

PORTFOLIO

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Hoto Stud Finder

Brief

Identify a gap in **HOTO's** current product lineup and design a lifestyle tool to fill it, utilizing their distinct design language, aesthetics, and CMF strategy.

Project: Self-Initiated

Year: 2026

Duration: 8 Weeks

Brand: HOTO



We Make Cool Tools

HOTO

Brand Introduction

HOTO is a lifestyle-oriented tools brand creating minimal, approachable products for renters and casual home users, focused on light-duty tools for everyday home tasks.

Brand Positioning Statement:

Inspiring innovation, transforming the way creators work.

Values:

- Design Aesthetics (Functional, Desirable)
- Cutting Edge Technology
- Professional Quality (Reliable, Trusted)



Product Gap Analysis

HOTO's electric drill and tape measure are widely used by urban renters for mounting TVs, shelves, and artwork, but stud finders are often overlooked due to unfamiliarity or intimidating designs, leading to avoidable safety risks and wall damage.

Awkward Ergonomics/
Interface



Construction Colors
Exposed Instructions



Cheap Plastic CMF
Utilitarian Forms



Stud Finder Market Analysis

The stud finder market is currently divided between aggressive industrial products and low-quality consumer alternatives, creating a clear opportunity for an inclusive design approach that combines professional-grade reliability with a refined, lifestyle-oriented design language.

Circle, Squircle,
or Slot Form



Tri-Tone CMF
Textured Matte-
Black & Gray Plastic
Glossy Black Plastic



Yellow Accent
Signifier



Brand Language Analysis

Form

- Extruded Circle, Squircle, or Straight Slot
- Large Chamfer/Radius & Sweep Cuts

Detail

- Text Logo
- Knurling
- Concealed Fasteners
- Minimal Number of Buttons & Switches
- Form, Detail & CMF Signifiers
- USB-C / Lithium-ion Battery

CMF

Base Color

- Grey-scale (Black, Grey, White) or Blue

Accent Color

- Yellow

Material

- ABS+PC

Finish

- Textured+Matte and Glossy



User Interview & Research

“There was a lot of doubt about whether it (stud finder) was trustworthy. I think in part because of the quality of the material, but also because it was constantly sort of like throwing errors.”

Interview with Rian, Urban Planner, Brooklyn, NY

“Unfortunately, I had to return this product as I found it too confusing to use.”

Quote from Besiana on Mecurate Stud Finder, Amazon Reviewer, United Kingdom

Insights

- Users need to feel confidence and trust.
Reinforce this through clear feedback (haptics, light, sound) and a high-quality build expressed through material choice, texture, weight, and form.
- Users value clarity over complexity.
Design for approachability through a simple intuitive interface and focused functionality.



Role-Playing

I hung a picture in my apartment to empathize with the existing user experience and identify pain points throughout the user journey.

Evaluation

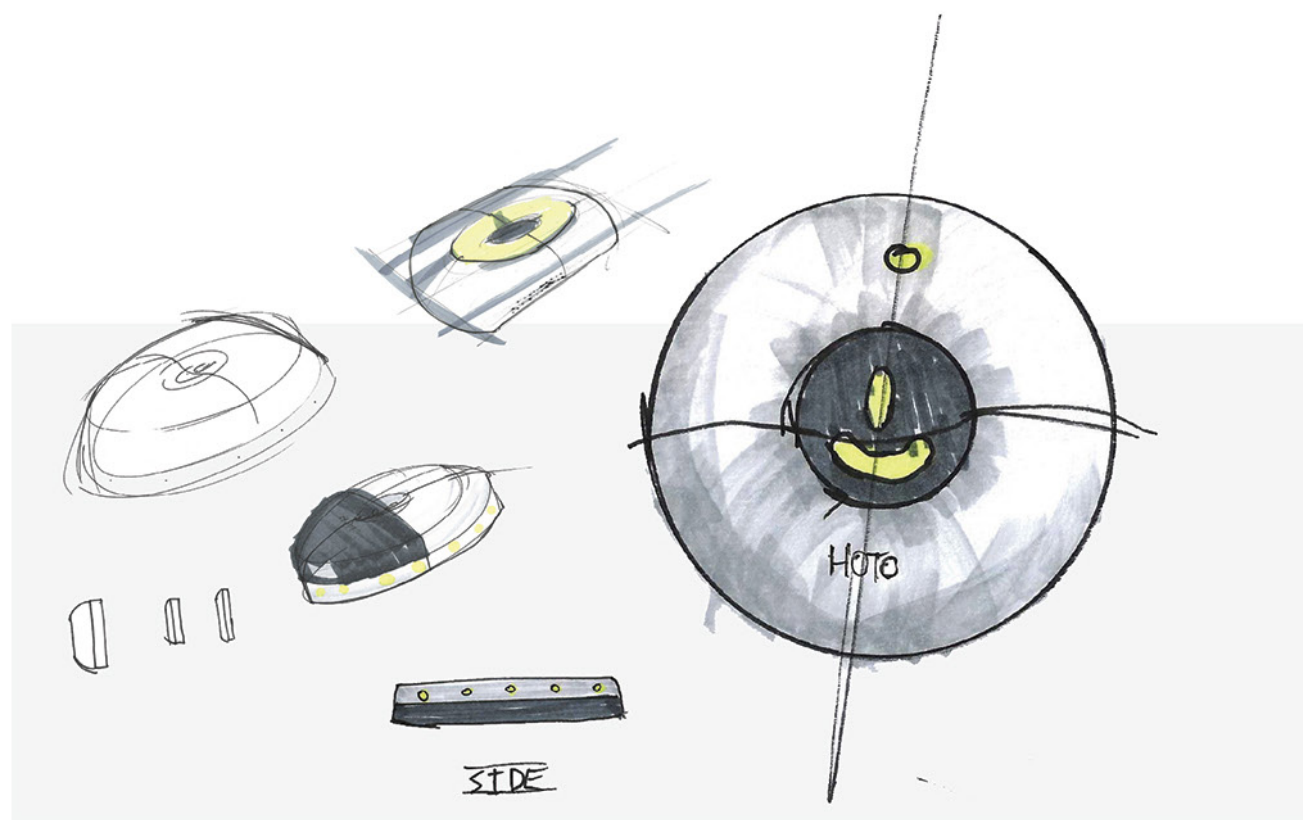
Positives: Ergonomic, Smooth interaction, Instructions on back of device

