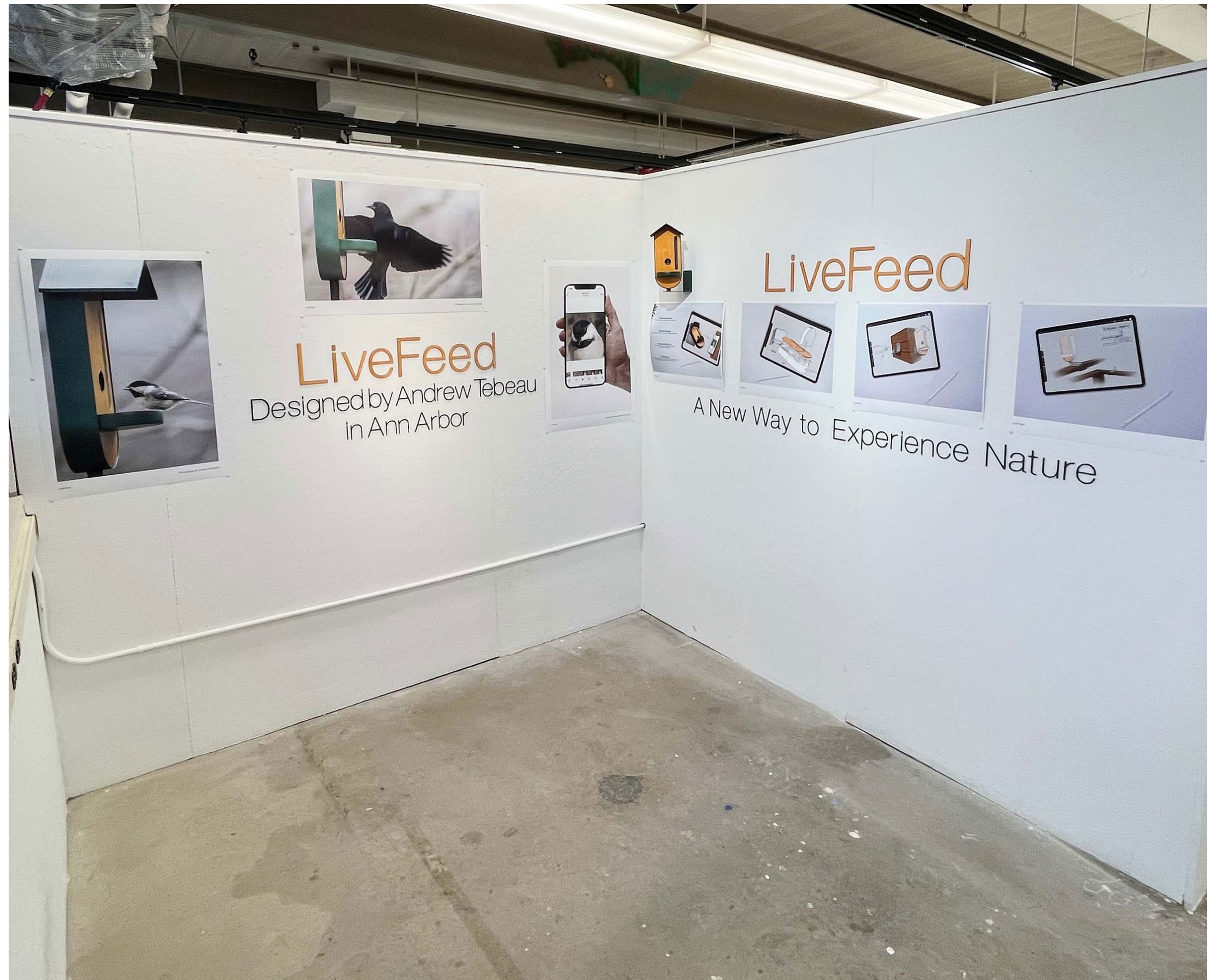
The Exhibition was an opportunity to showcase the work that I had done over the course of roughly eight months. Originally, I had planned on displaying the design process that led to the final deliverable. However, after more consideration, I decided to simplify my exhibition just as I had my design work during this process. I found that it was most important to show what LiveFeed does and how it does it. This all comes back to visually communicating to potential users, that this product is very user-friendly.

