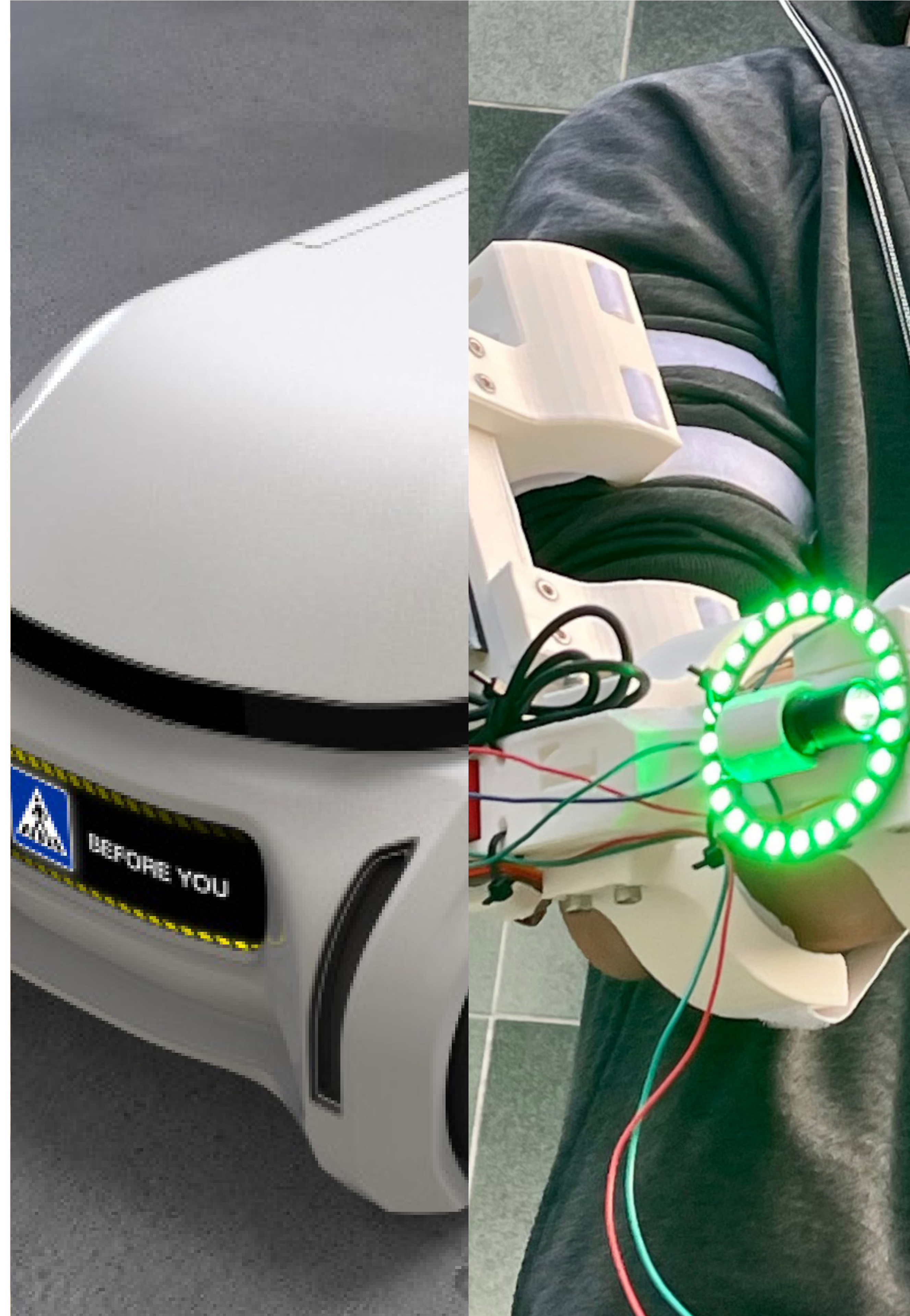


Thomas Chen

Email: thomaschenhy@gmail.com
Phone: 929-281-5828



**Design@
Large**

EXO-Arm

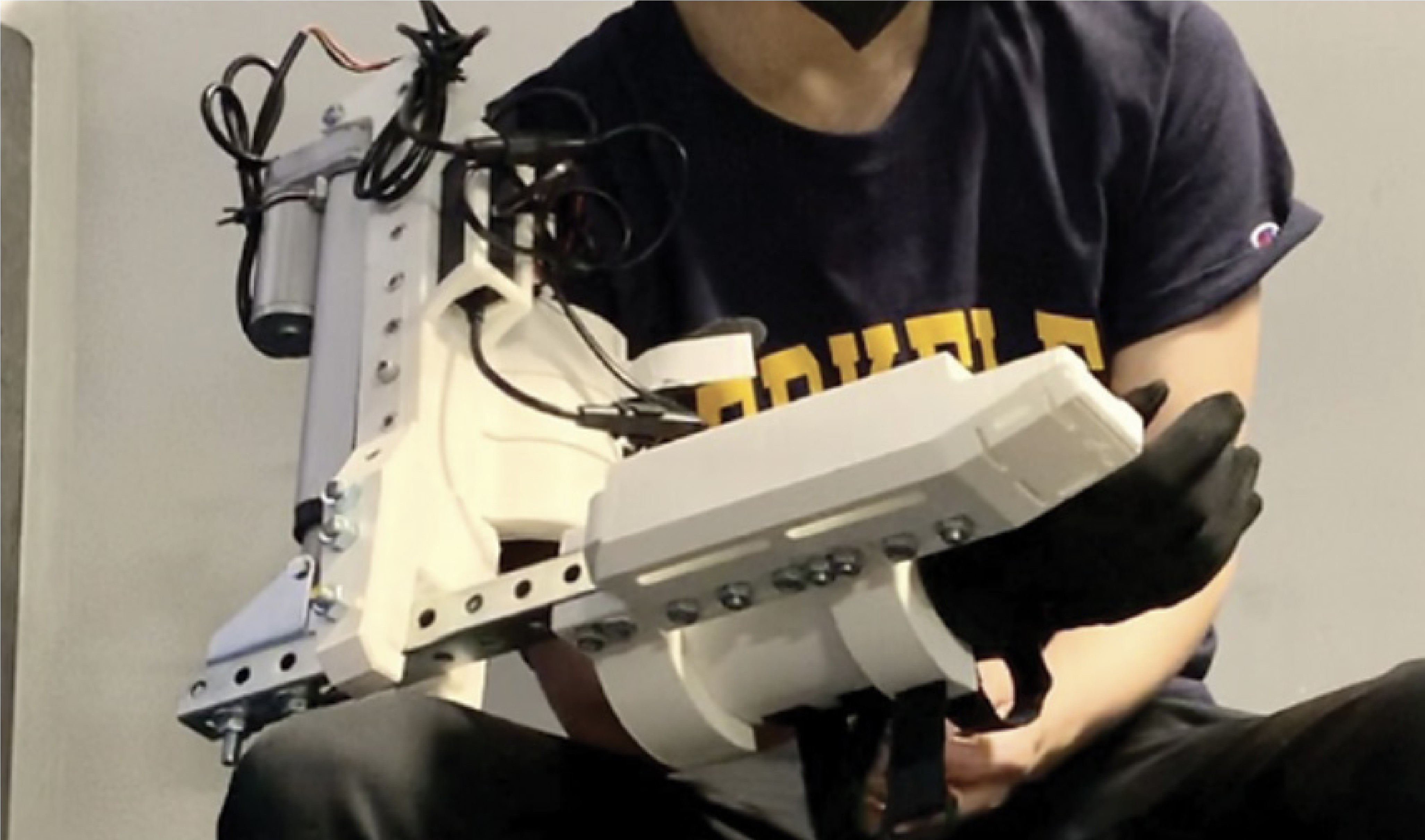
Individual Project



Prototypes



1st Prototype
Equipped with a raspberry pi to mainly explore all different functions the arm can perform. Limited lifting capacity.



2nd Prototype
Equipped with linear actuator powered by battery pack. 7 times stronger than the first prototype in lifting.

First Prototypes



Material

- 3D printed parts
- M4 & M6 screws

Input

- Button press
- Touch sensor

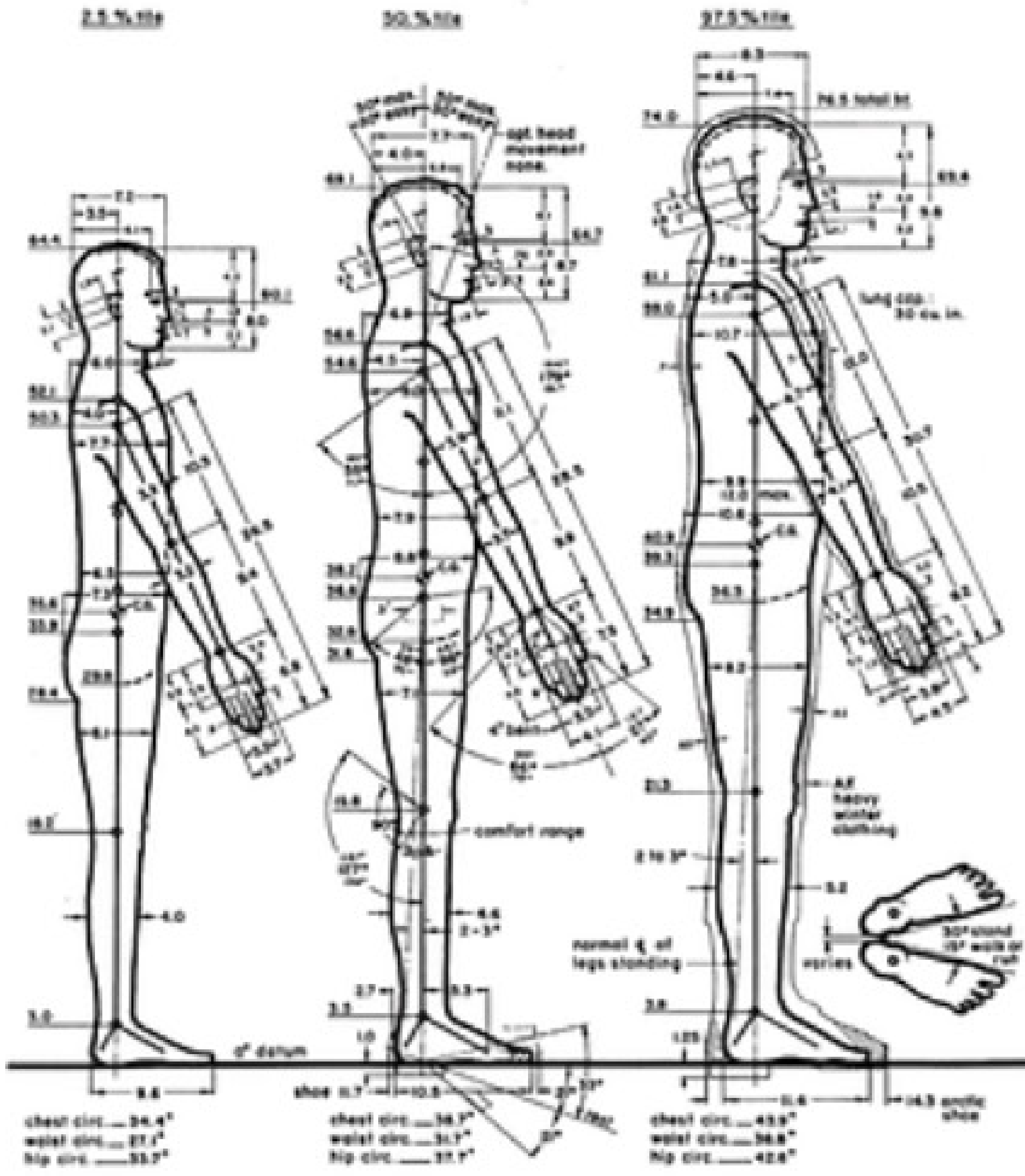
Output

- Motor
- Speaker
- Neopixel Ring

To Improve

- More carrying capacity
- Remove Raspberry Pi off the arm for more space

Process



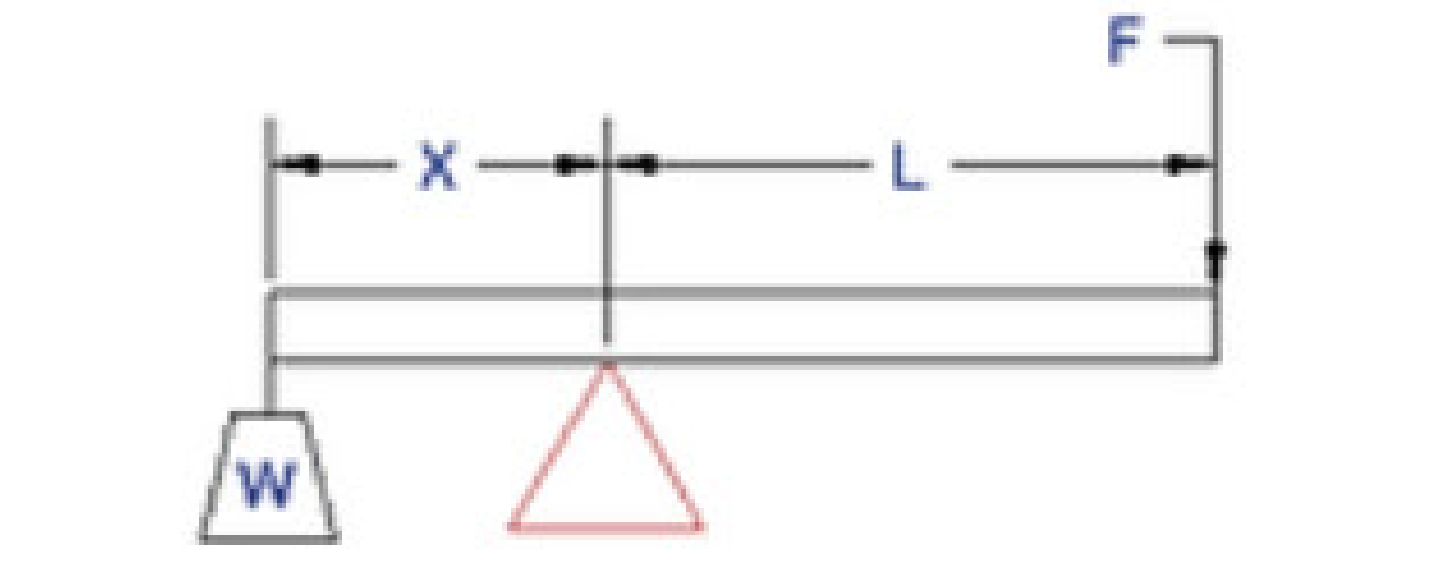
Human Factor Study

Research on human & position dimension
 Ref: The Measure of Man-Human Factors in Design, Henry Dreyfuss

CURRENT PRODUCT	
Brand	Everbit
Name	1-1/4 in. x 36 in. Zinc-Plated Punched Square Tube
Price	\$19.63
Ratings	★★★★★ (158)
Tube Shape	Square
Product Length (in.)	36
Product Thickness (in.)	.078
Product Width (in.)	1.25
Slotted	Slotted
Type	Square tube
Material	Steel
Product Height (in.)	1.25

Material Acquisition

Checking material spec and collecting data for CAD & calculation



Inputs: Inch ▼

(W) Total Load (lbs/kg) =

(L) Length from Fulcrum (in/mm) =

(X) Length to Fulcrum (in/mm) =

How Much Force is Required?:

Force (F) Required for Equilibrium (lbs/kg) = 250

Calculate: Calculate Reset

Calculation

Taking measurements and data into equation to calculate mechanical leverage and maximum capacity of the arm

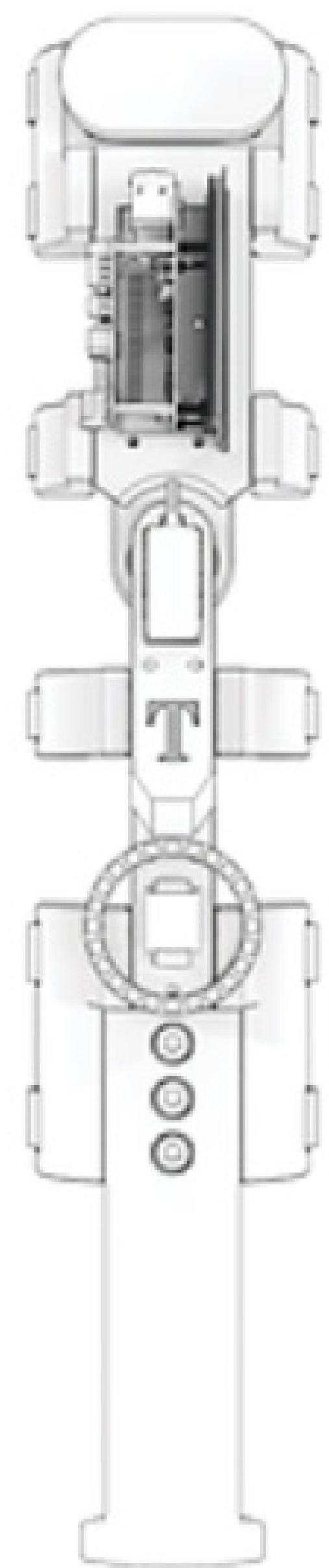
```

24
25 while True:
26     if not ss.digital_read(BUTTON_1):
27         print("Button 1 NOT pressed")
28         crickit.servo_1.angle = 0
29         time.sleep(1)
30
31     pixels.fill(RED)
32     pixels.show()
33     time.sleep(.1)
34     if not crickit.touch_2.value:
35         print("Cap 2 NOT pressed")
36     else:
37         text = "hello, I, am, thomas."
38         language = "zh+en"
39         genderIdentity = "+f3"
40
41         print(text)
42         subprocess.Popen(["espeak", "-
43
    
```