Negatives: CMF, Form, UI

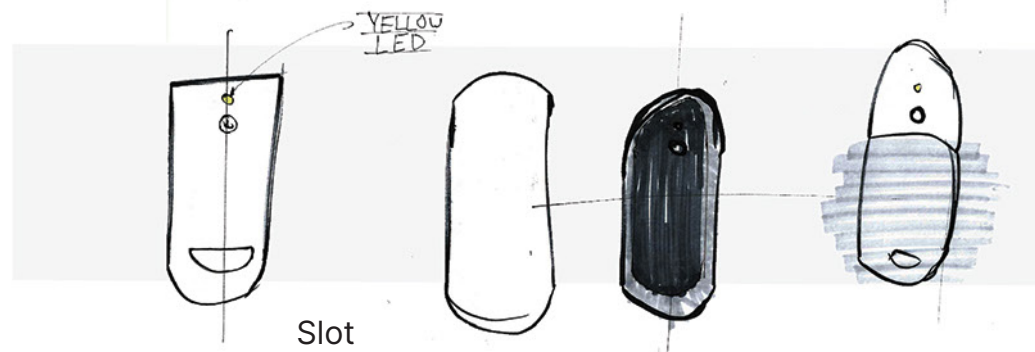
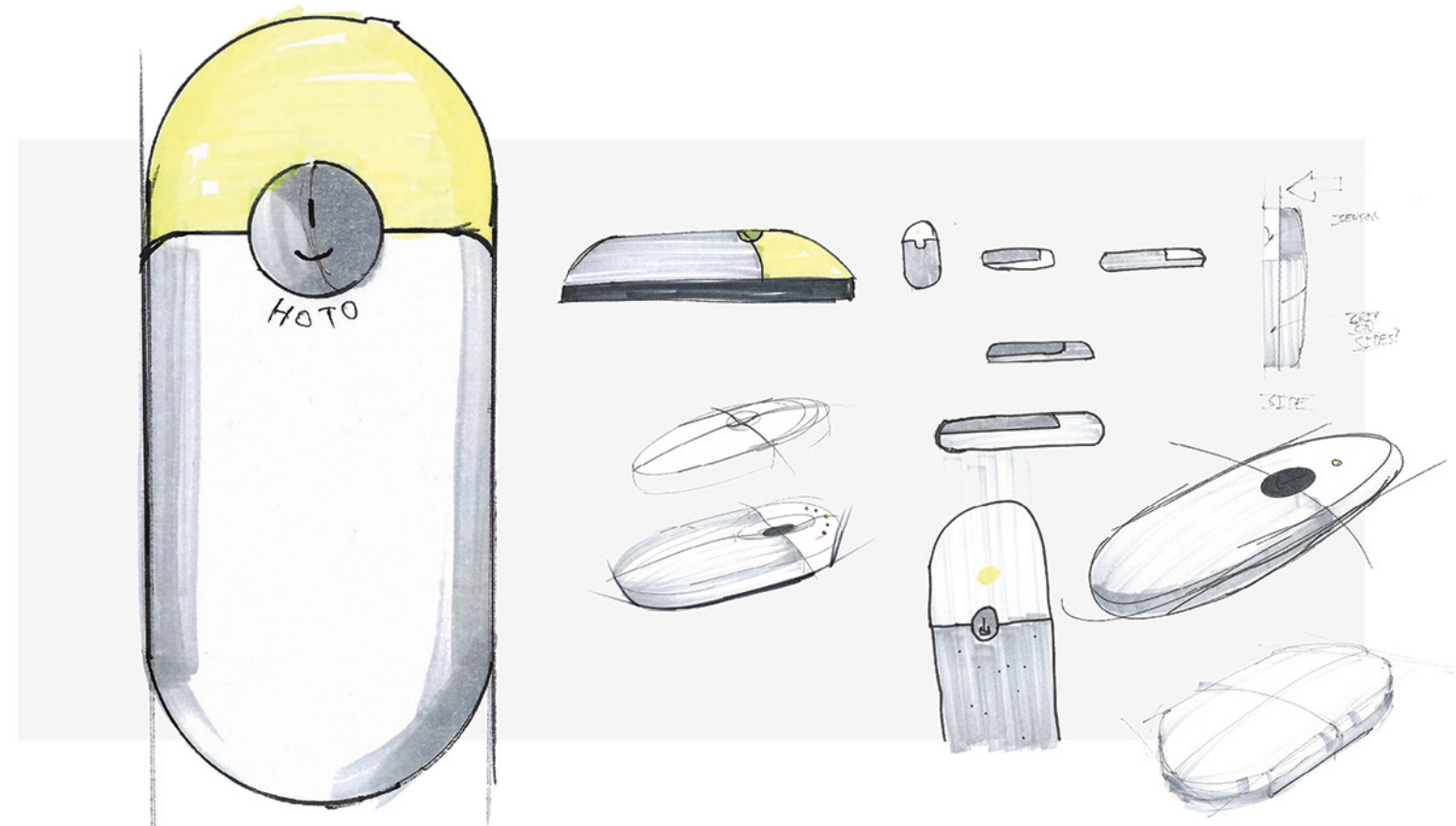
Insight

- Physical interaction should feel effortless and controlled.

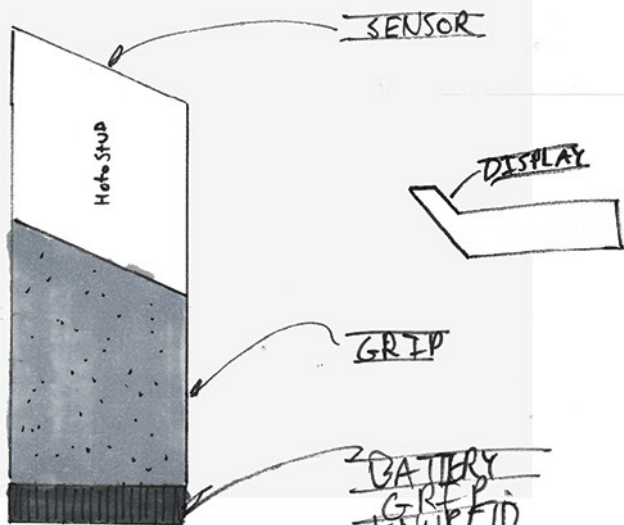
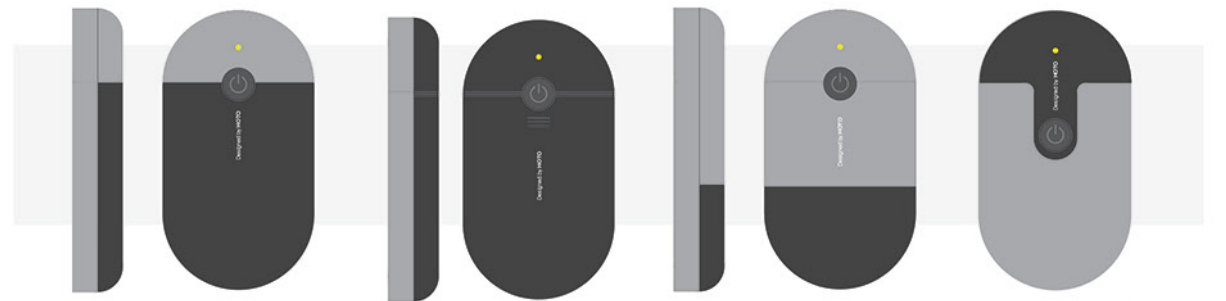
Use low-friction materials on contact surfaces (Velcro, PTFE feet) to create smooth enjoyable interaction.