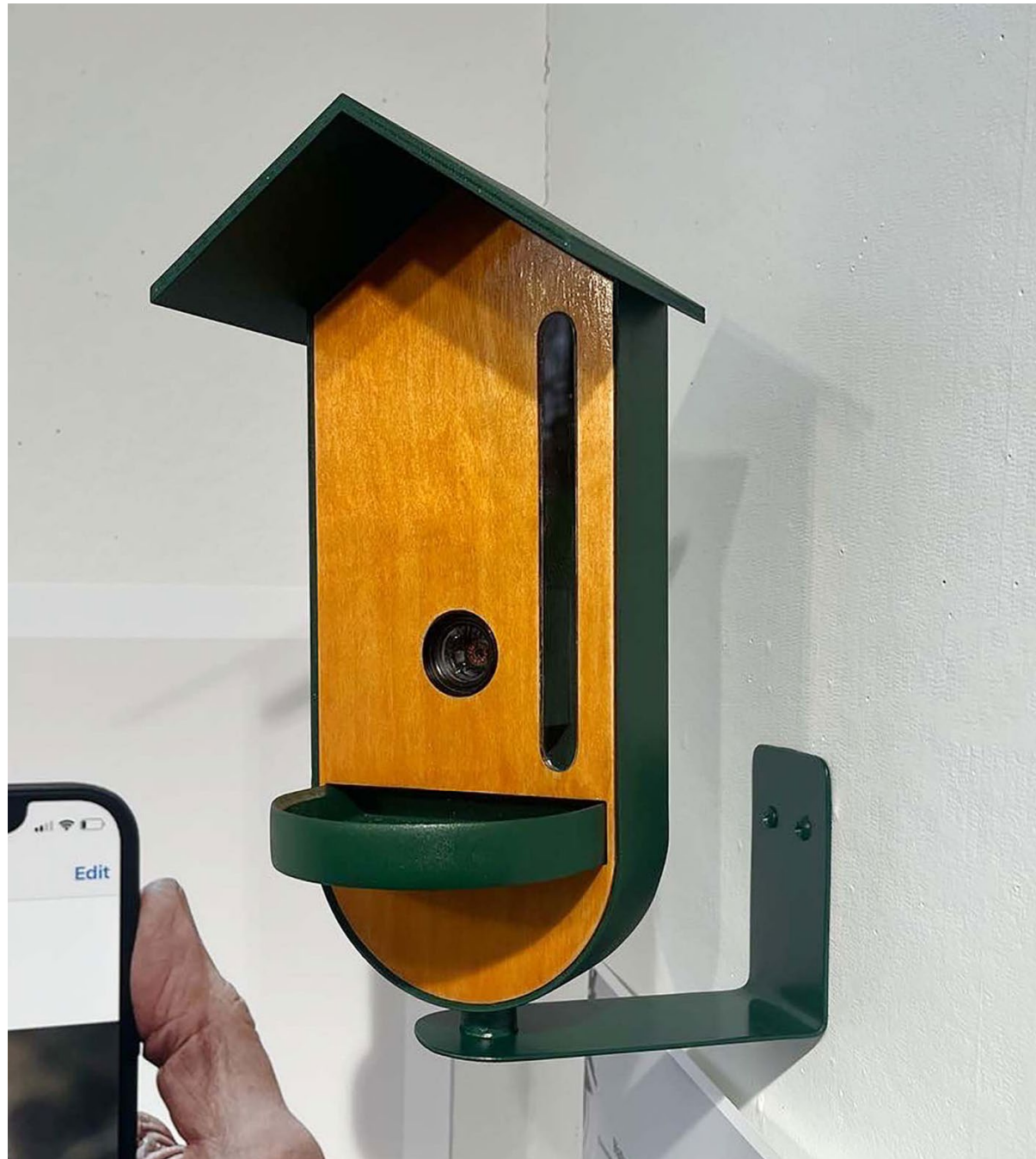


To keep in line with the aesthetic of the feeder itself, I used the same wood used on the feeder to laser-cut letters to be placed on the wall. Similarly, I used the same wood stain on the title ("LiveFeed") and the same green-colored paint on the taglines. To achieve a floating appearance with the letters, I used museum wax to stick them to the walls.