Coding

Executing the design started with coding different parts in python

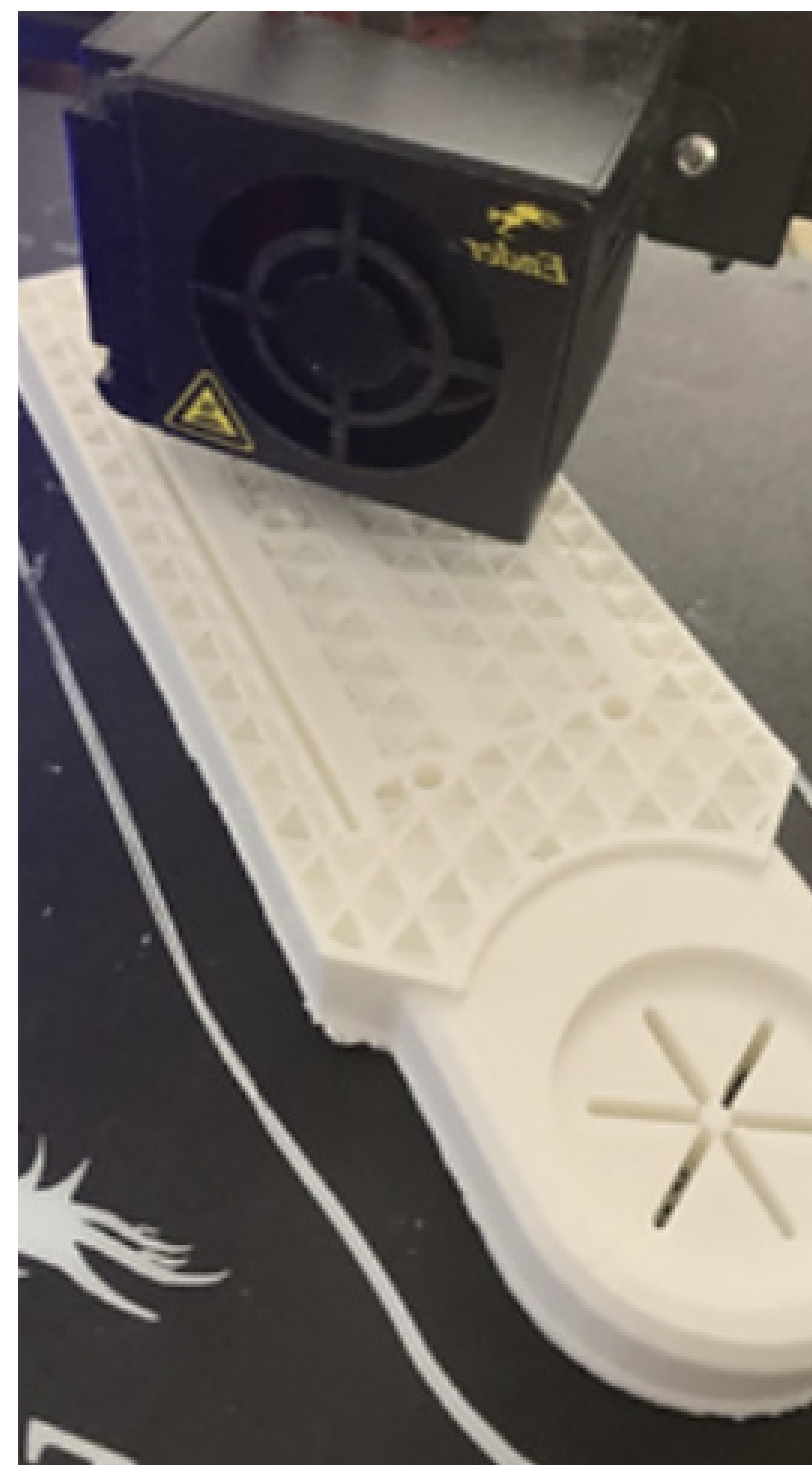
Prototyping



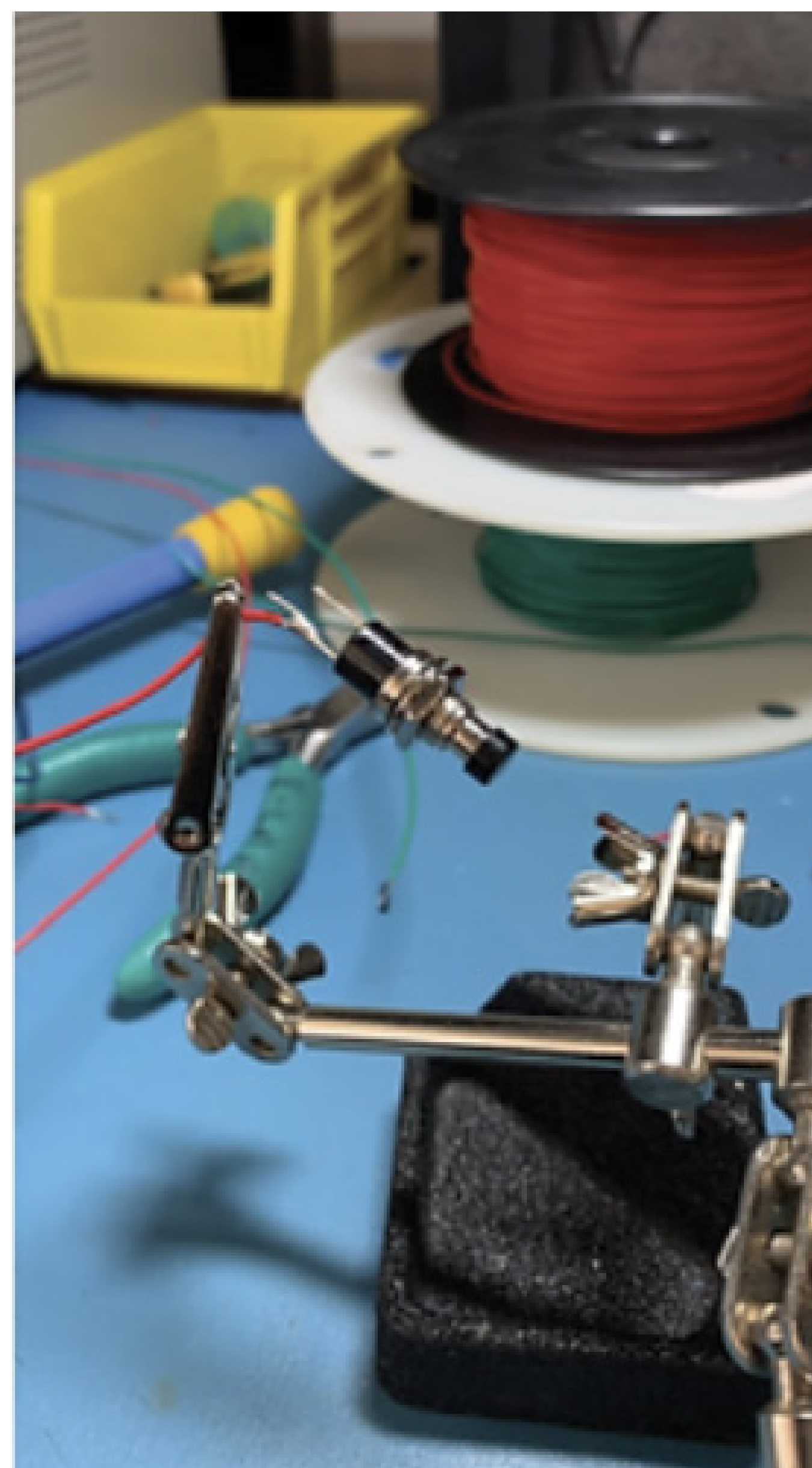
CAD Modeling
Translating ideas and drawings in to CAD model



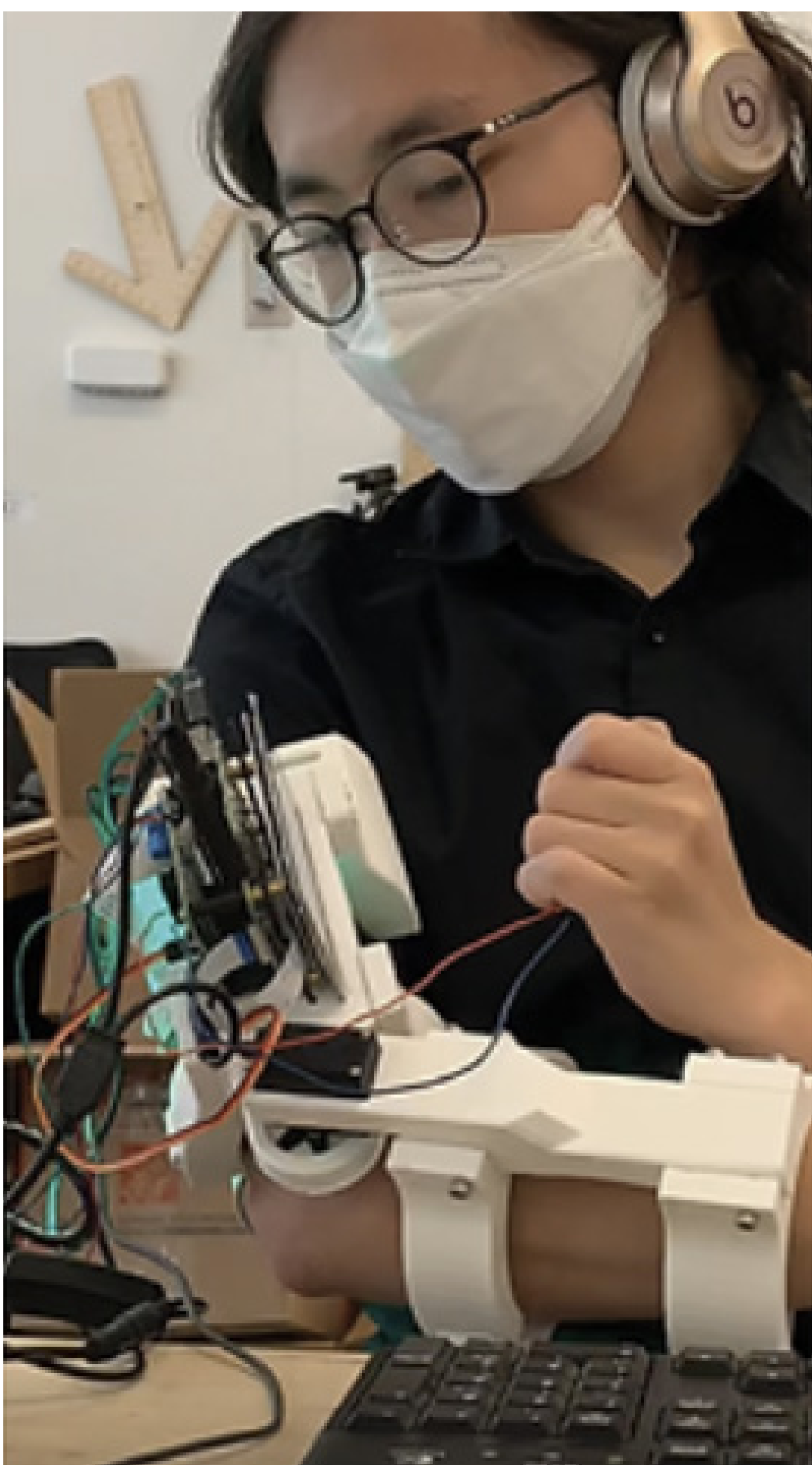
Material Acquisition
Translating ideas and drawings in to CAD model



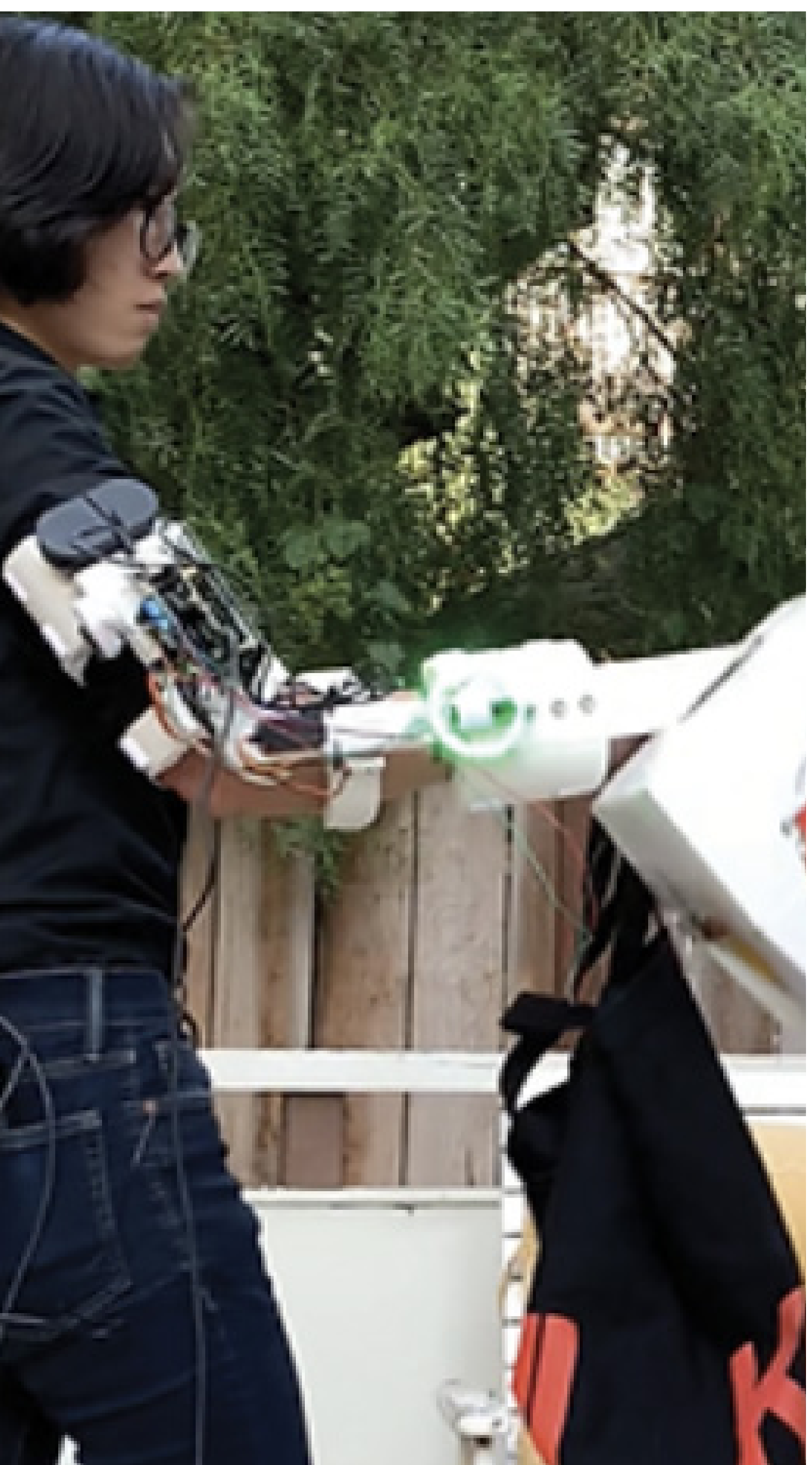
3D Printing
Splitting final CAD model in various parts and printing it with PLA fillament



Soldering
Soldering custom made parts together, in preperation for joining with the printed parts



Assembly
Combining all the 3d printed parts, as well as the electronics



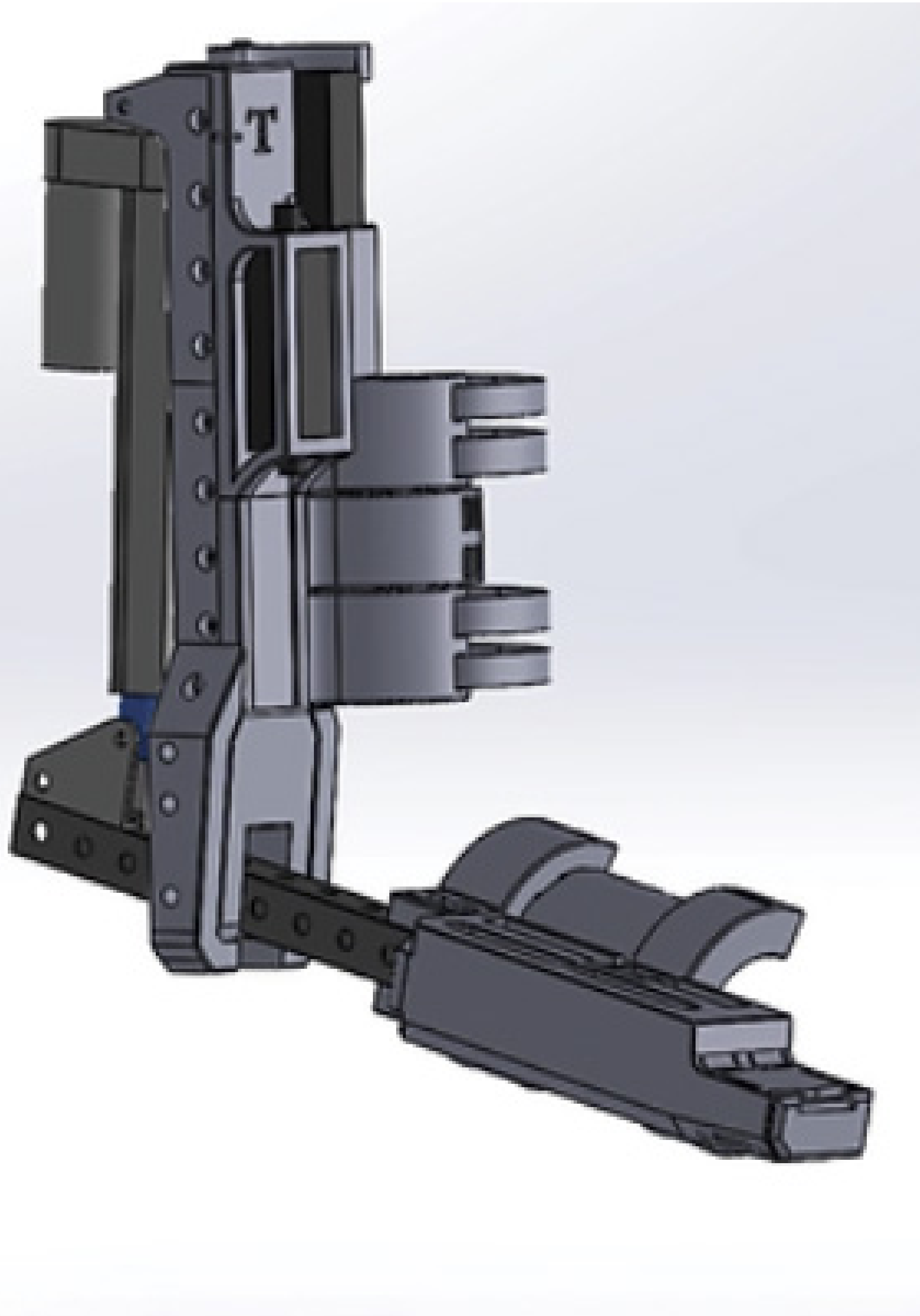
Testing
Testing how much the prototype can lift depite the calculation numbers!

Second Prototypes



Prototyping





CAD Modeling

Translating ideas and drawings in to CAD model



Parts Fabrication

Hands-on work modifying material



Soldering

Soldering custom made parts together, in preparation for joining with the printed parts



Assembly

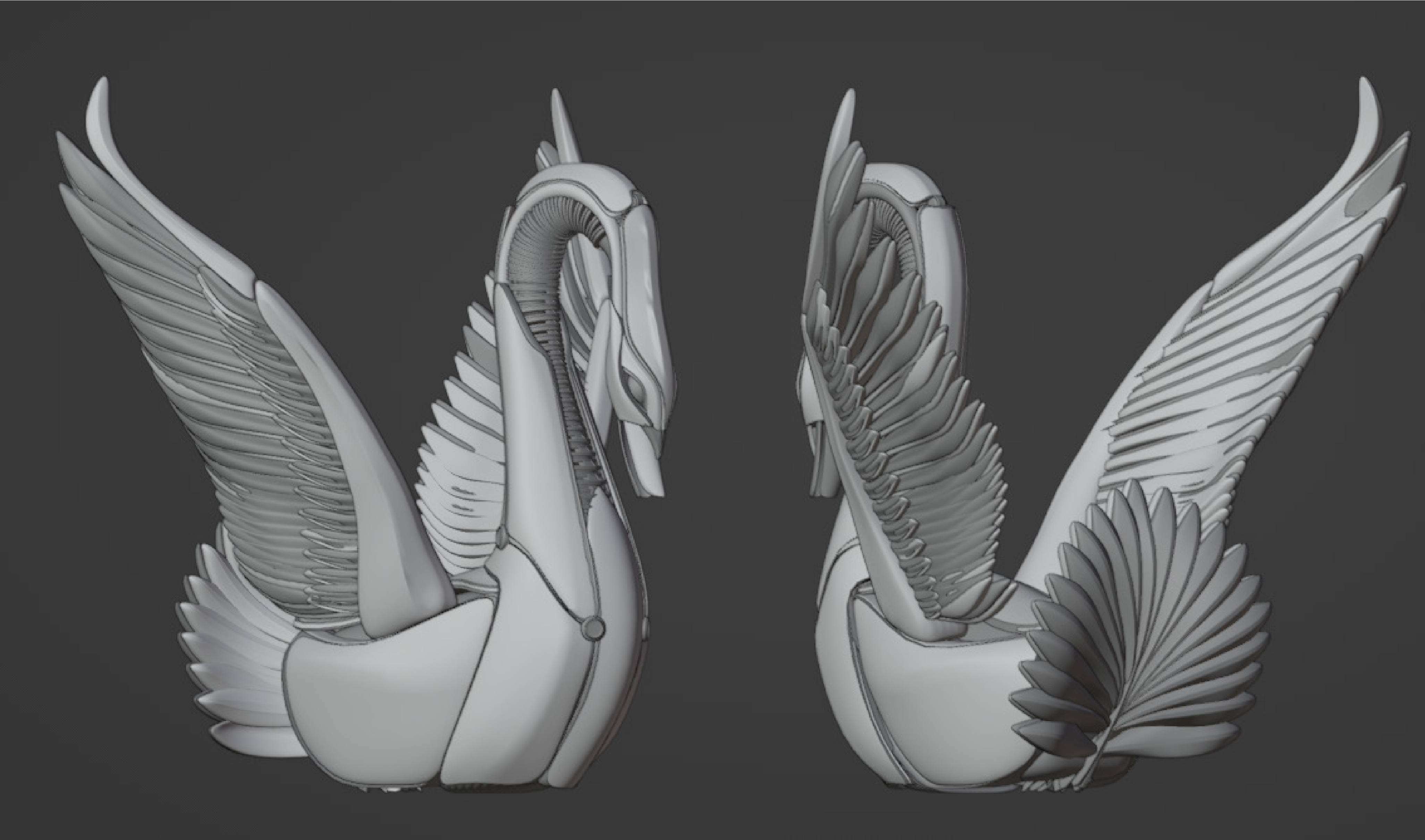
Combining all the 3d printed parts, as well as the electronics