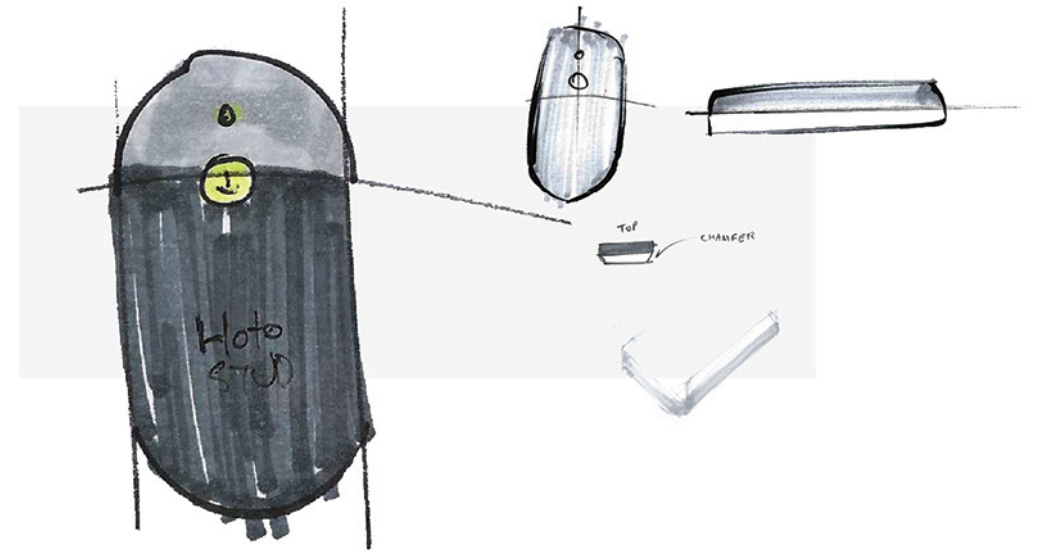
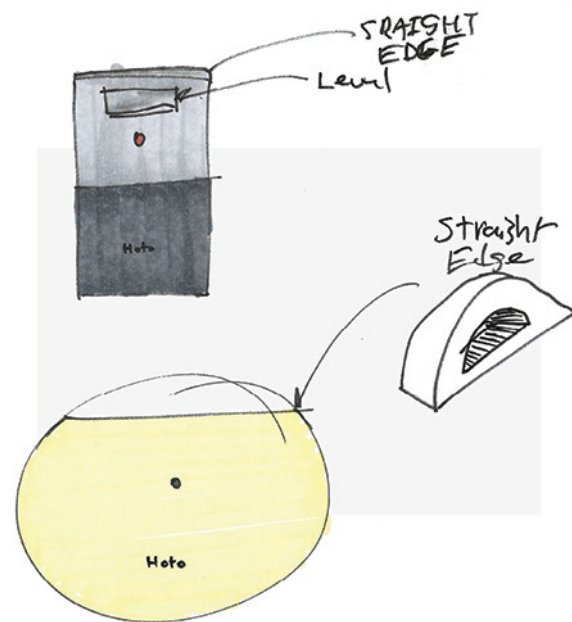
Circle



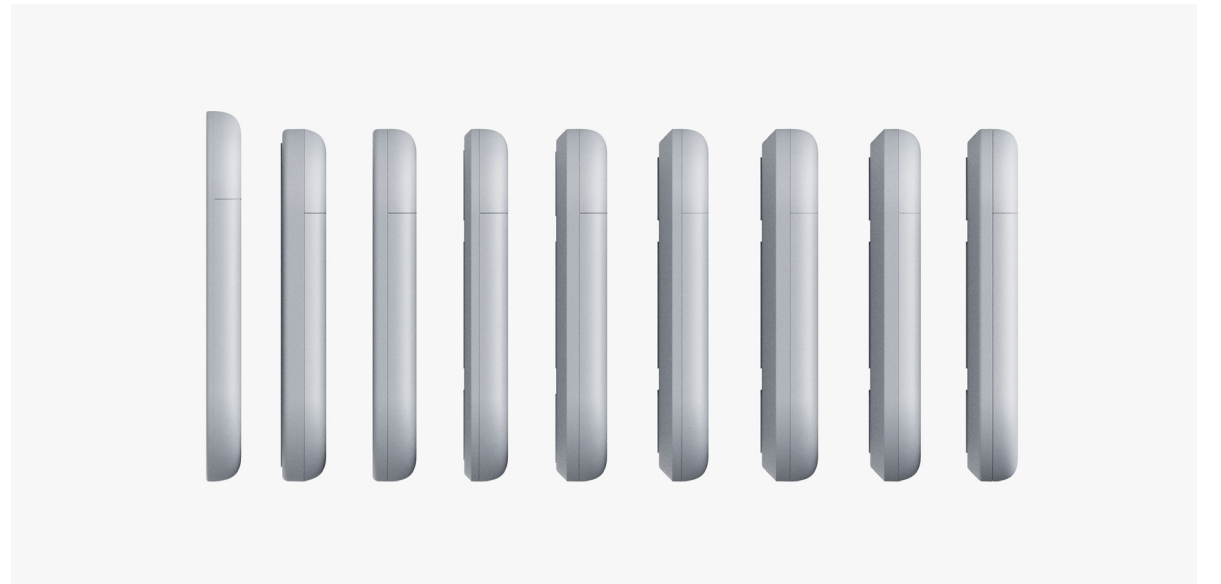