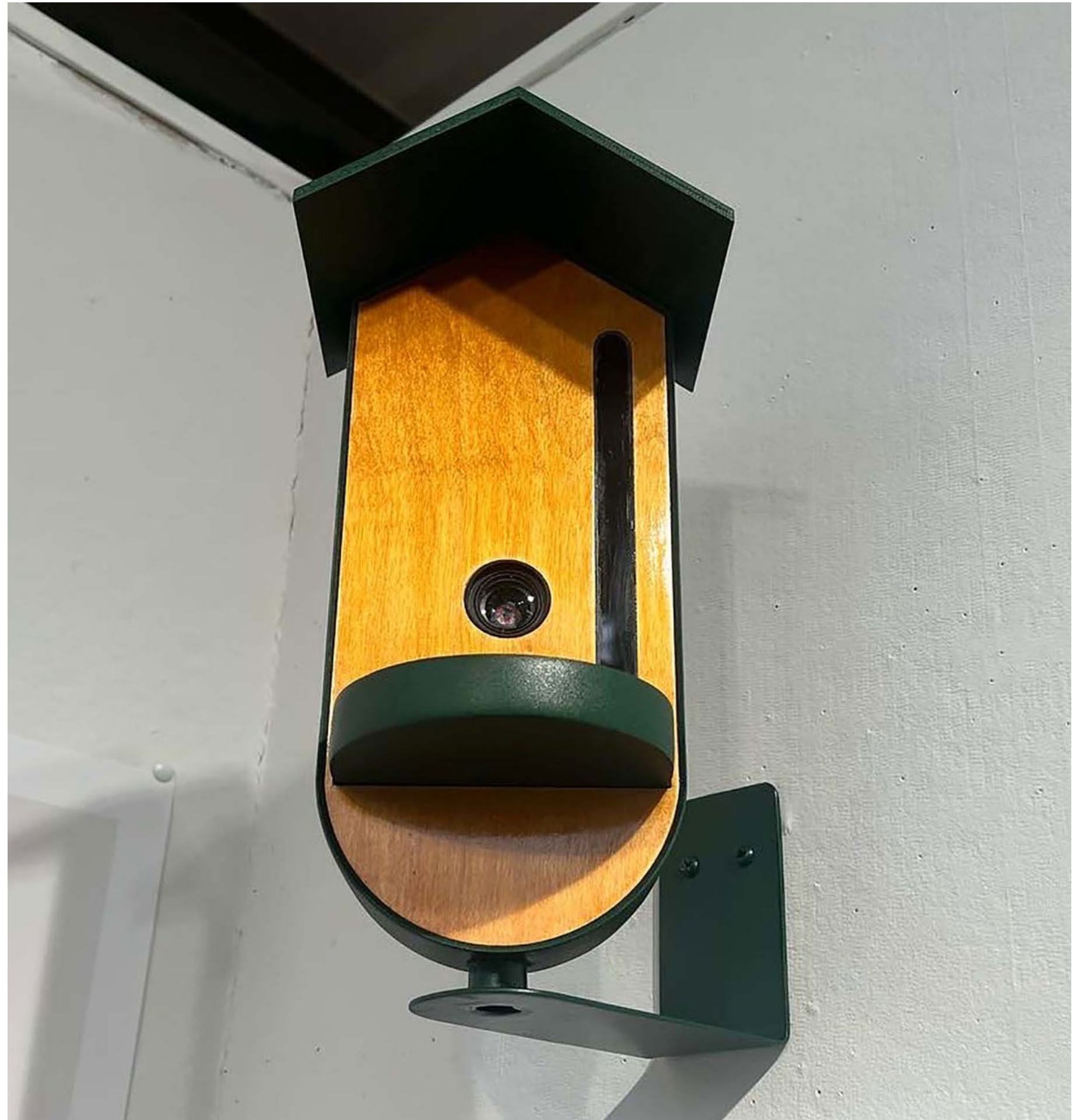
Visual Communication

The first wall that viewers see when walking into my exhibition space, shows what LiveFeed does. Using shots of birds on the feeder with an image from the feeders' camera aims to visually communicate the essence of the project in its simplest form. The tagline on this wall is meant to communicate that this object has been designed, with care and focus. After gaining an understanding of what the project is, the second wall shows viewers how it works and how it can be used. On this wall, the tagline is used to communicate the purpose and driver for the project.





The feeder is mounted on the wall, alongside the sketches of use cases and assembly. While the original plan had been to display the feeder outside, I found that displaying it on the wall was an opportunity to give viewers a closer look at the details and what the sketches led to. Perfecting the build of the final model was a strenuous process and I was proud of the result. I wanted to make that evident by letting viewers see the feeder up close and personal.



Reflection

Entering IP roughly eight months ago, I had set goals that were largely focused on refining and expanding upon hard skills. I viewed this project as a means of learning new software, tools, materials, etc. While LiveFeed provided me with the opportunity to solve problems that taught me the skills and tools I was looking for, I found that the most important learning that I received from this project wasn't hard skills. Instead, the most informative learning I received from this project was how to respond to negative feedback, failure, and the structural elements that frame an educated design process.

LiveFeed's Future

The completion of this course will not result in the completion of LiveFeed. I see a new life for the direction of this project, focused on the initial research I conducted. I am currently reaching out to the Ornithology Department, at Cornell University to propose the incorporation of my project into their "NestWatch" program. I'm proposing the integration of LiveFeed into "NestWatch" as an open-sourced file available to the public. Nestwatch encourages the public to engage with, observe, and collect data on wild birds. As an open-source file available through "NestWatch", LiveFeed could potentially be an educational tool used across the globe encouraging the conservation of wild birds.