AR Swan

Individual Project



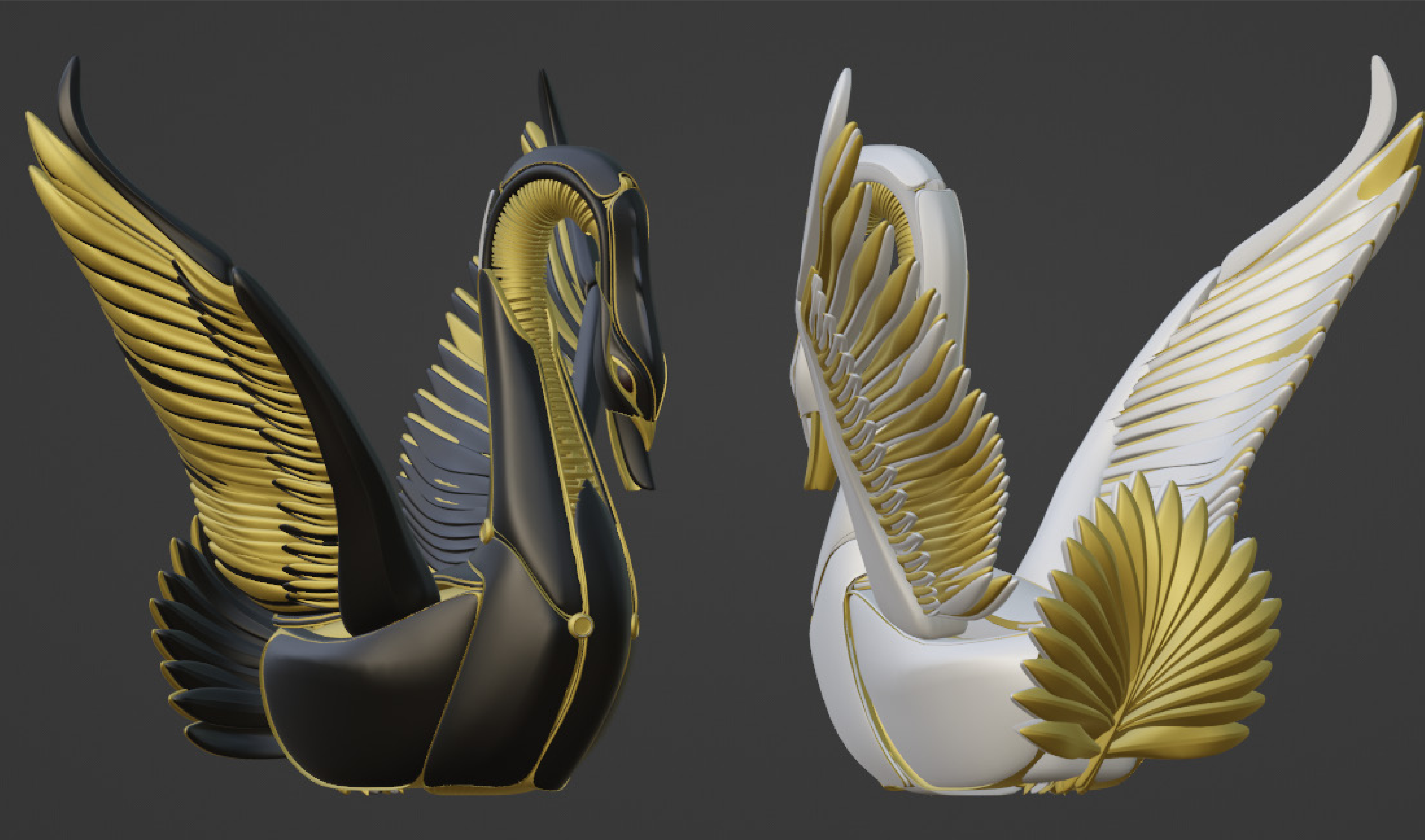
Digital Assets Preparation



Modeling

All models were originally created in Maya and Blender. It was a fun process exploring the form, orientation and proportion of what I wanted to show in AR.

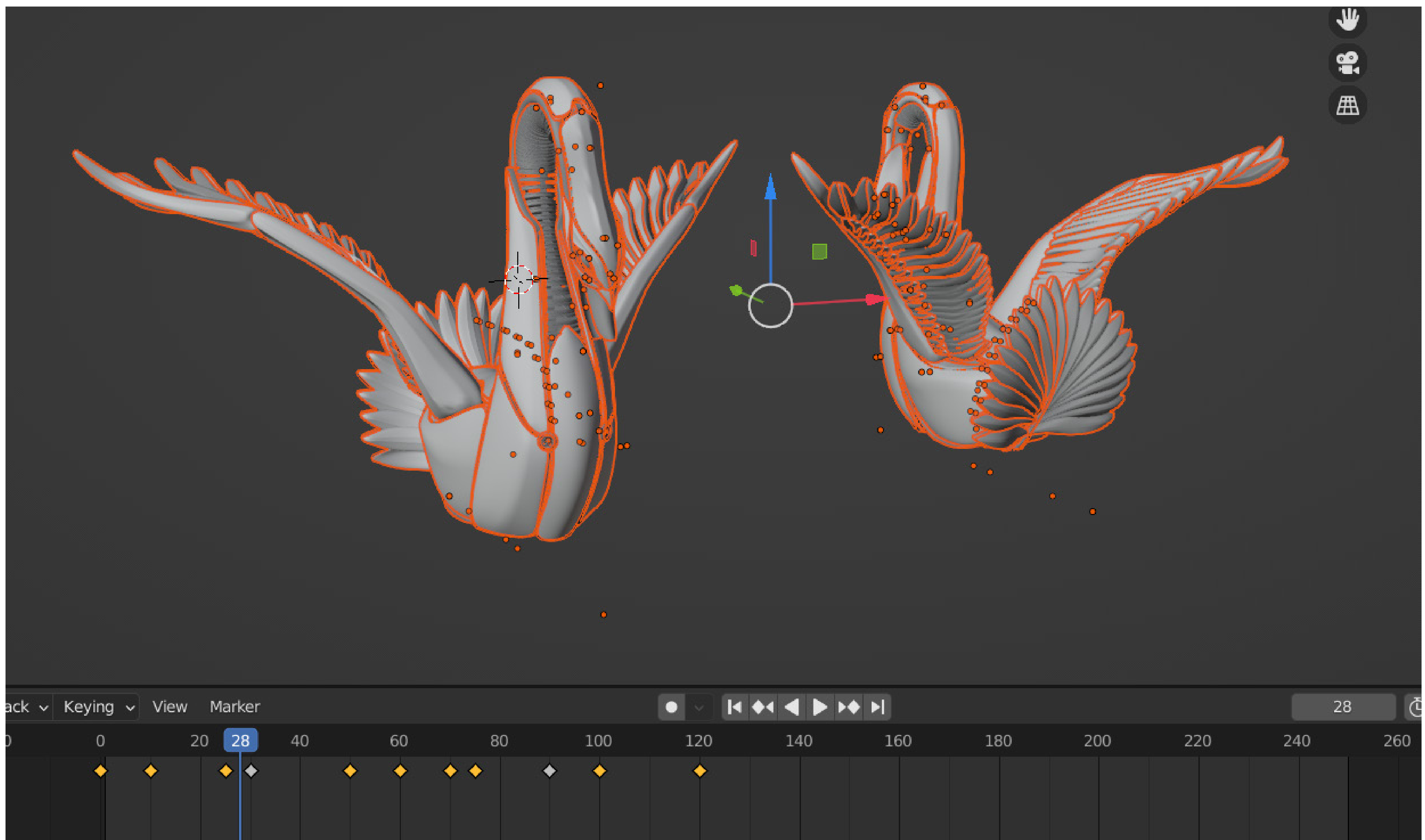
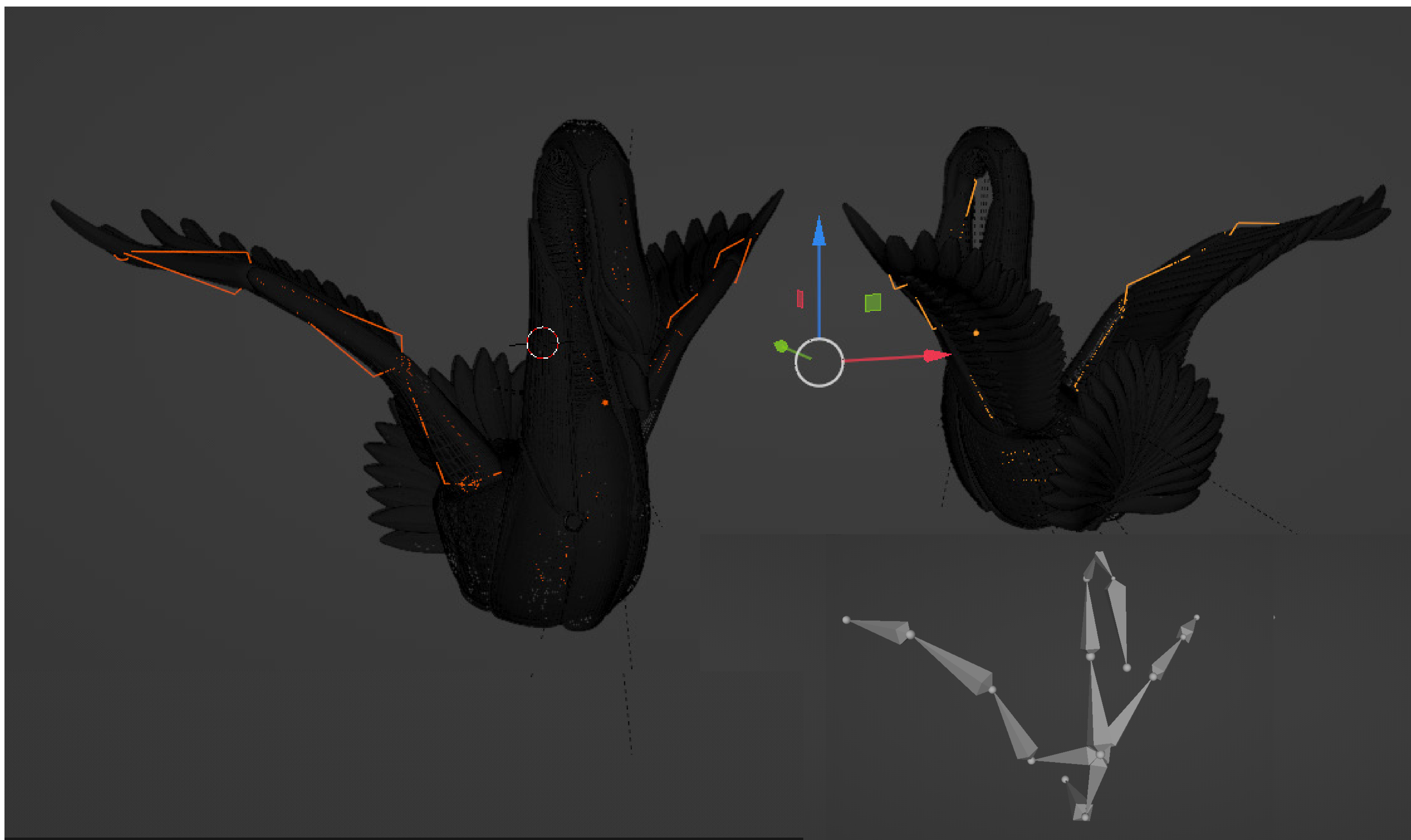
(Models: Swan, Flower, Butterflies)



Texturing

All model textures were created in Blender. However, some textures were not transferred well to Unity. Therefore some were remade in Unity instead.

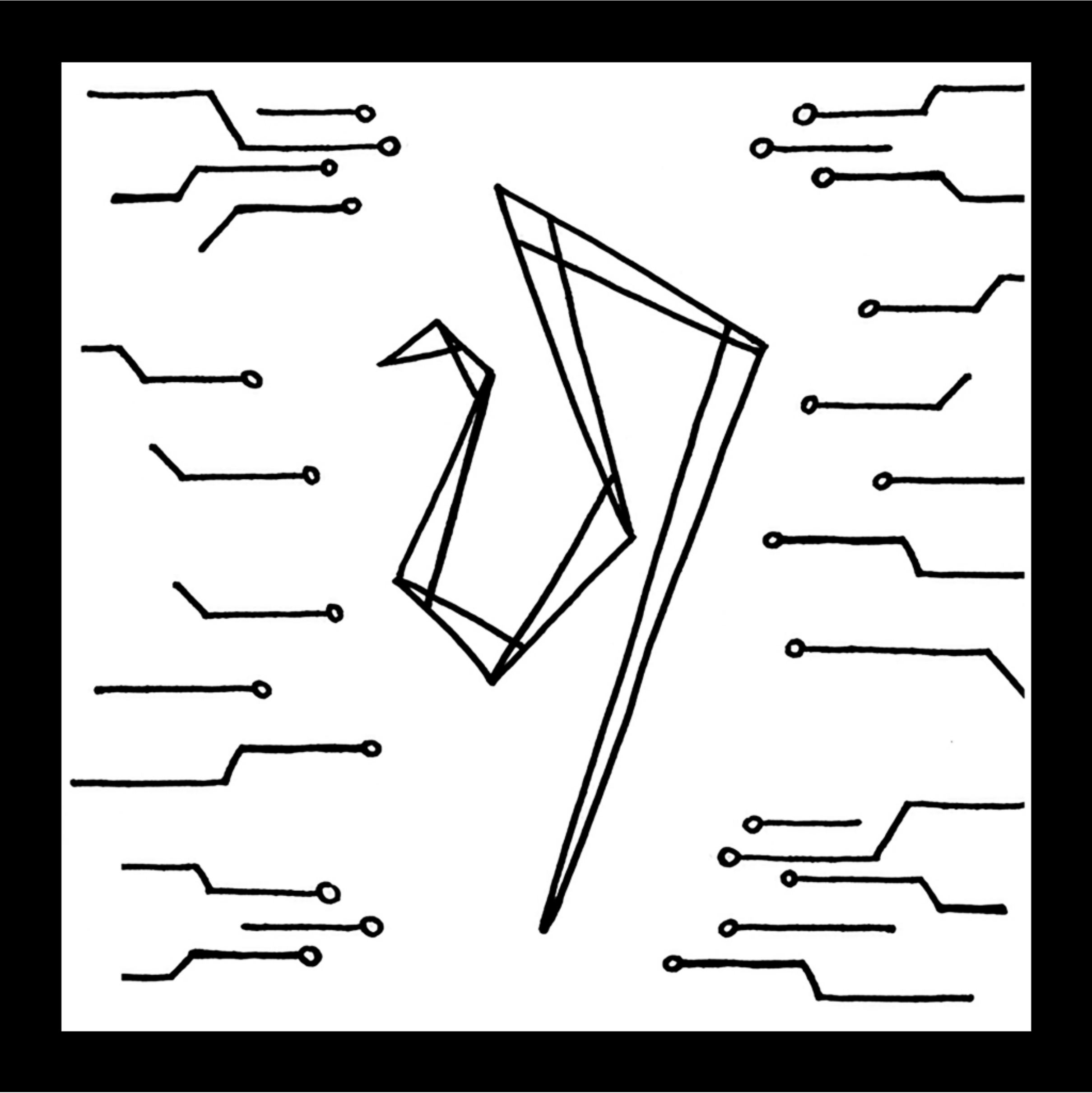
Digital Assets Preparation



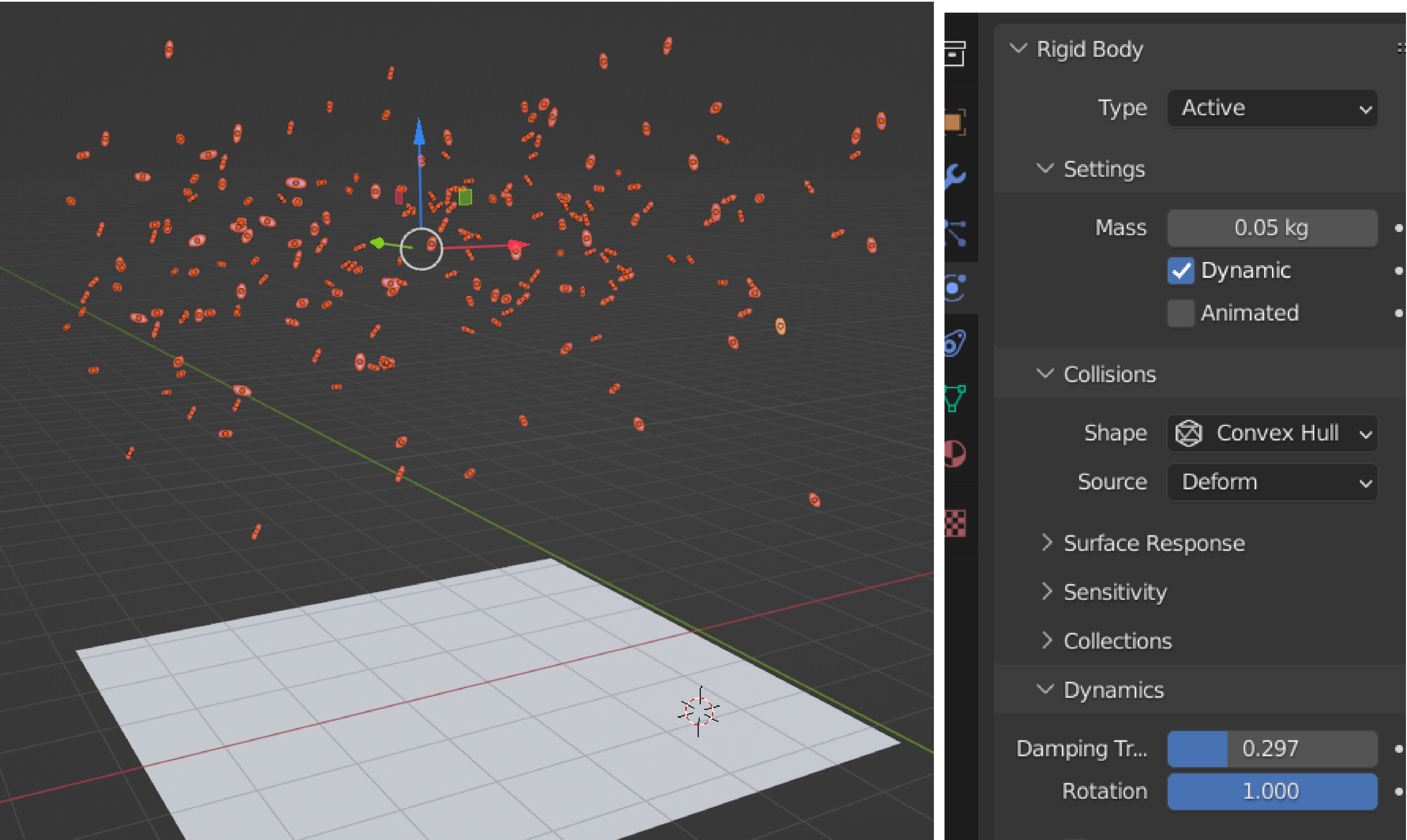
Rigging & Animation

After the models were completed, I rigged the swan and butterflies in Blender so I could easily have my models moving and being animated by inserting keyframes.