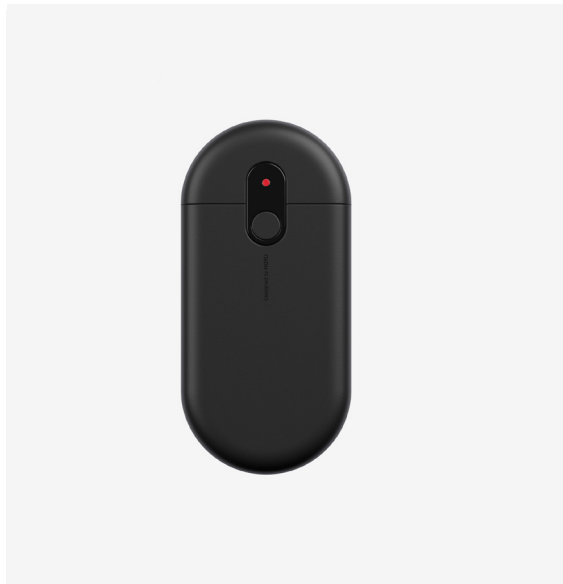
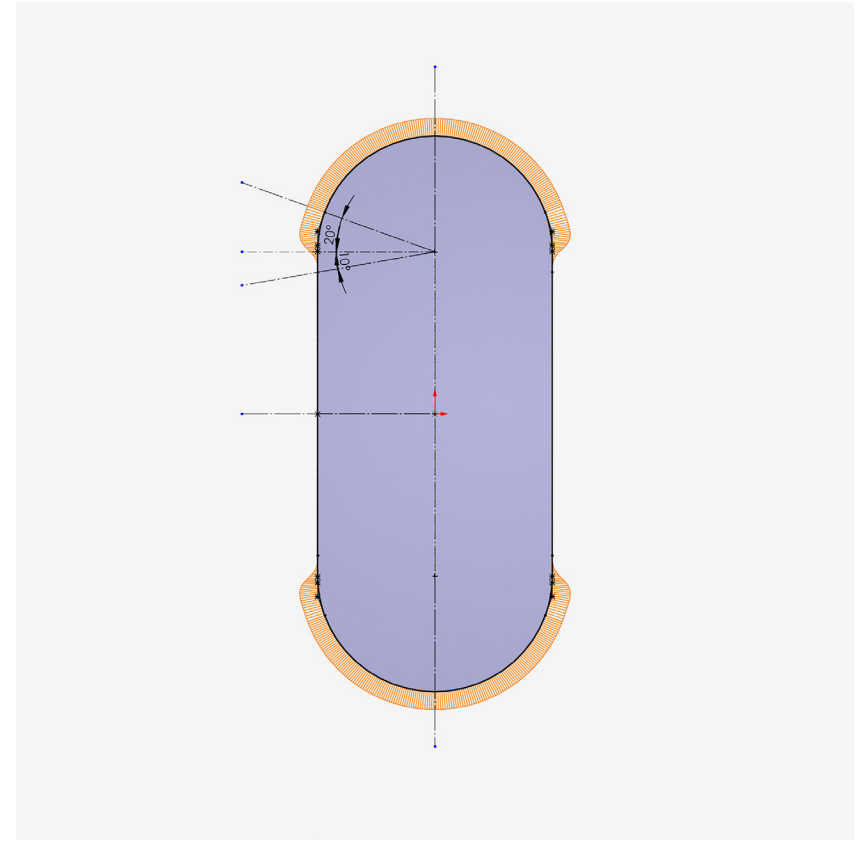
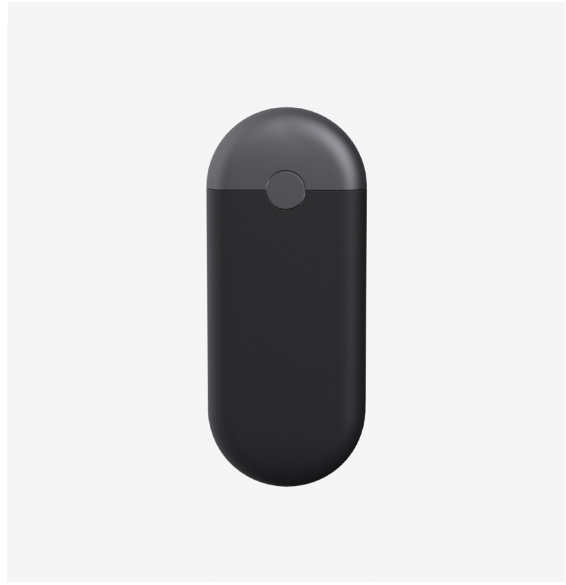
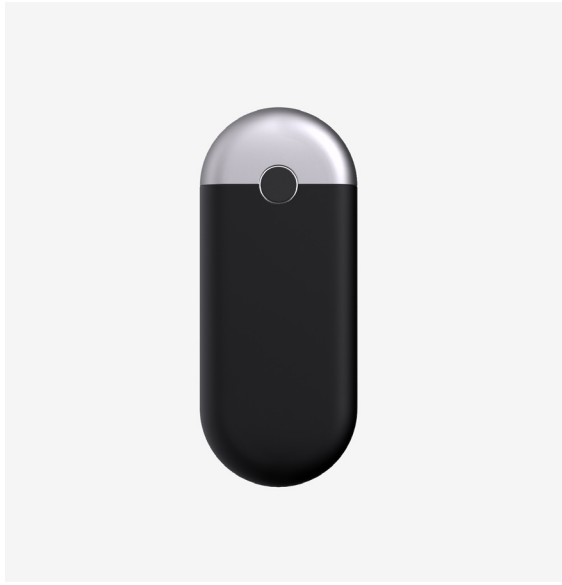
Slot