Process-Initial Prototyping

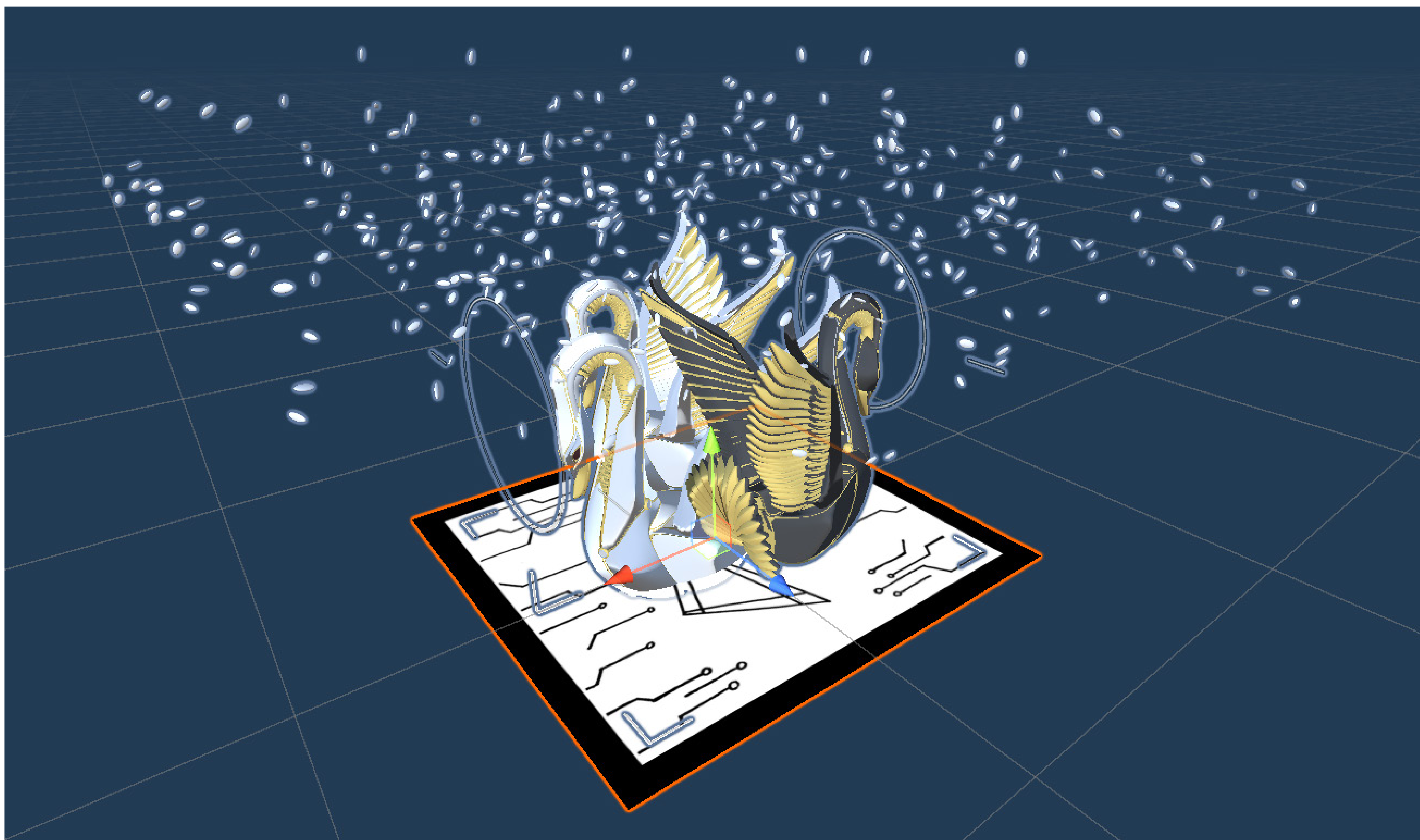


QR Code Design
I drew a Swan with distinctive features like sharp angles, all corners filled, etc., to use as a QR code so the software and camera can register.

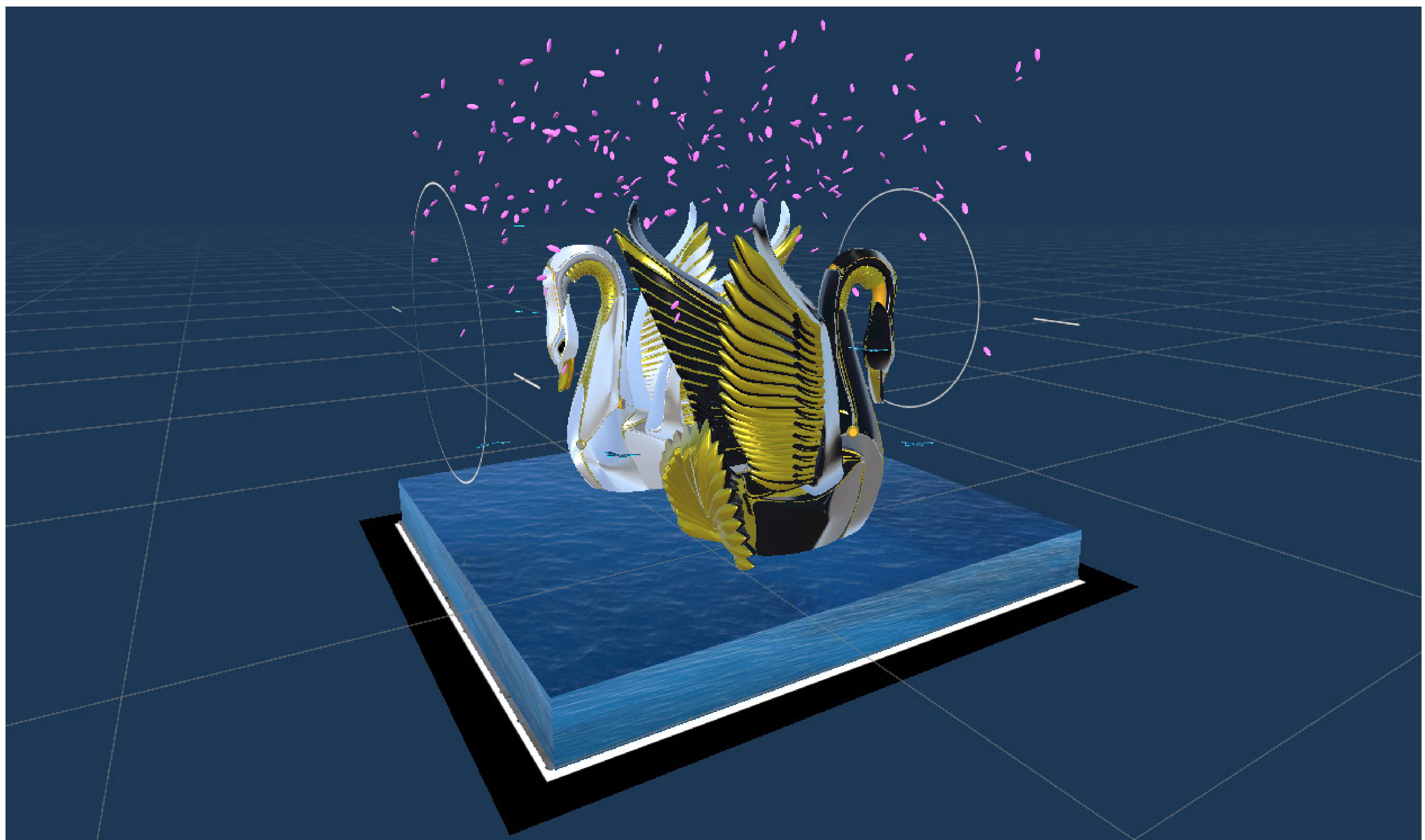


Physics
Instead of animating flower petals falling, the petals were given physics to mimic a more natural fall.

Process-Unity

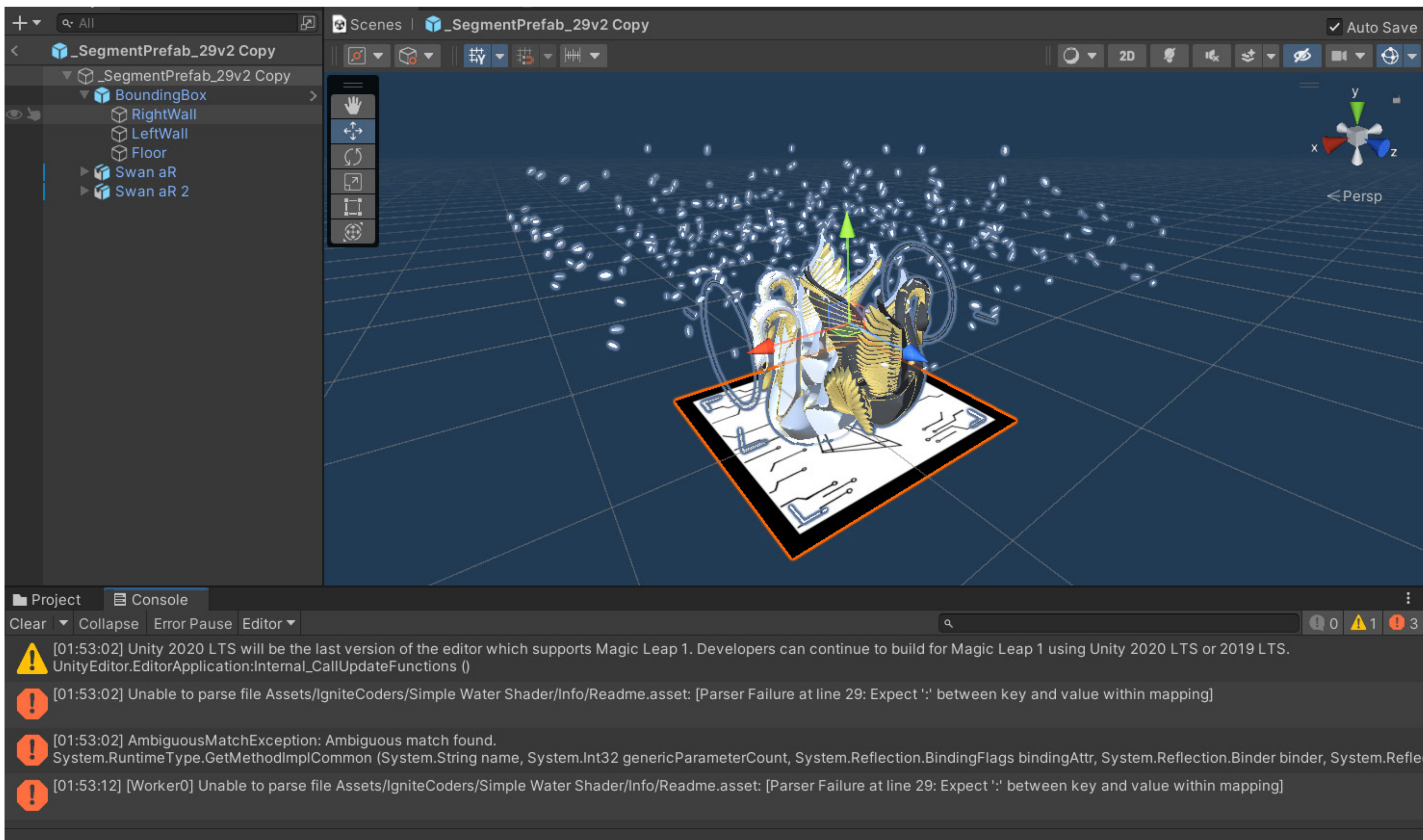


Importing to Unity
After the modeling, texturing, rigging, giving physics and animating, I imported the blender file into Unity. Then I scaled and positioned the models to the correct position within my marker.



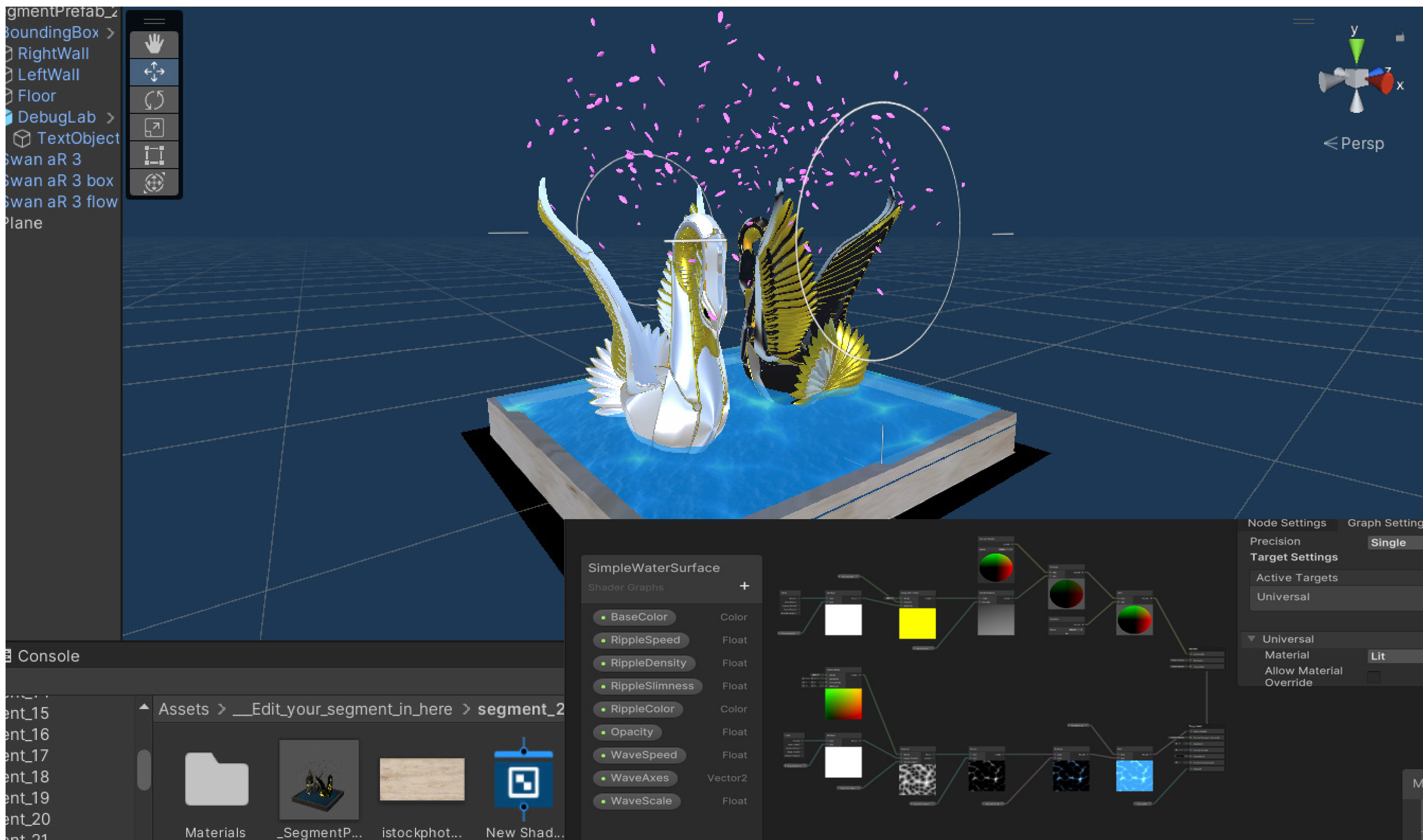
Adding water
After the modeling, texturing, rigging, giving physics and animating, I imported the blender file into Unity. Then I scaled and positioned the models to the correct position within my marker.

Process-Difficulty & Solution



Adding refined water texture

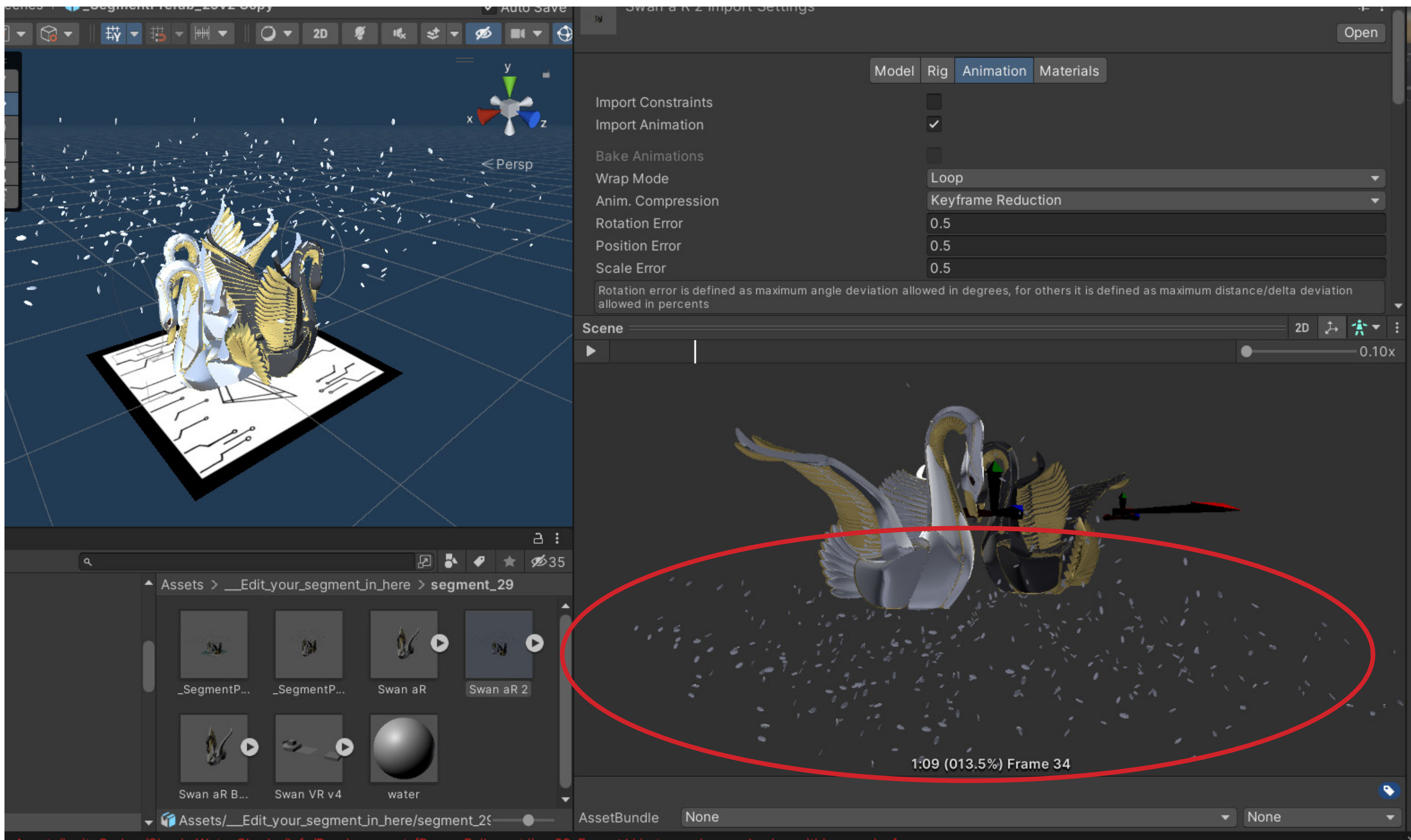
Instead of a still water block, I wanted to give the water some more realistic texture. However, I made wrong setting about the plugin and rendering pipeline and the entire file got messed up. I had to restart from stretch from there.



Fixing water & shader

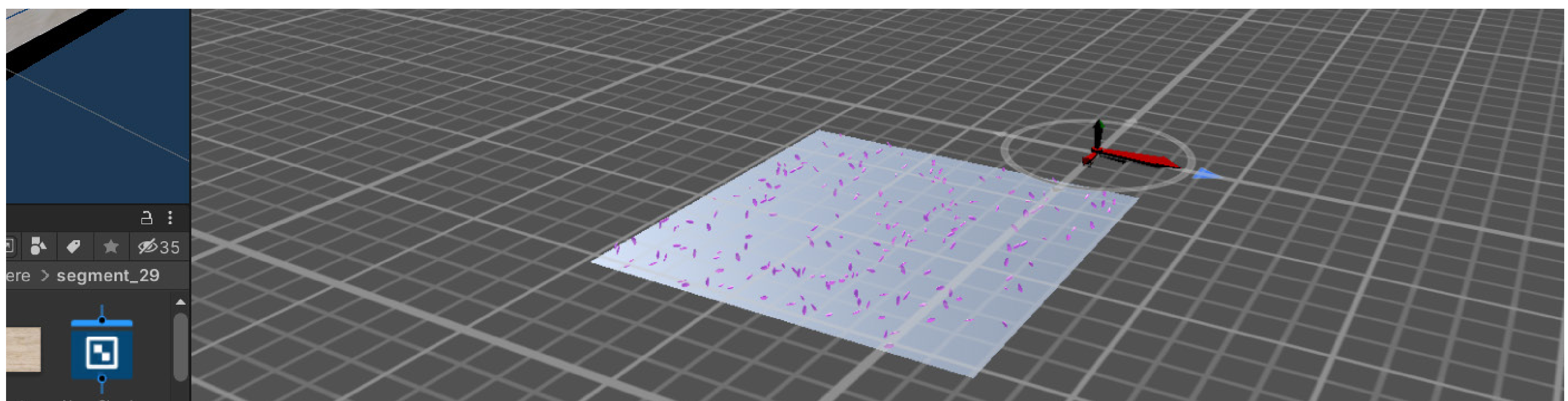
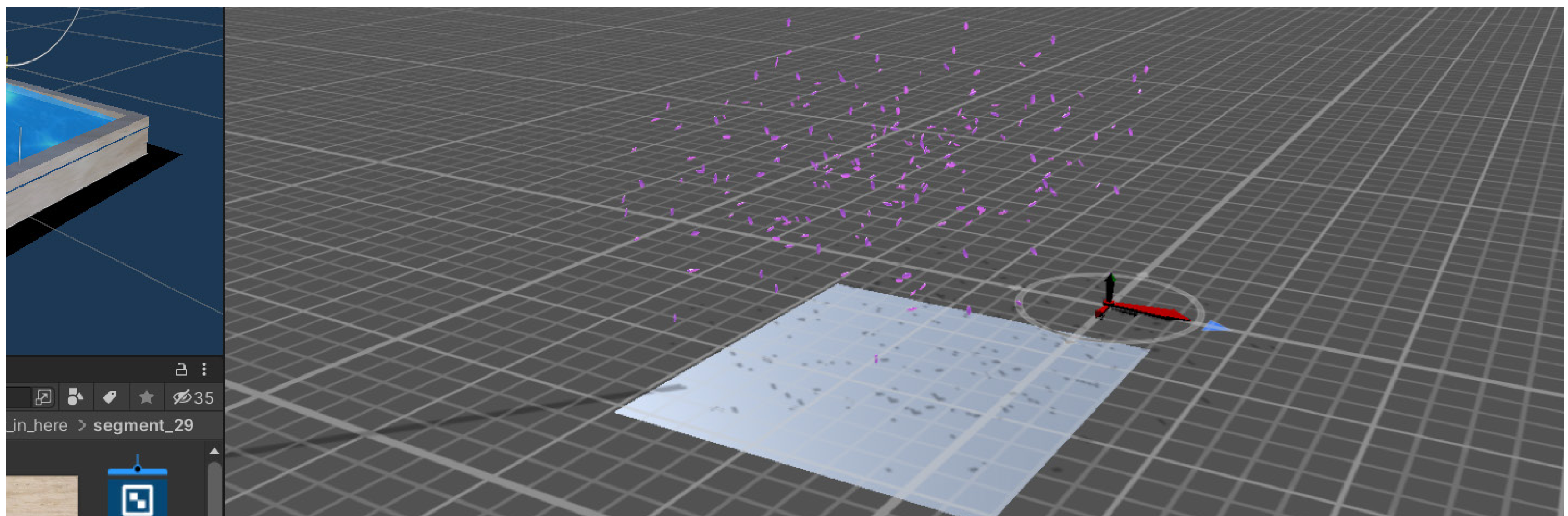
I went through the rendering pipeline again and imported the right package with help from the tutorial. Thankfully the problem was solved and I had a refined water texture with water wave movement.

Process-Difficulty & Solution



Flower Petals fell over the boarder

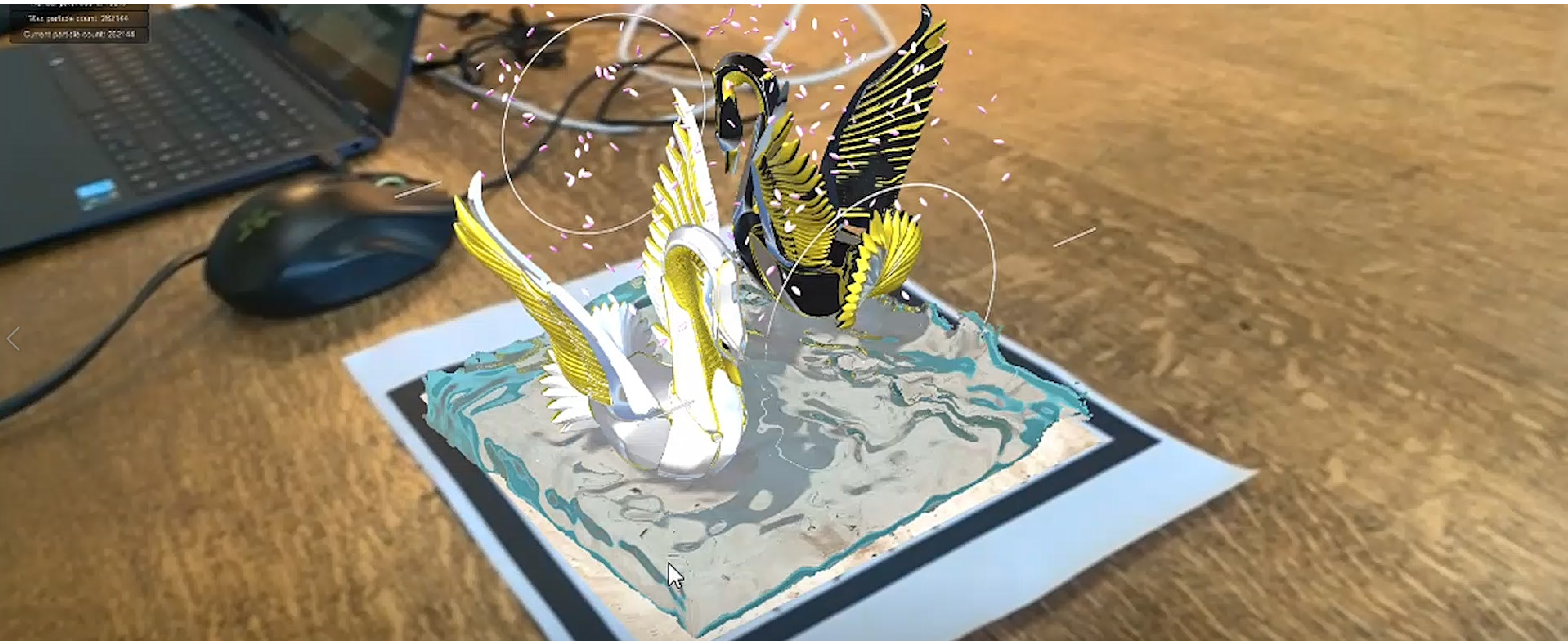
Since the petals have falling physics, they went through not only the swans but also the bottom. They fell all the way over the bottom and I didn't want that.



Adding collider

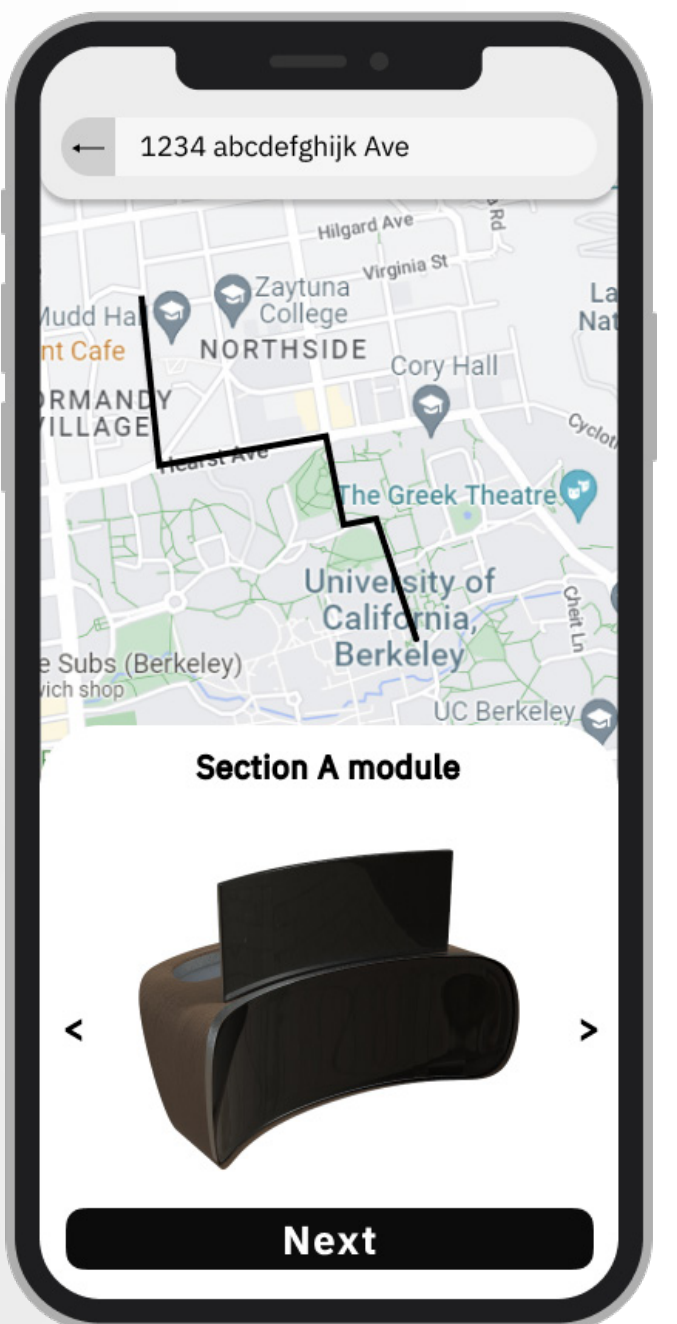
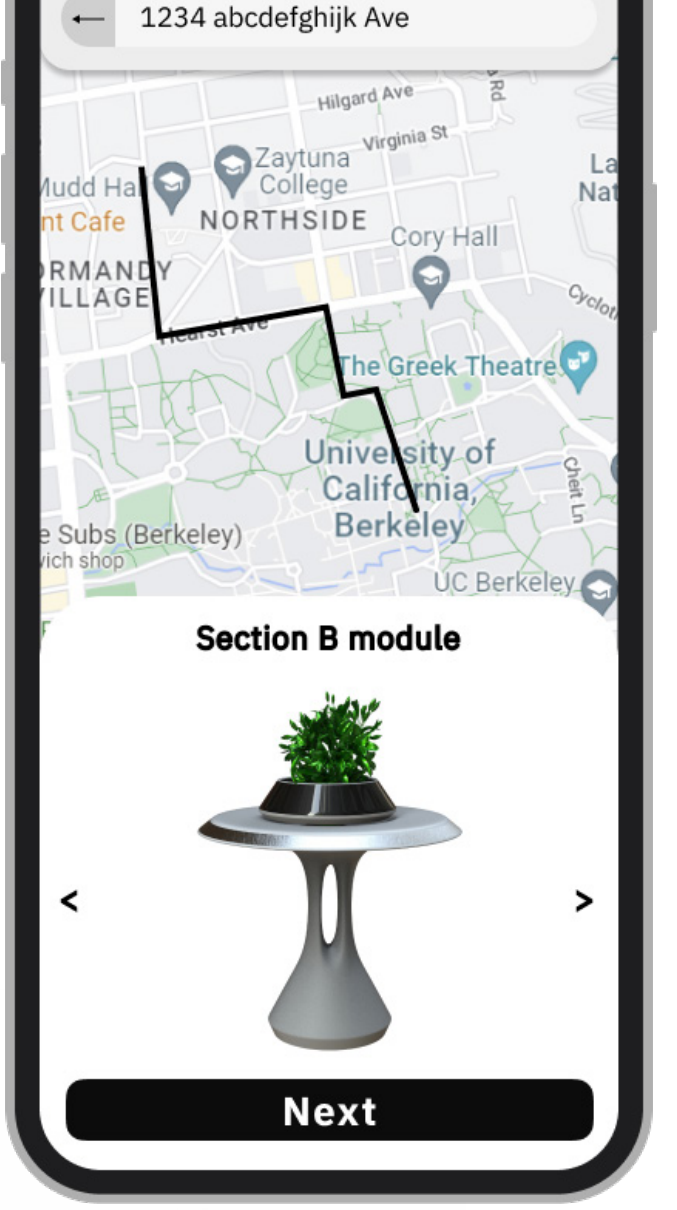
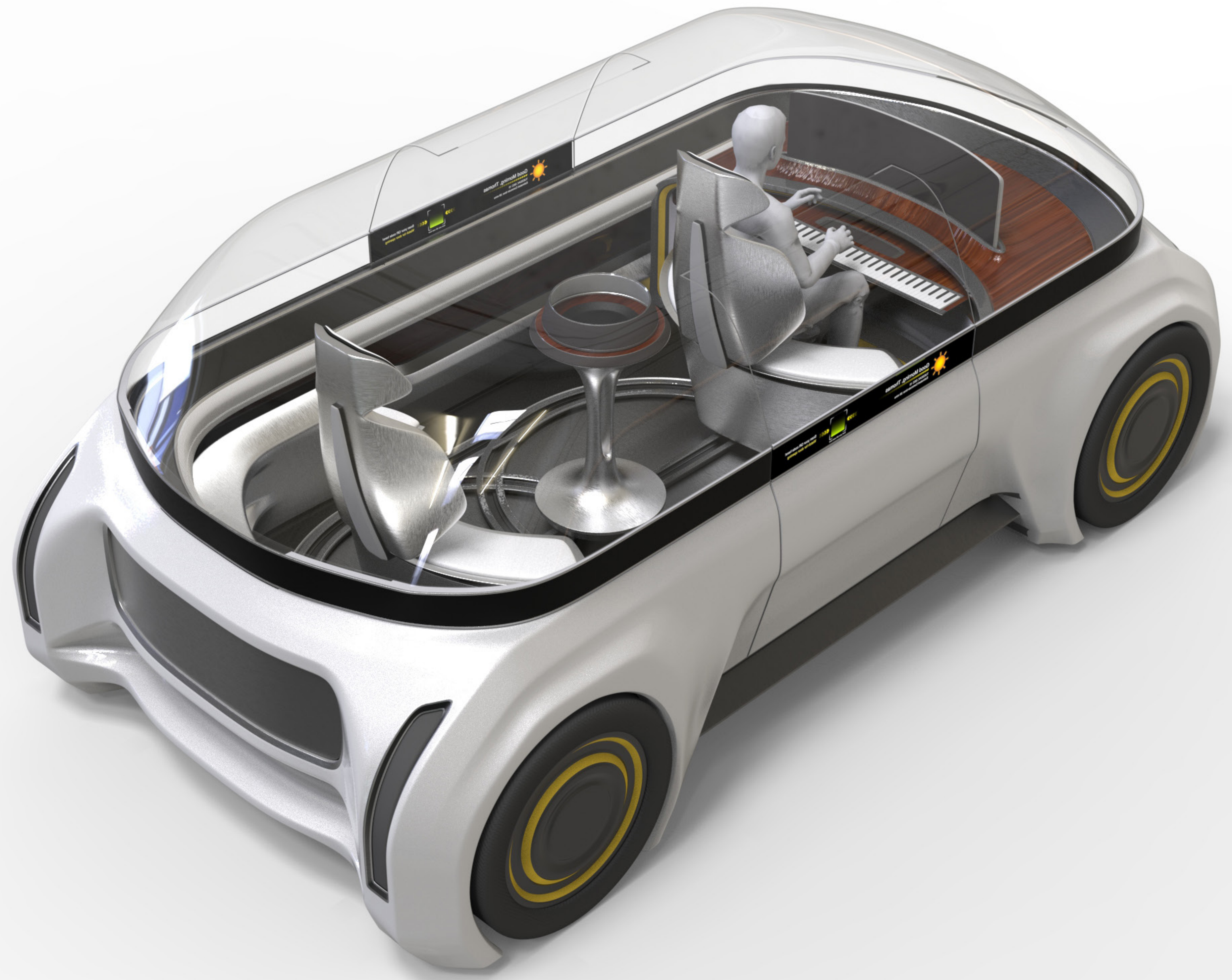
To fix the problem, I set the models as active and passive colliders. The results turned out well and I could have the petals stop falling

Final Outcome



Modular Shared Vehicle

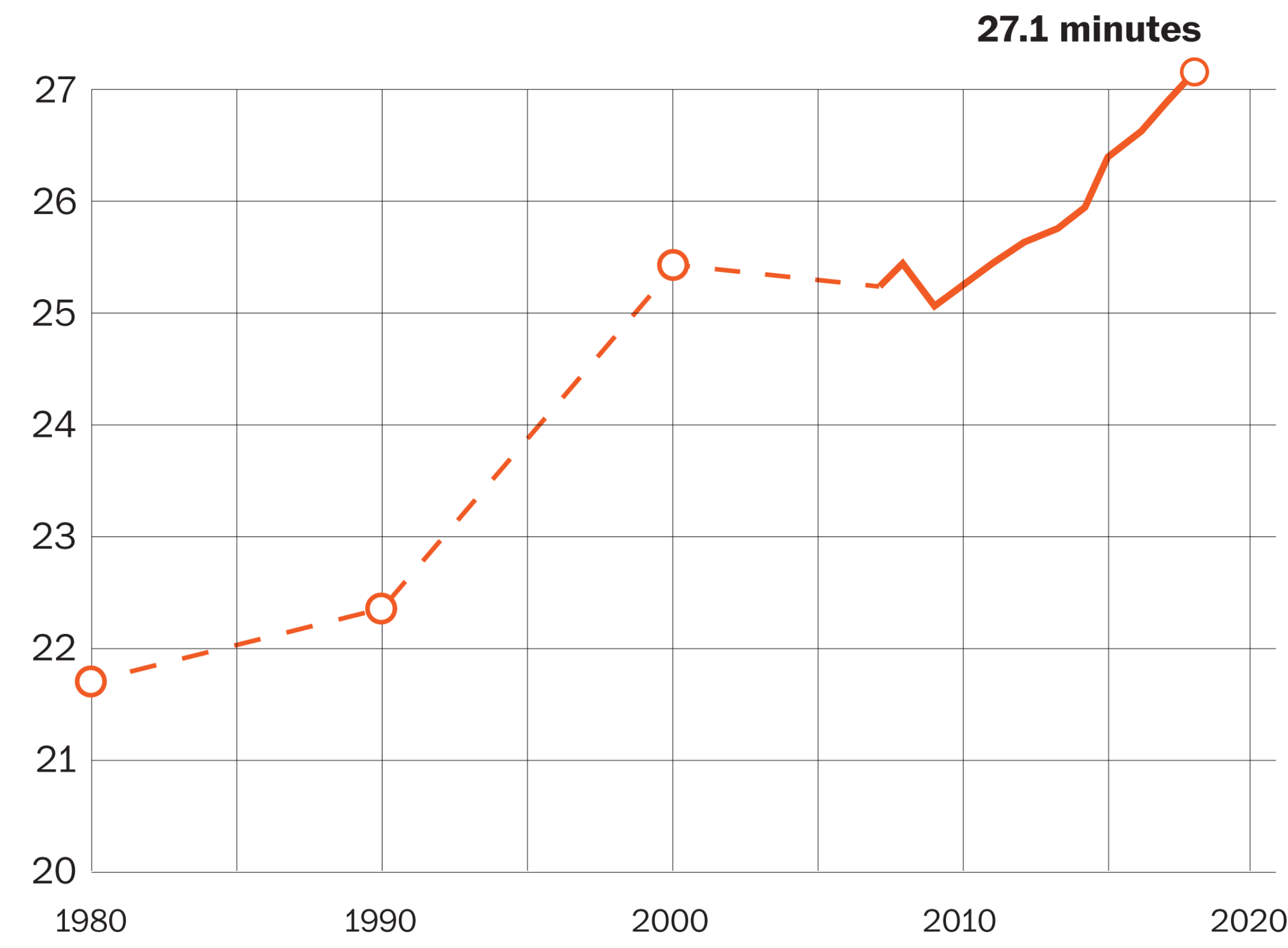
Individual Project



BACKGROUND: Research

American commutes hit a new record in 2018

Average one-way commuting time for American workers age 16 and older



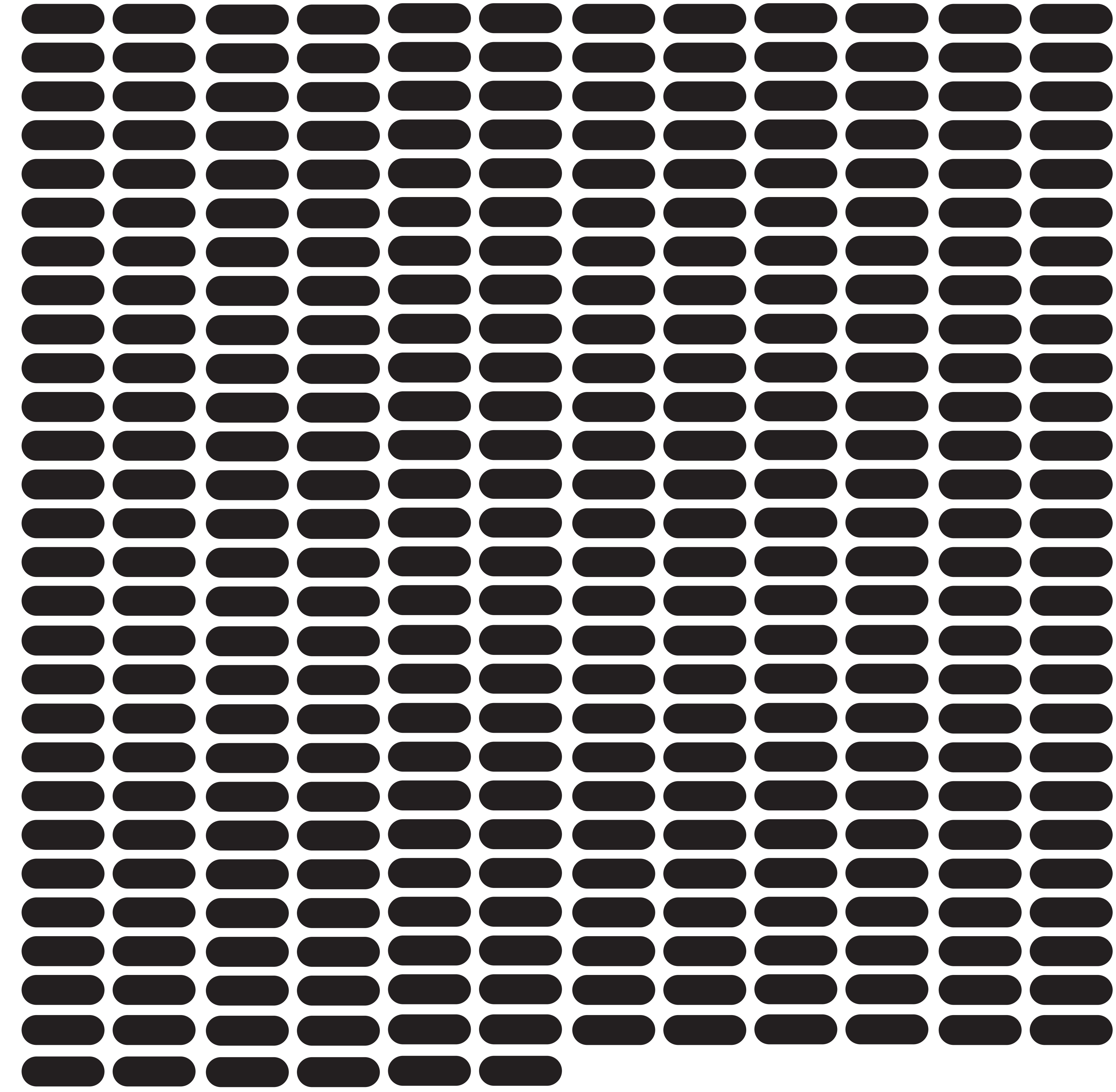
Source: U.S. Census Bureau

THE WASHINGTON POST

U.S. Census Bureau-
Average one-way commute in the United States increased to a new high of 27.6 minutes in 2019

1 hr on the road (round trip)
People spend per day commuting

330 hrs on the road
People spend per year commuting

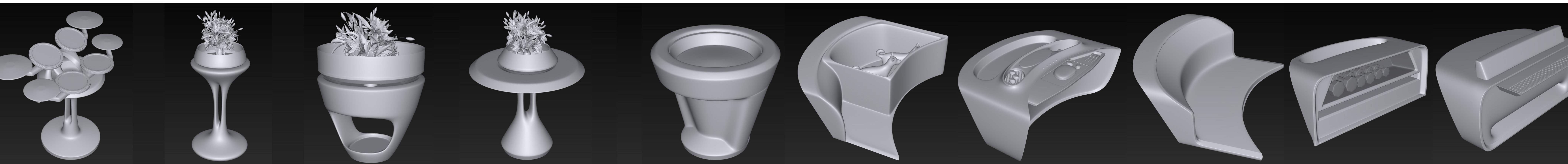


PROBLEM STATEMENT

Current shared vehicles/service impact passengers' lifestyles due to meaningless use of time and loss of personal connection to each ride.