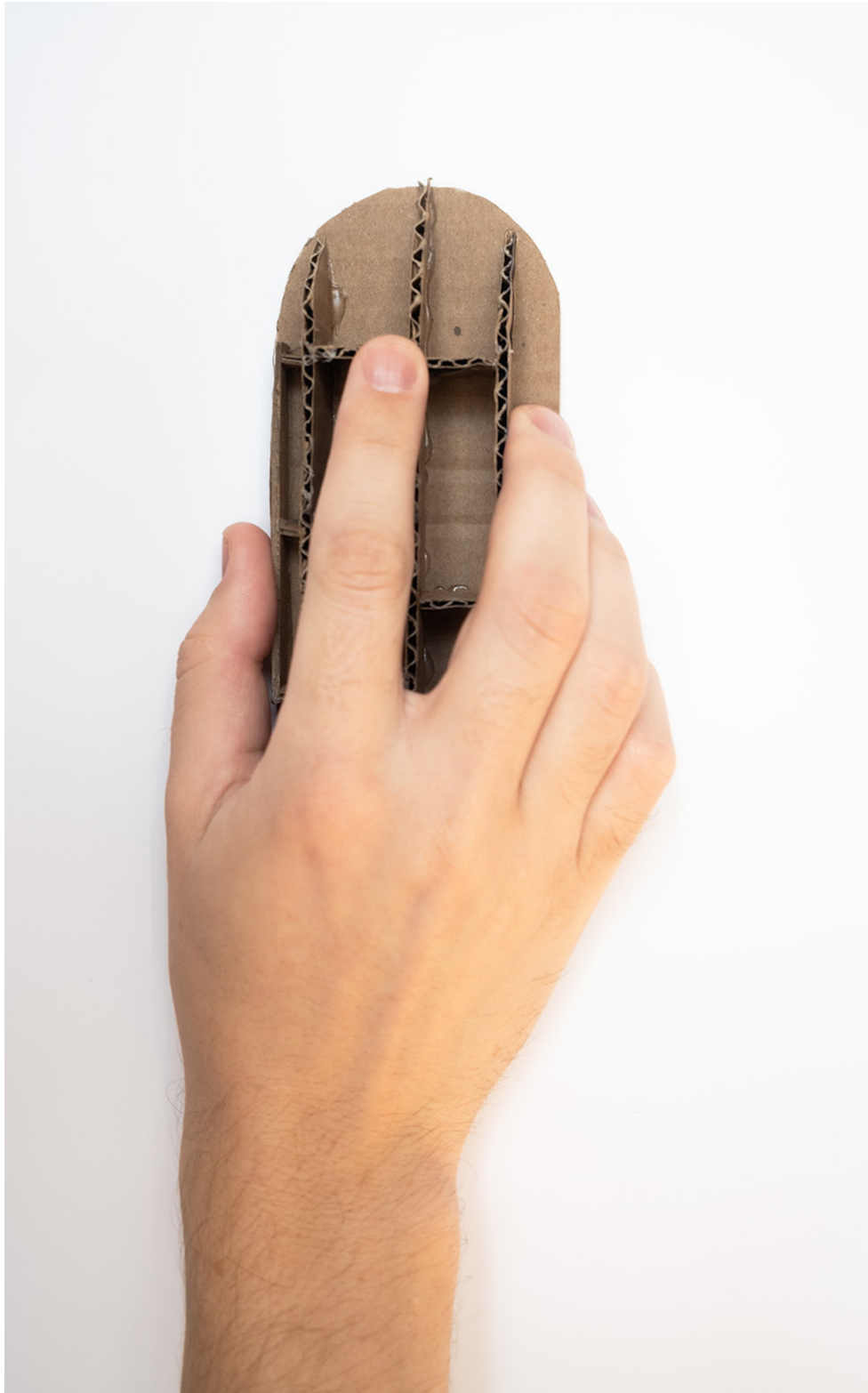
Cylinder



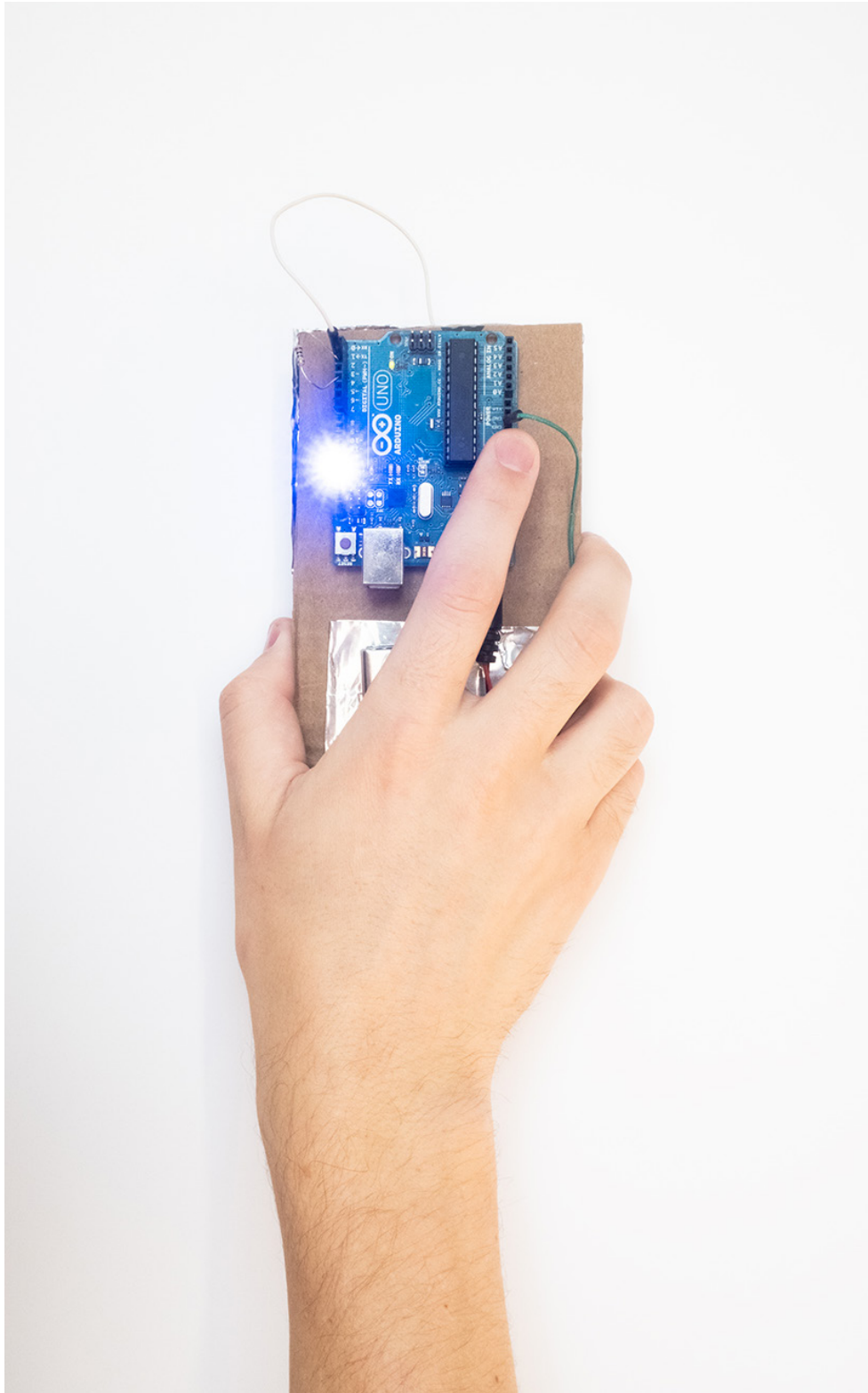
I explored forms derived from circle and slot extrusions.







Testing form, size, ergonomics, button placement, and button indentation.



Cardboard and aluminum foil prototype **confirmed** that capacitive sensing could detect studs through drywall.



PCB prototype **validated** the single LED/button interaction, component layout and fit within the FDM prototype.



PCB revision **refined** component layout and BOM, swapped button for improved tactile click, and increased board size to improve space between edge and screw hole.



Confirmed PCB hole and boss alignment. Iterating and refining the snap fit connection between the slot and top housing.

CMF

Following **HOTO's** CMF strategy, the device combines textured dark and light gray matte plastics with black glossy accents. The neutral colors feel approachable rather than industrial, appealing to the target user group, while the contrast of matte and glossy surfaces conveys a sense of high value and quality.



CMF and Form

The contrasting light gray back and large chamfer visually thin the device, creating a floating effect on the wall. The chamfer naturally encourages users to grab the device closer to the front, helping prevent fingers from getting pinched as it glides across the wall. The large radius on the front cups the palm, allowing comfortable operation of the single power button.



CMF

Inspired by my Logitech mouse, I added low friction PTFE feet. They provide ultra-smooth glide across walls without scratching the wall or device. Clear, unobtrusive instructions for initial capacitance calibration maintain **HOTO's** clean CMF. The indented slot further protects the pad print.



Technology

A copper plane on the bottom of the PCB enables low-power **capacitive sensing**, allowing studs to be detected reliably when the device is placed against a wall.



Interface

A single LED simplifies communication between the user and the device by displaying only the most essential information: stud detection and power/calibration status. Limiting the interface to one indicator reduces unnecessary functionality, focusing the interaction and minimizing uncertainty to create a sense of confidence, clarity, and calm.



● STUD FOUND



● ON/CALIBRATED



● LOW BATTERY



● OFF



CMF Specification

1. Bottom and Top

Color: Black
Material: ABS+PC
Finish: Matte, VDI 27

2.Slot

Color: Black
Material: ABS+PC
Finish: High-gloss, SPI A2

3. LED Diffuser

Color: Translucent
Material: Optical-grade PC
w/ light-diffusing additive
Finish: VDI 12
Haze: 70% (ASTM D1003)