DESIGN GOAL

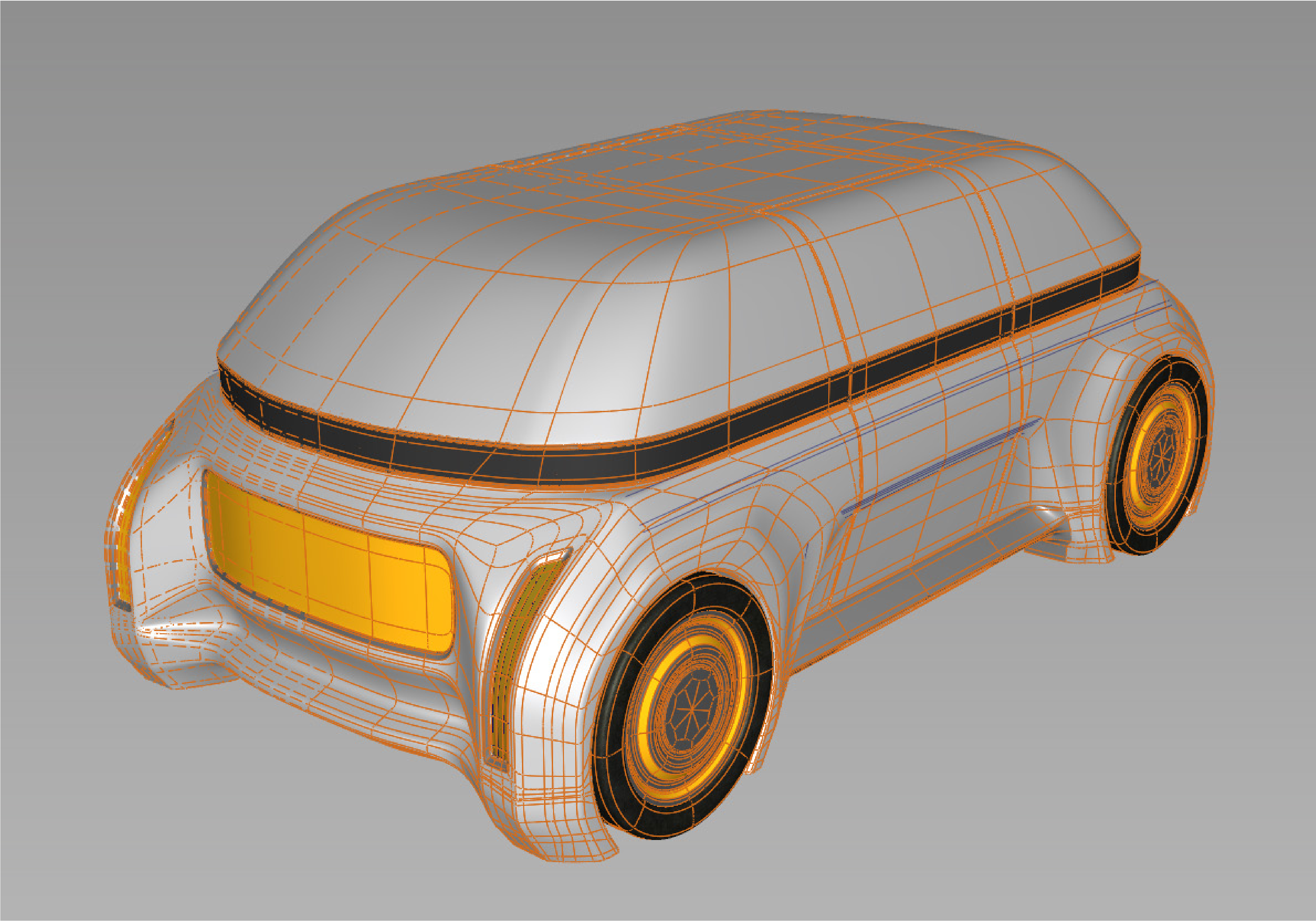
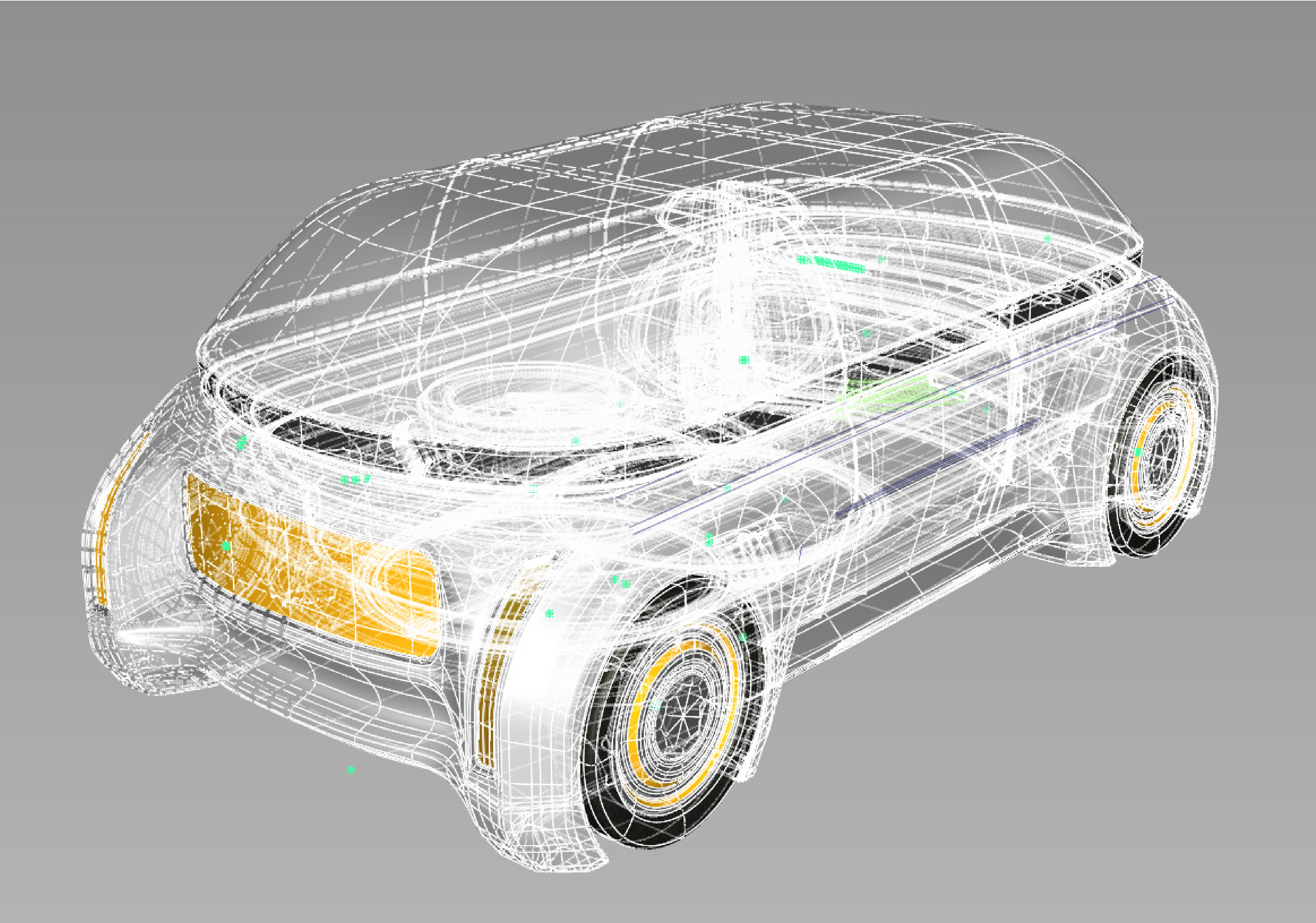
A shared service vehicle that passengers can customize interior configuration according to their comfort and activities during the trip, so the journey is as enjoyable as the destination.



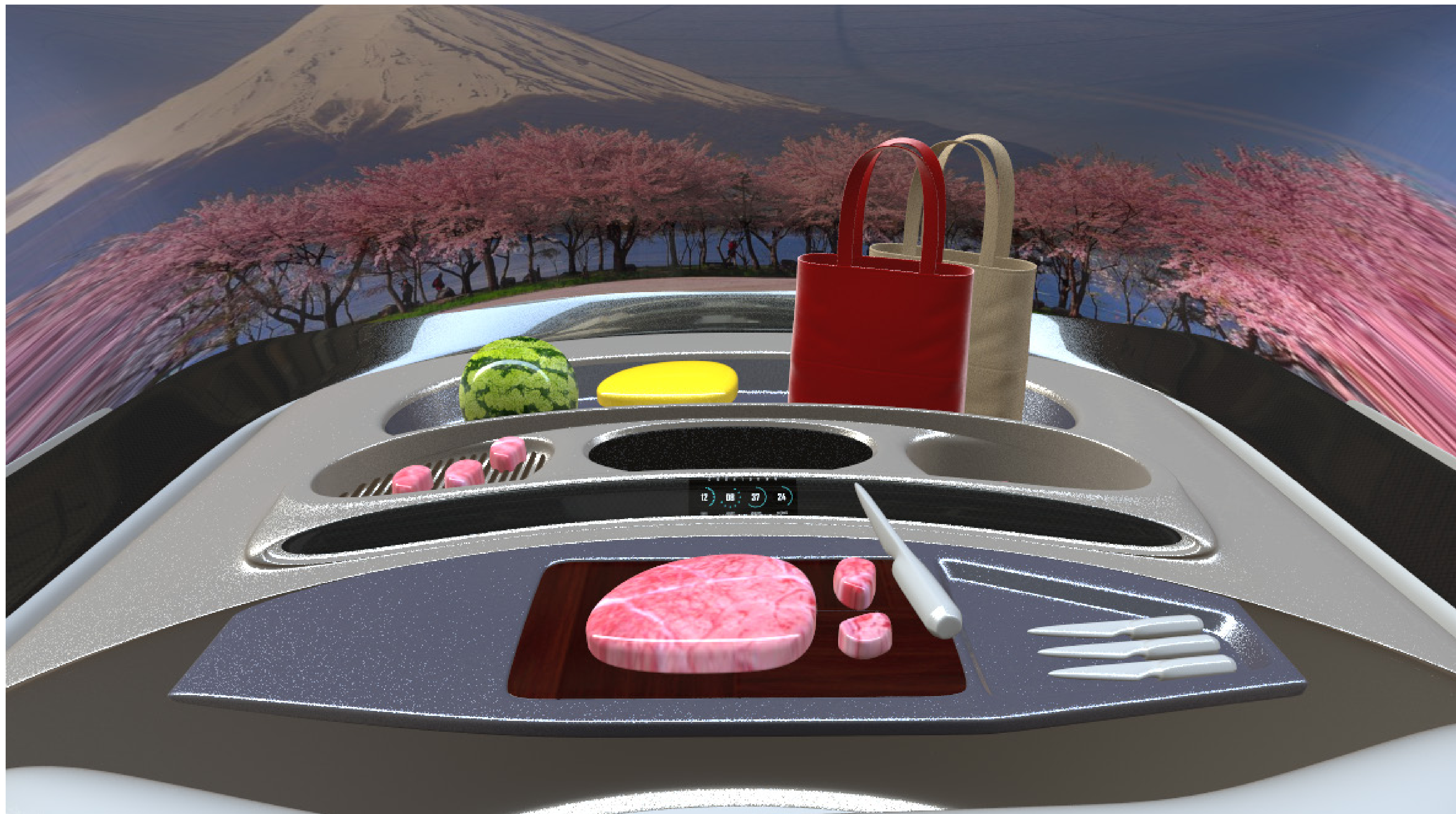
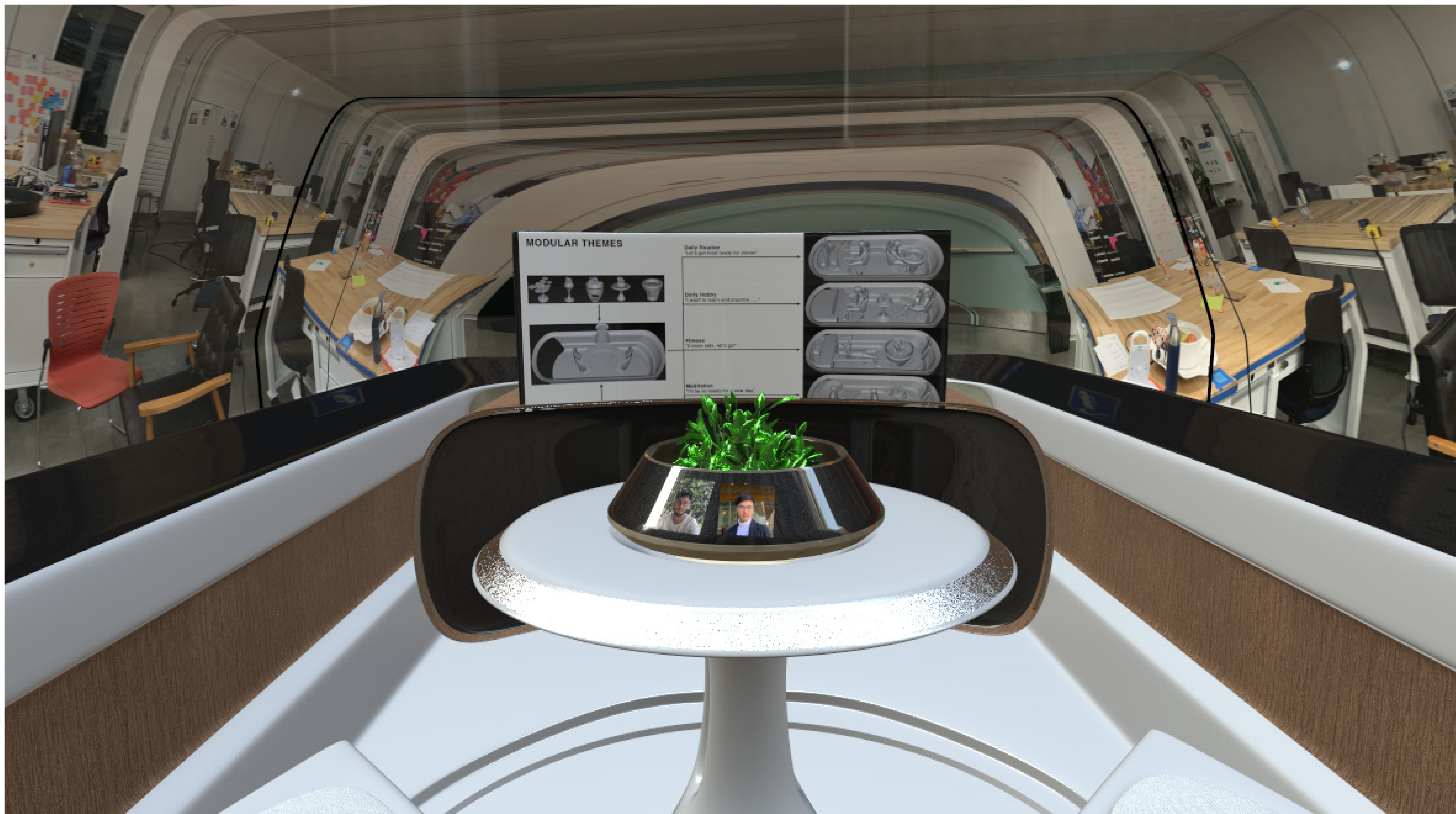
Ideation



3D modeling



Testing in VR



During different stage in the design process, models were imported in to Gravity Sketch for scale, proportion and general examination.