4. Power Button

Color: Gray
Material: ABS+PC
Finish: Matte, VDI 27

5. Front Label

Color: Light Gray
Finish: Matte
Process: Pad Printing

6. Back

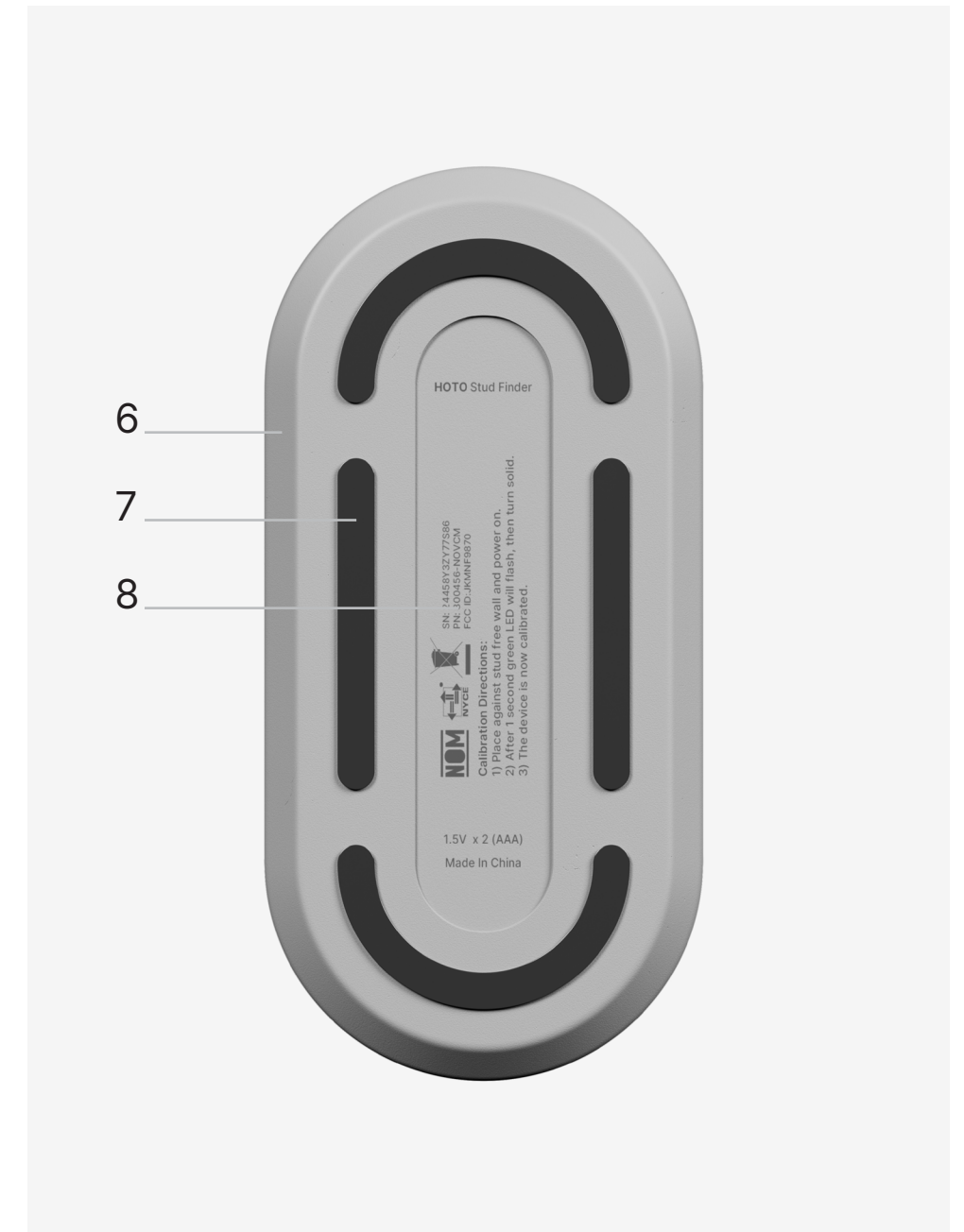
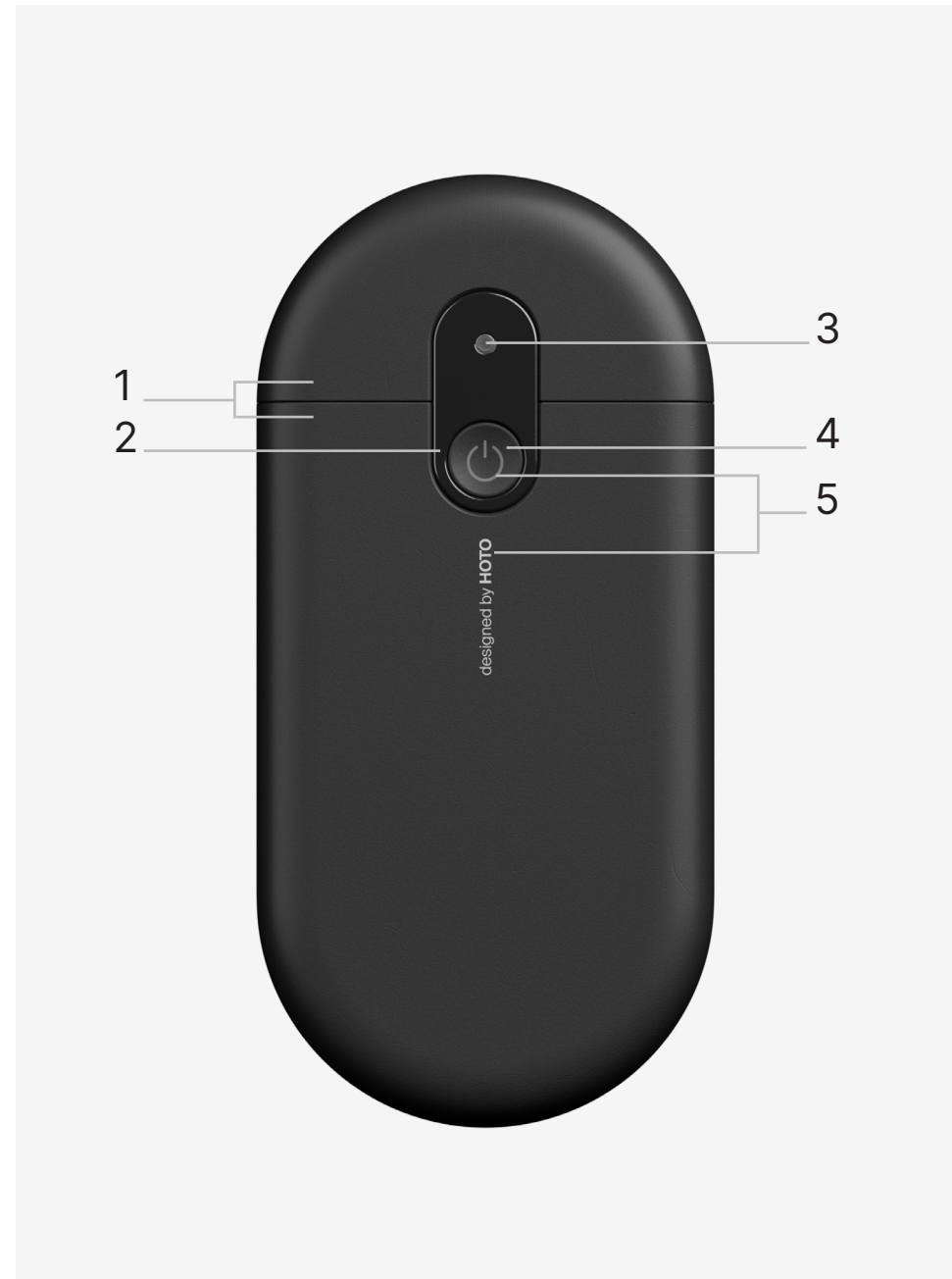
Color: Light Gray
Material: ABS+PC
Finish: Matte, VDI 27

7. Back Pad

Color: Dark Gray
Material: PTFE
Finish: Gloss (30% Matte)

8. Back Labels

Color: Dark Gray
Material: Matte
Process: Pad Printing







Surfacing Exercise

Brief

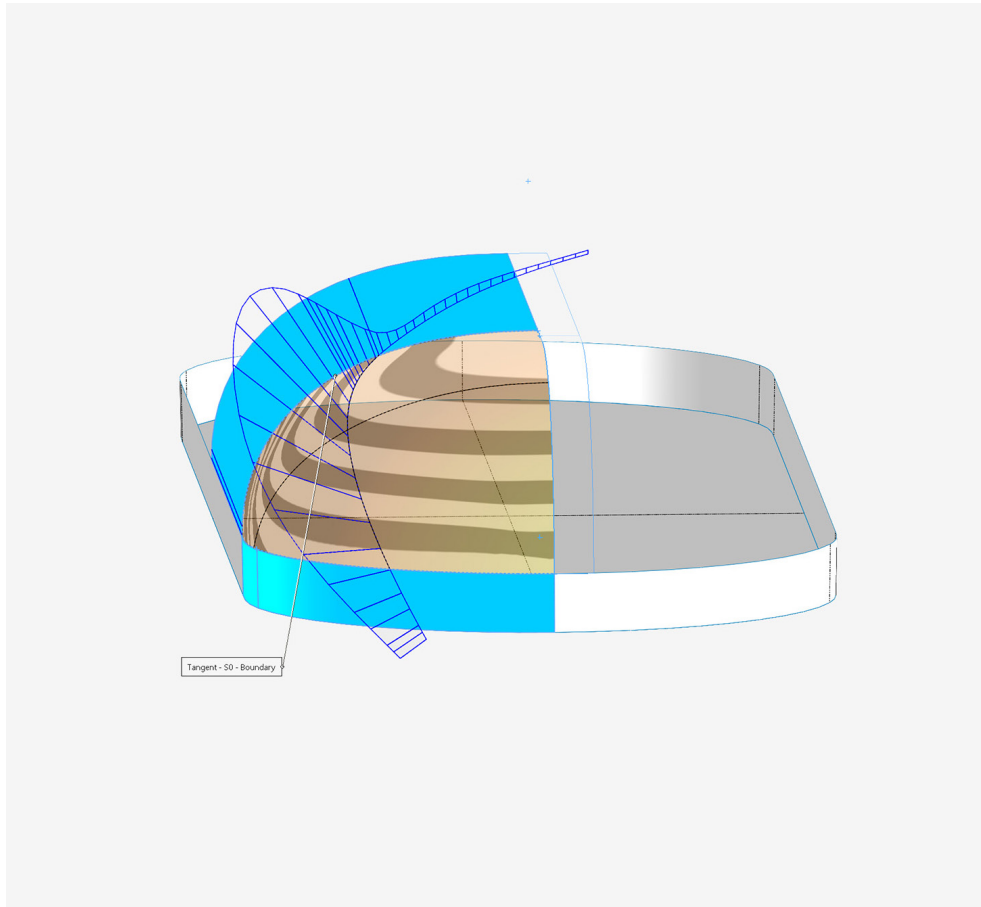
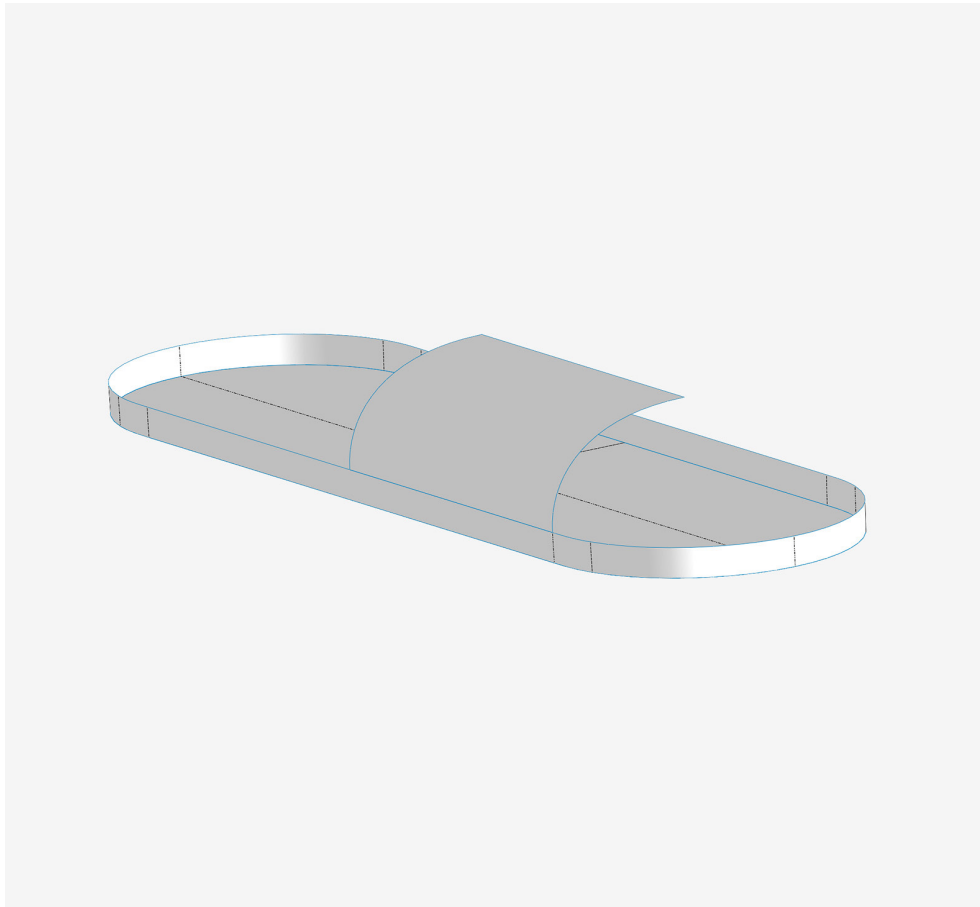
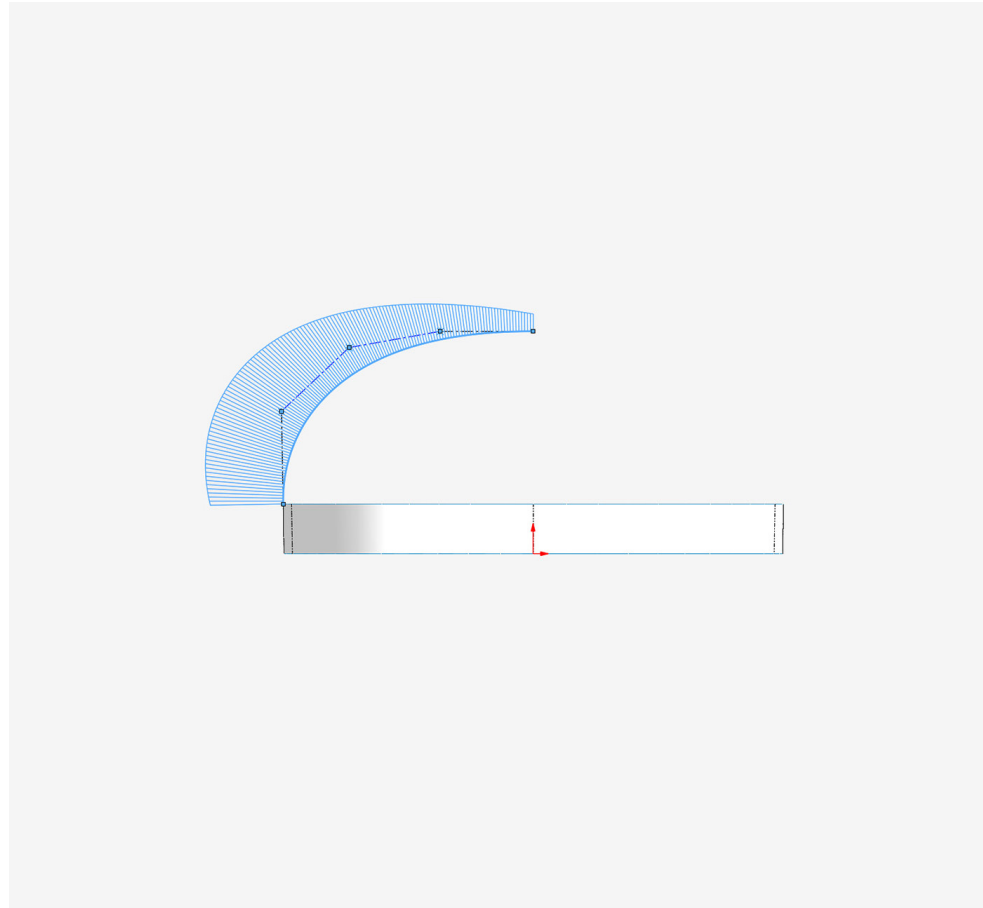
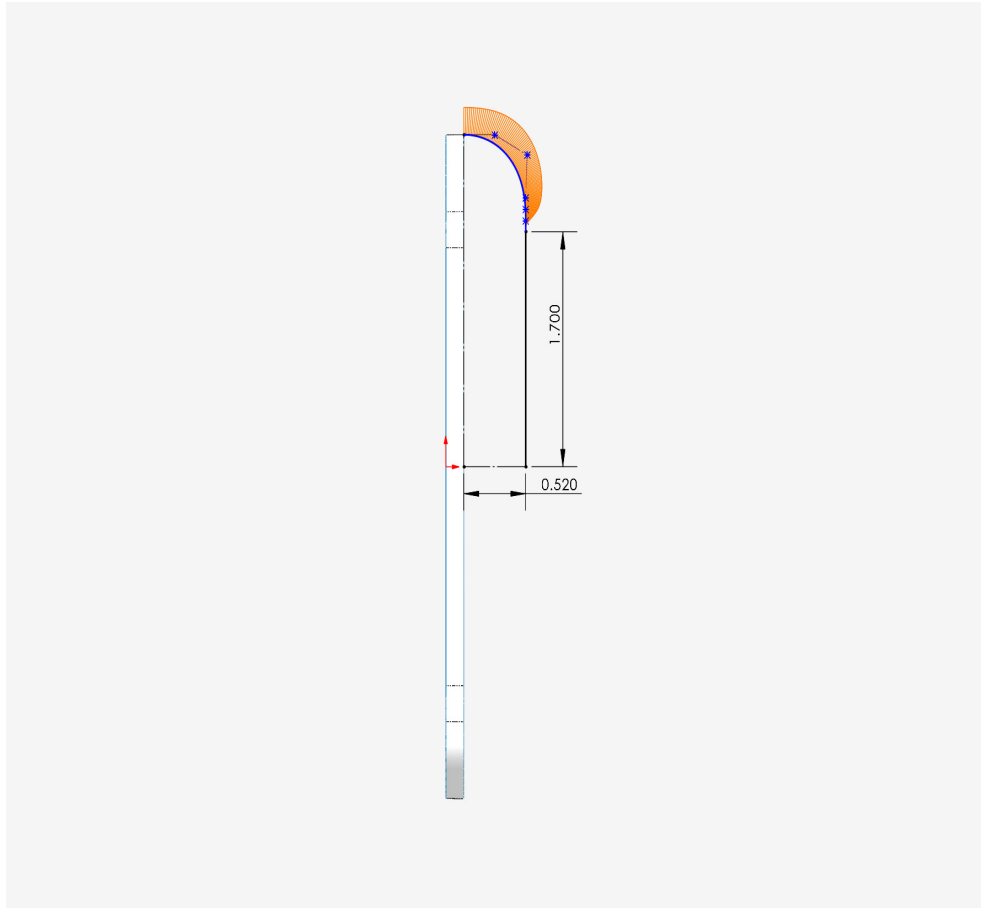