Interior

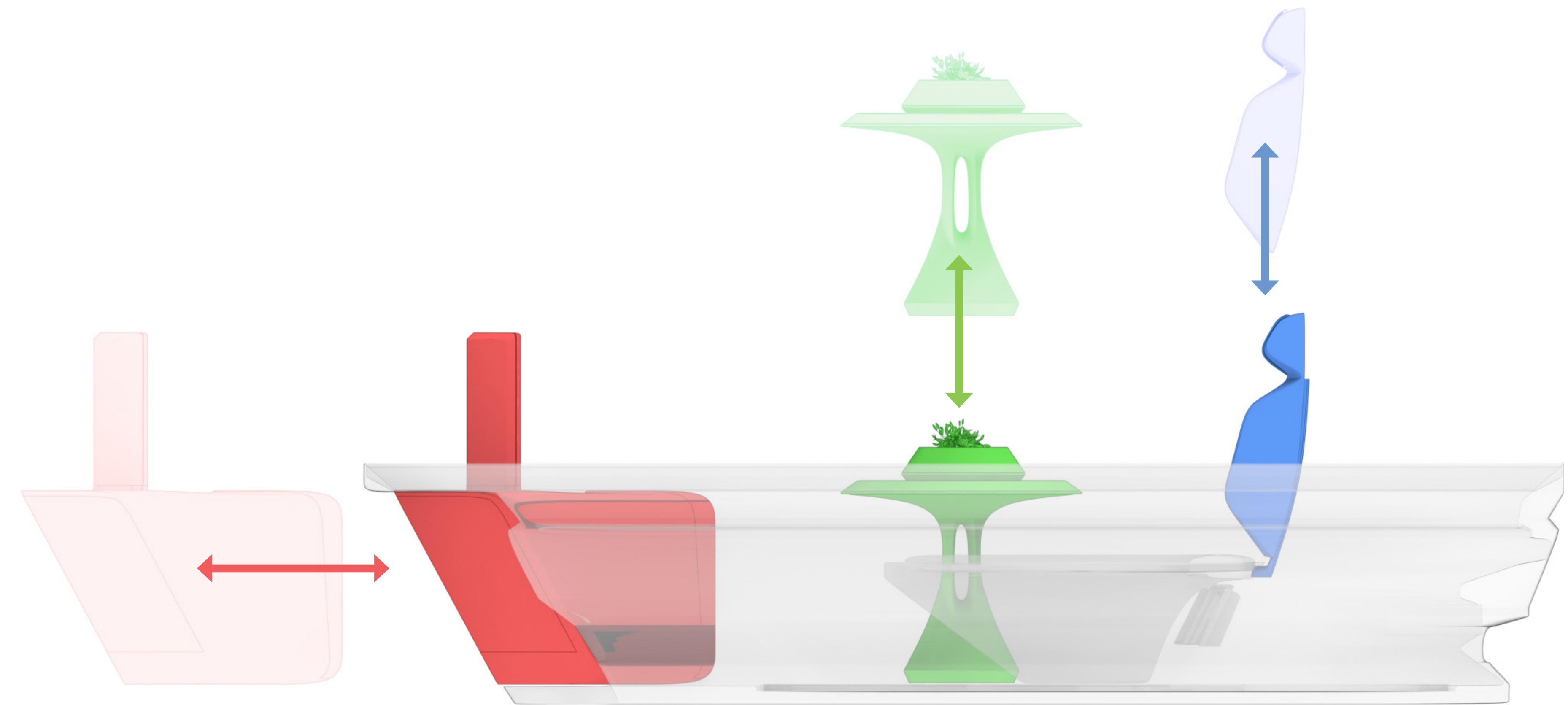
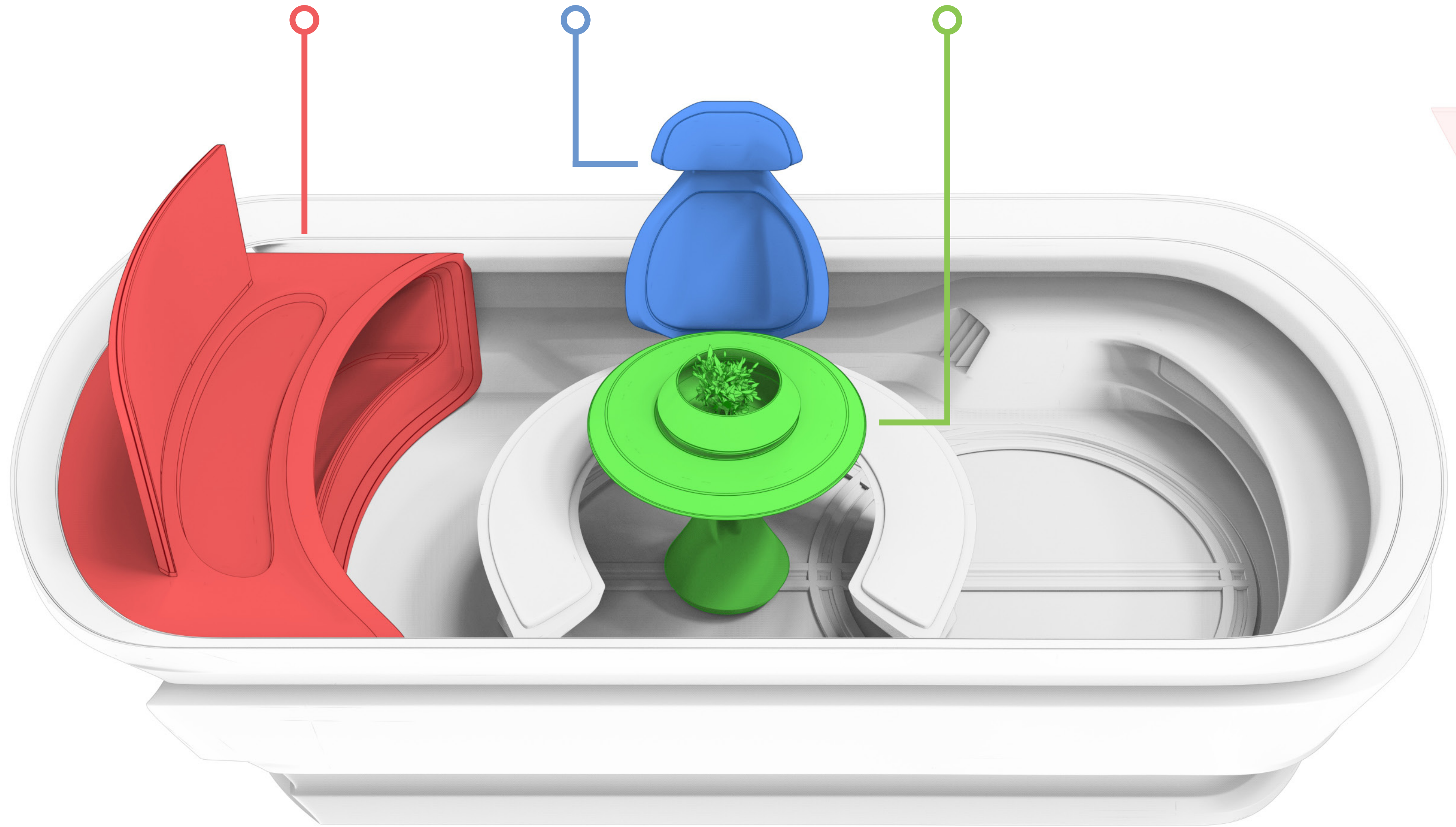


Modular Components

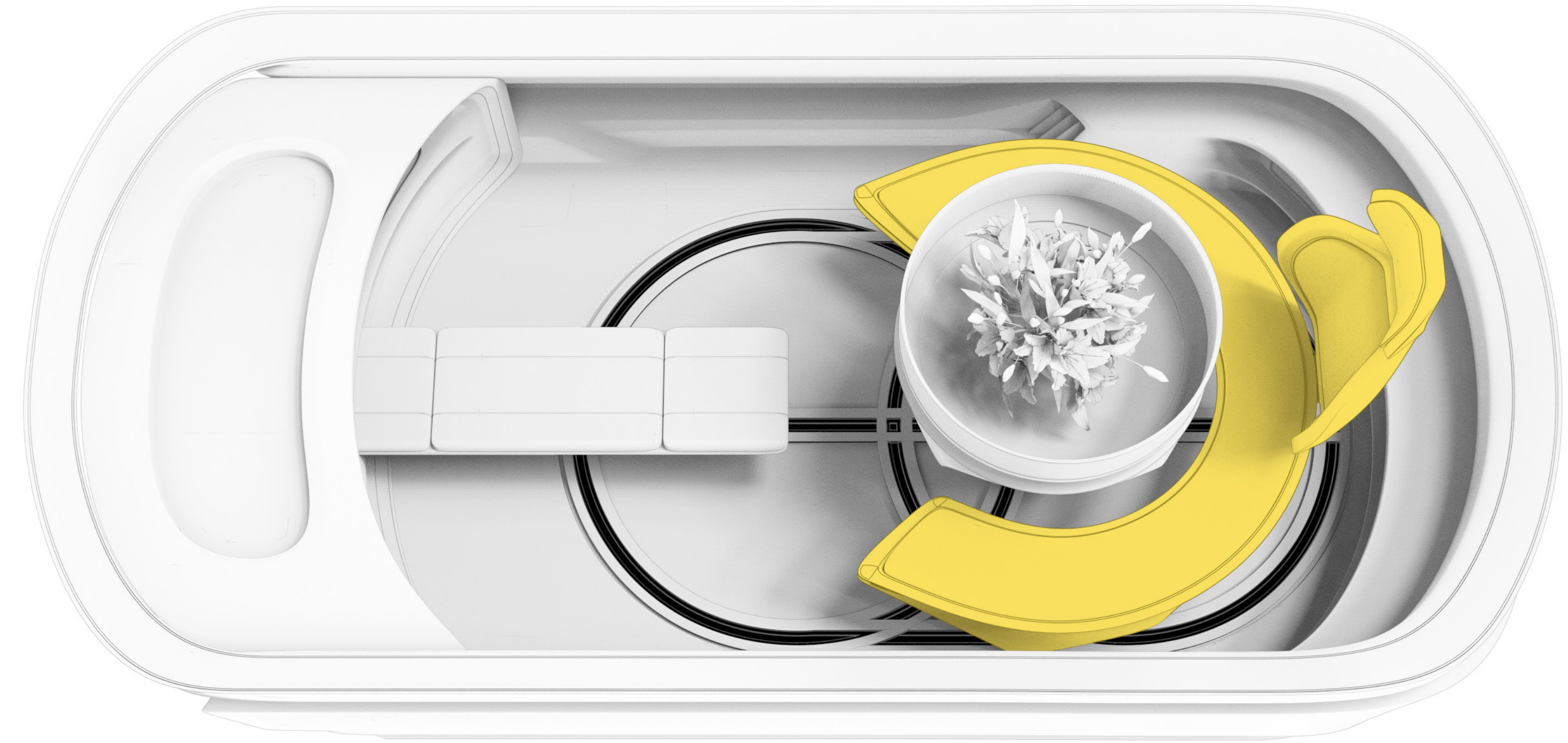
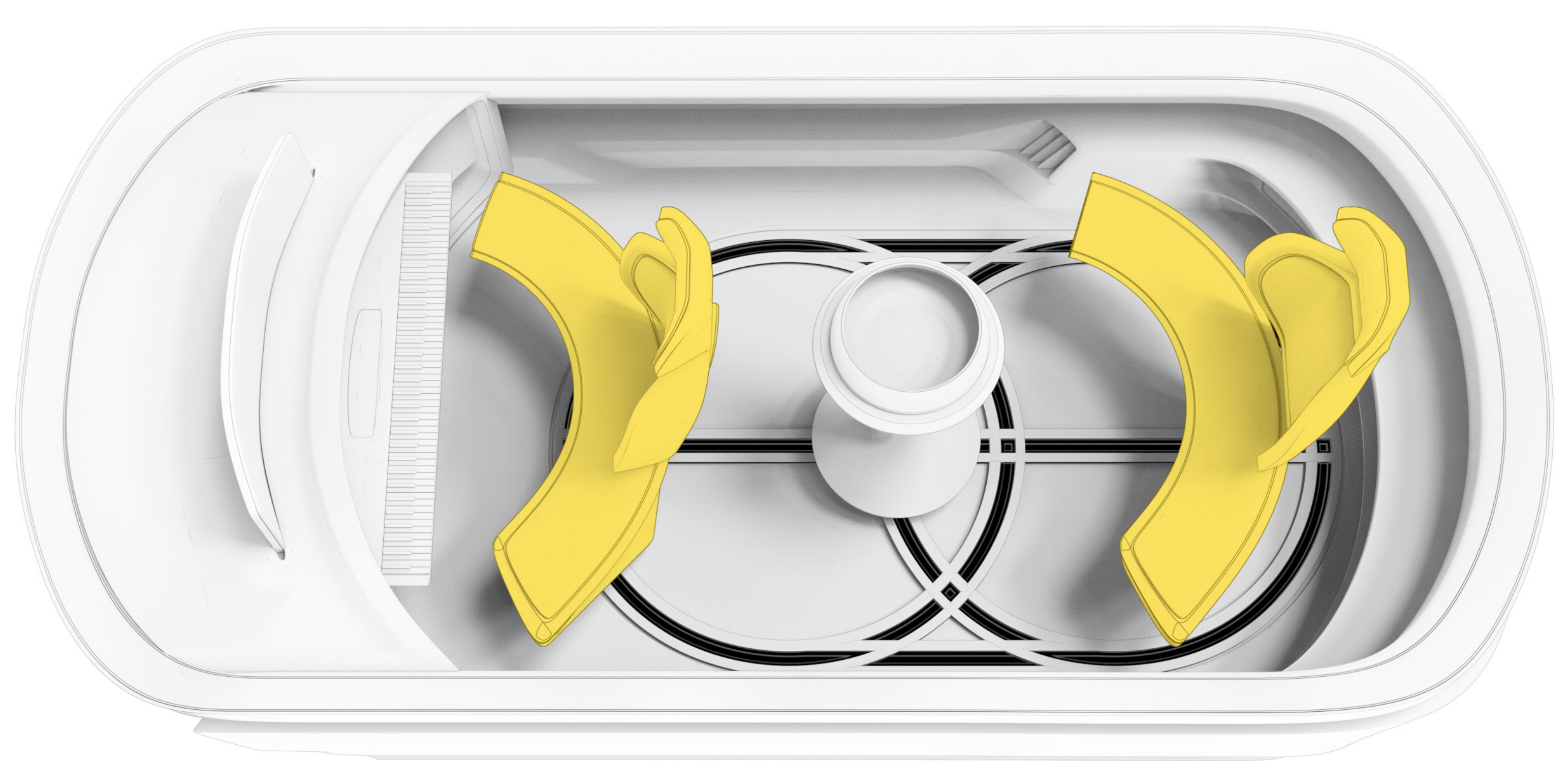
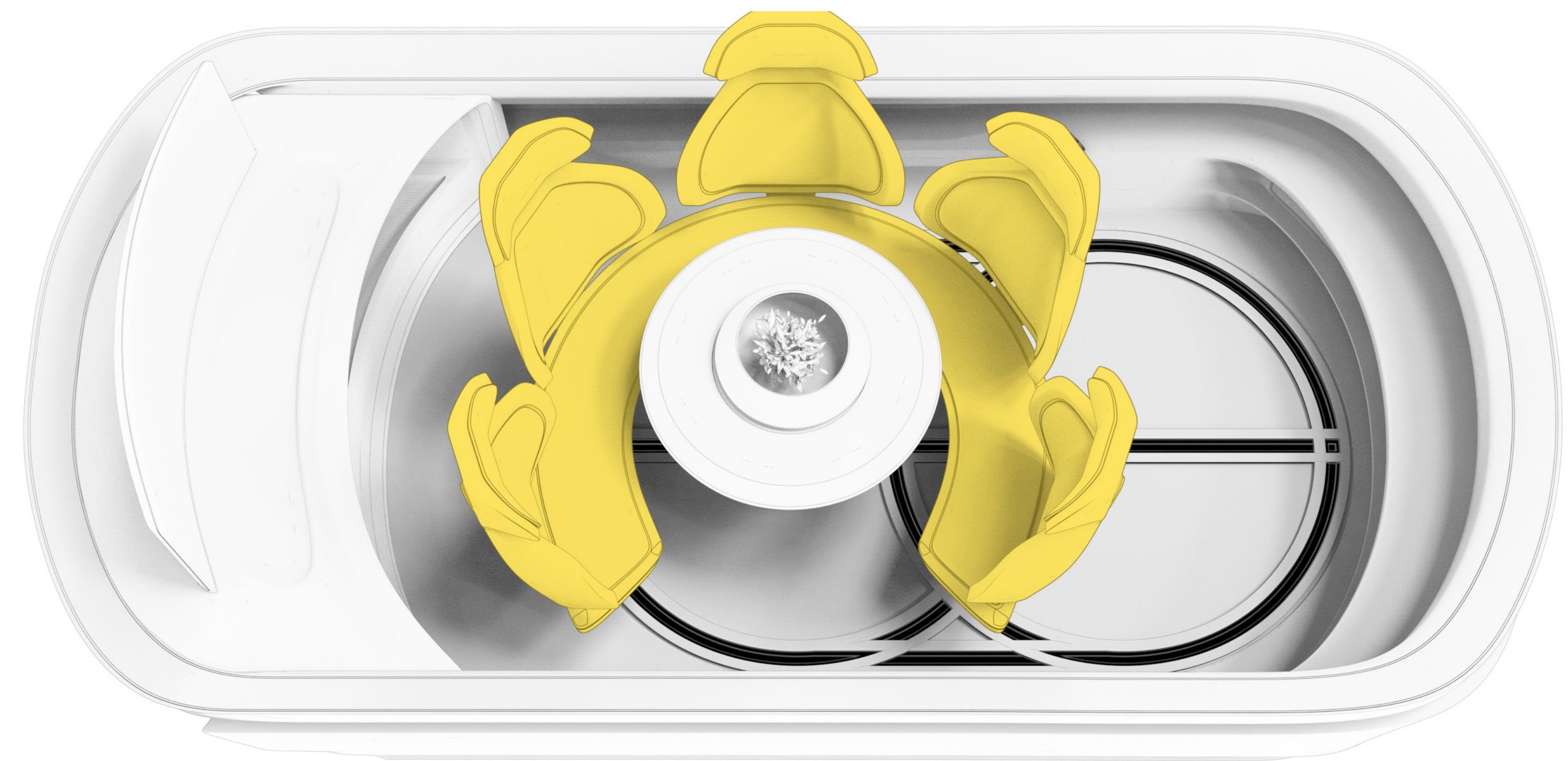
SECTION A
Multifunction module
Takes longer to change