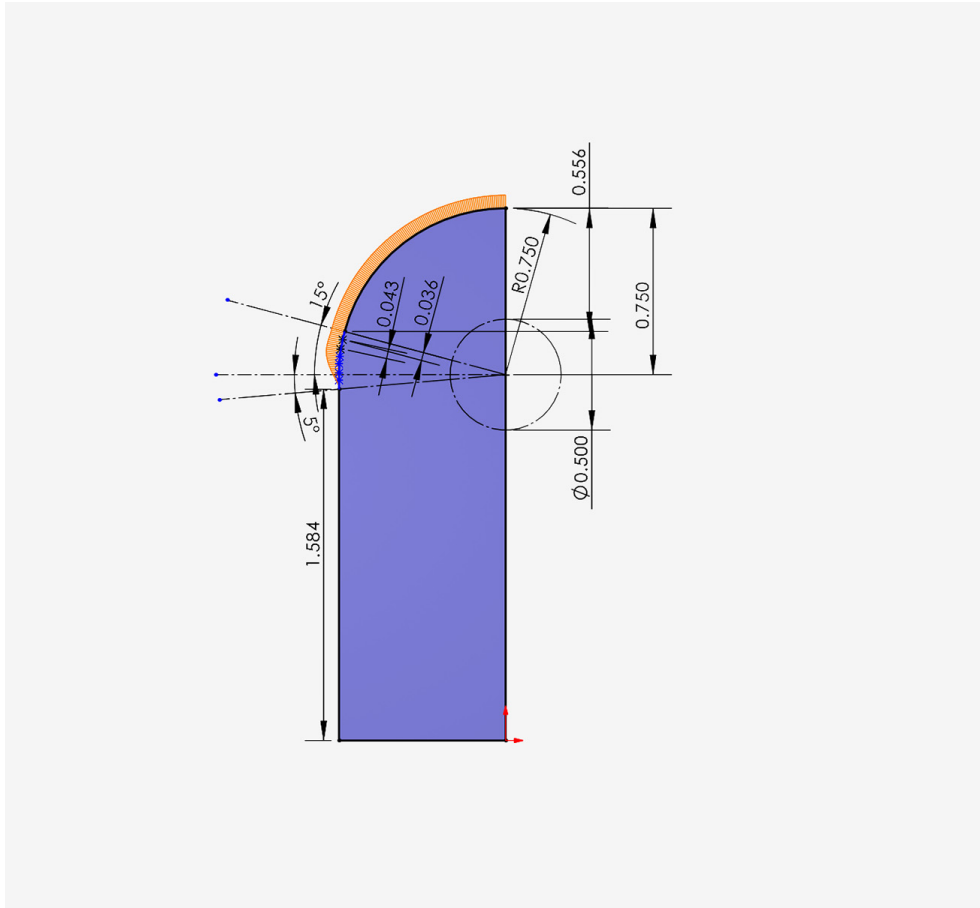
Practice surface modeling skills by modeling a product in your home.

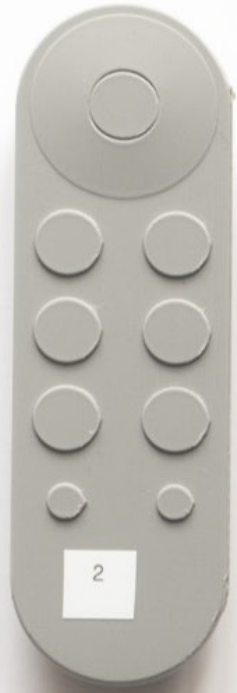
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END

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