SECTION B
Single module
Quick switch between trips

BACKREST
Quick switch according to the numbers
of passenger



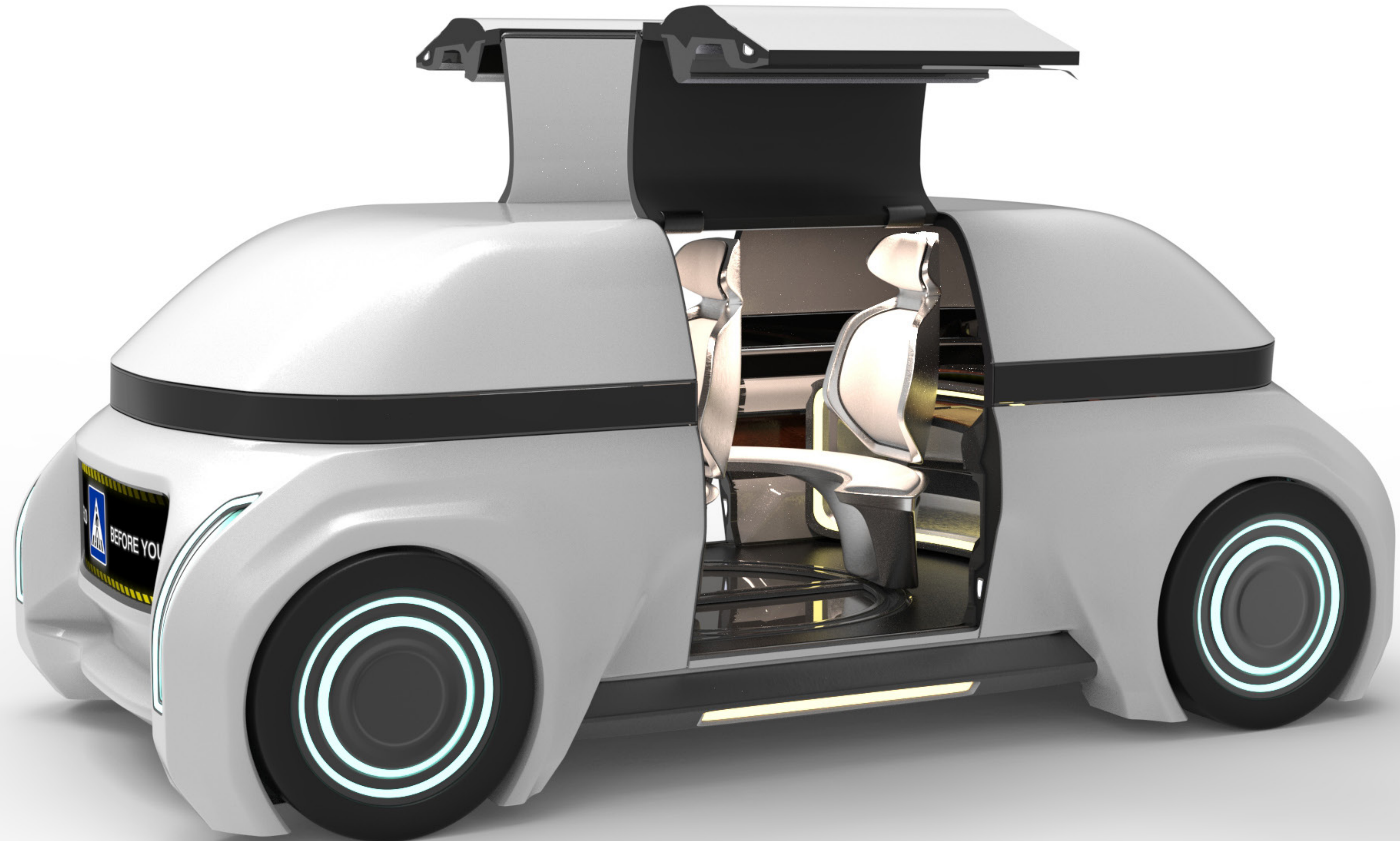
Modular Seats



Modular seating

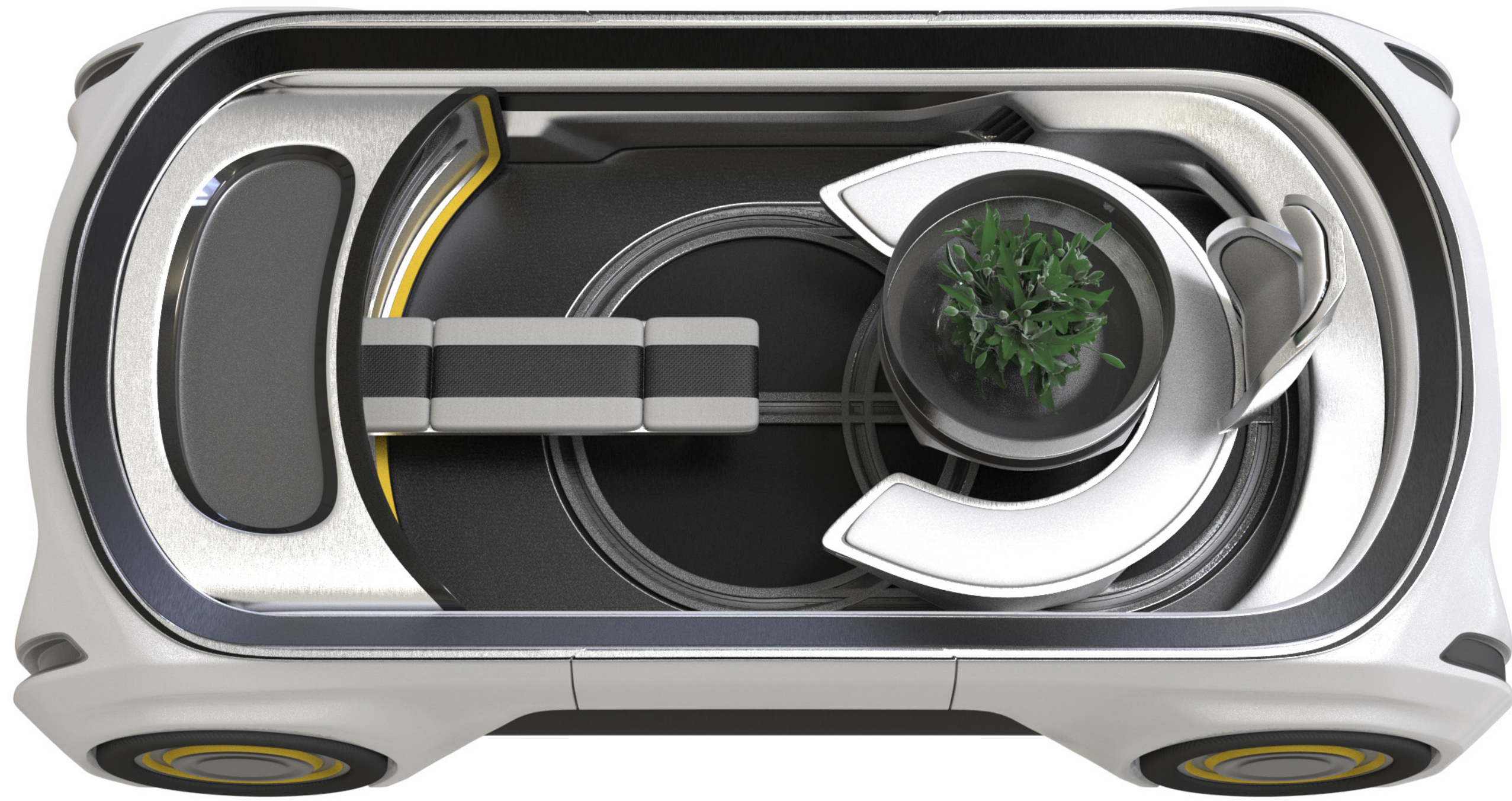
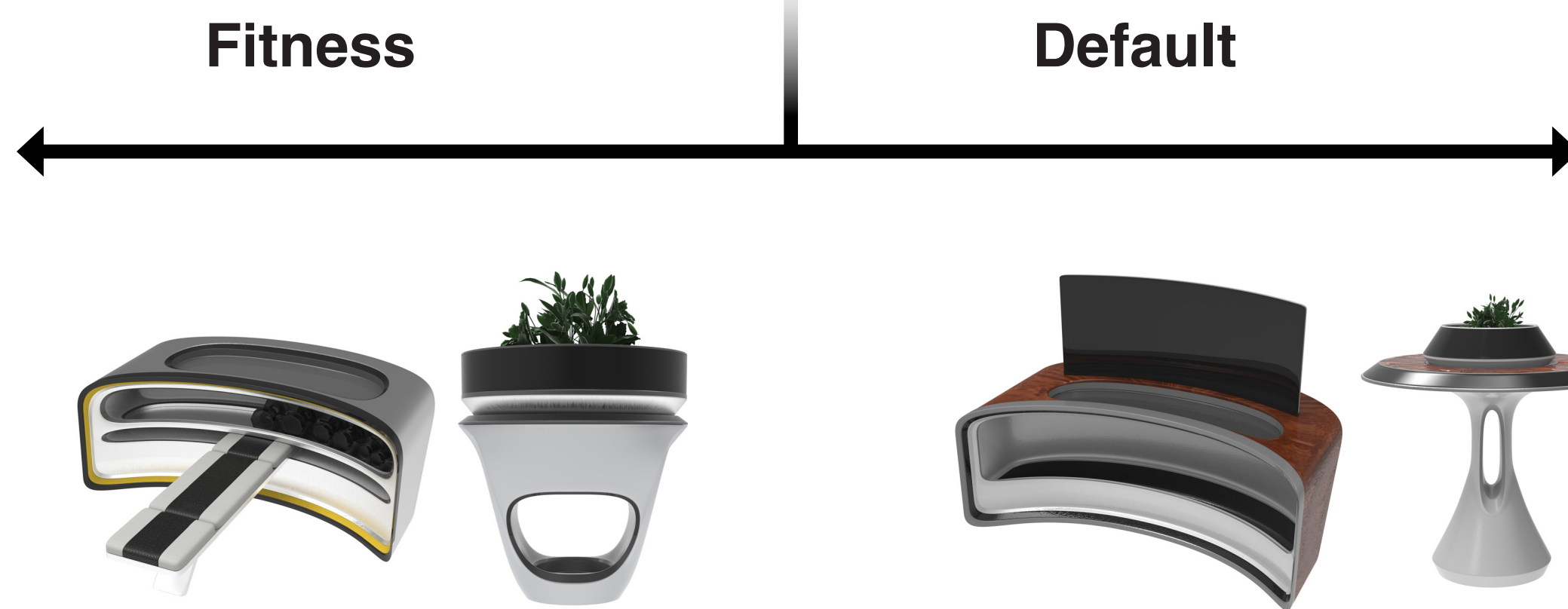
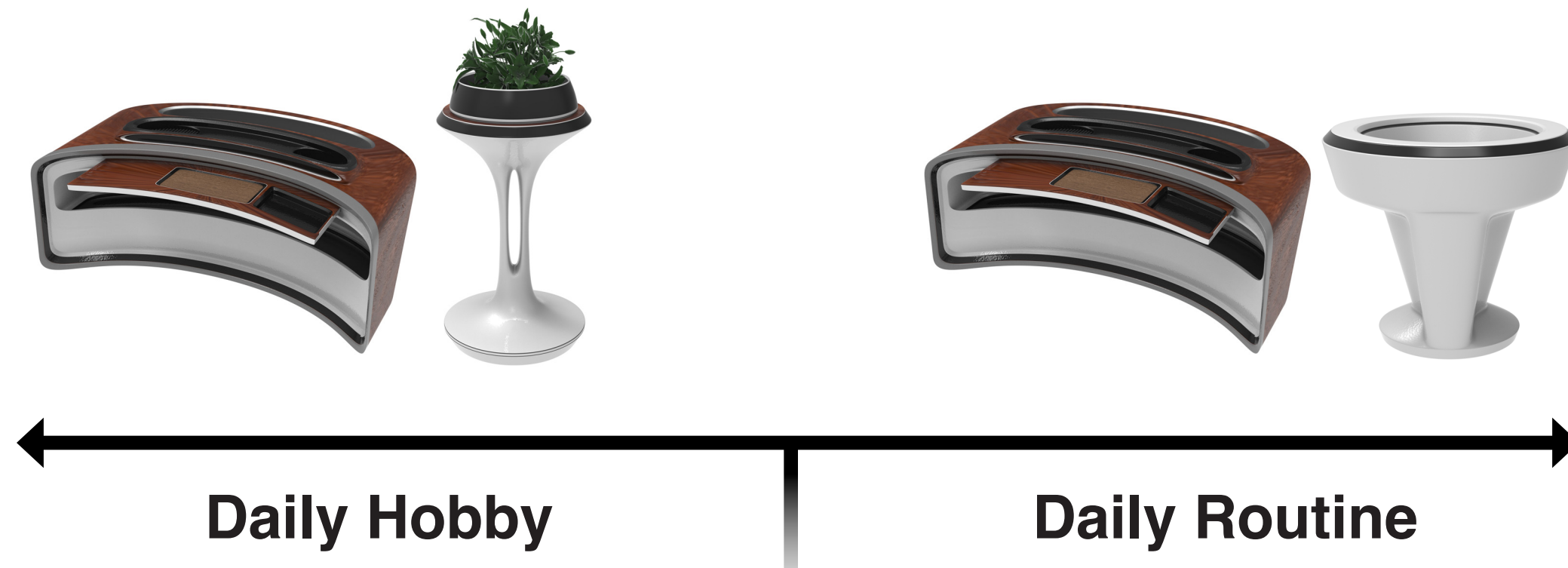
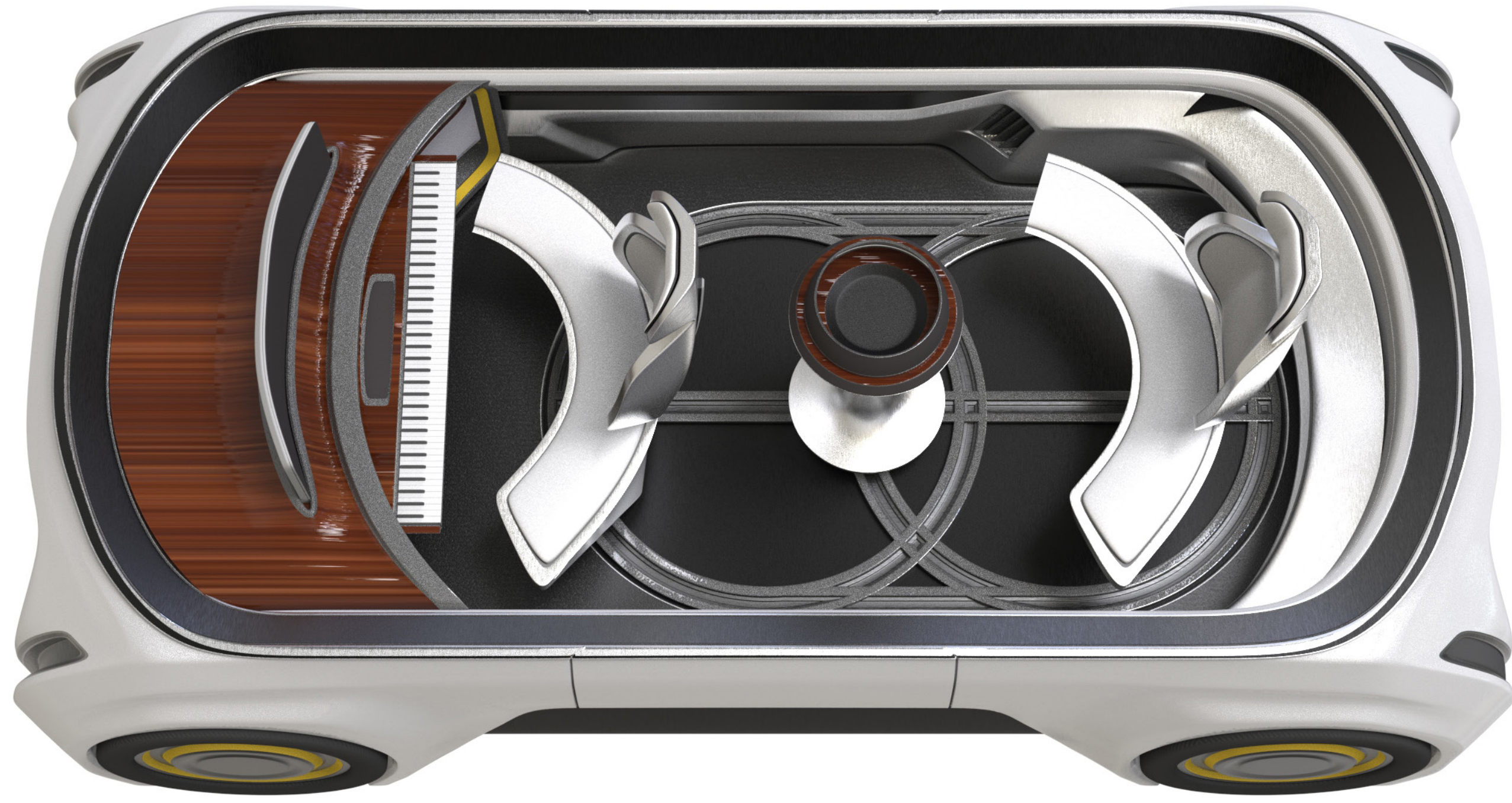
Uses can add up to 5 seats, have the seating panel rotate, move or split according to different need

Entrance & Exit

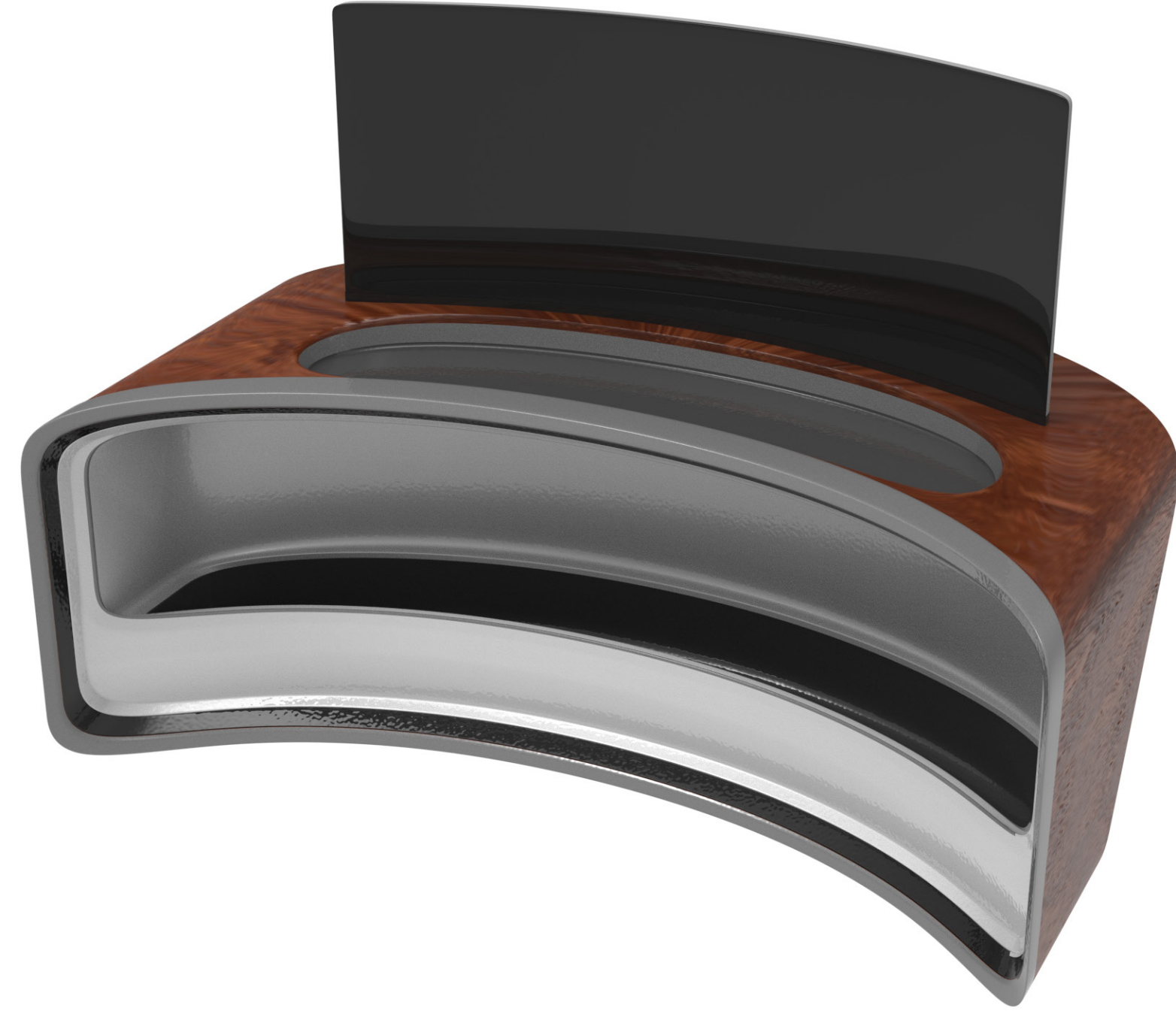
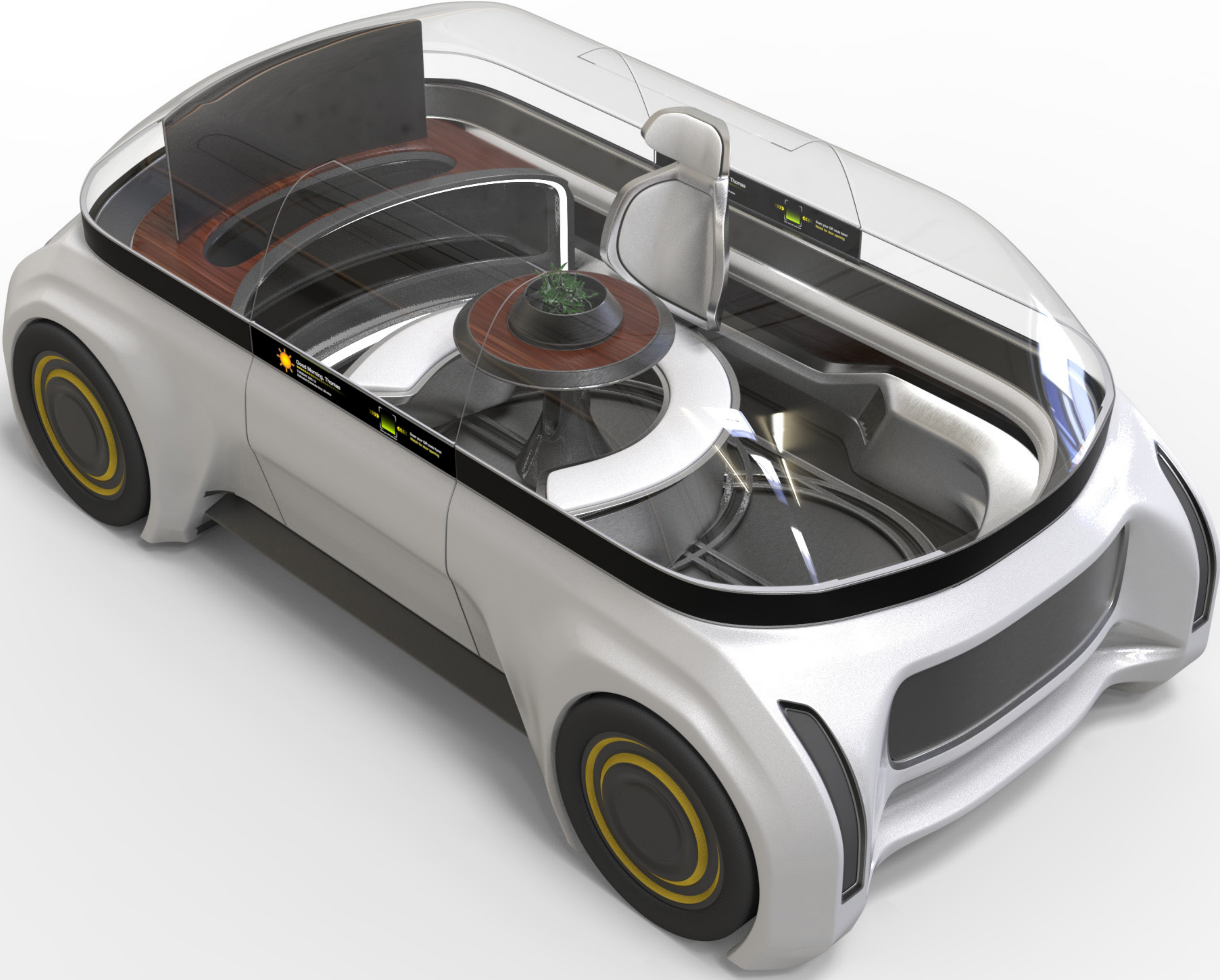


Door section

Upon scanning the QR code, the door will automatically open & close to allow users enter/exit the vehicle



Daily Routine Theme



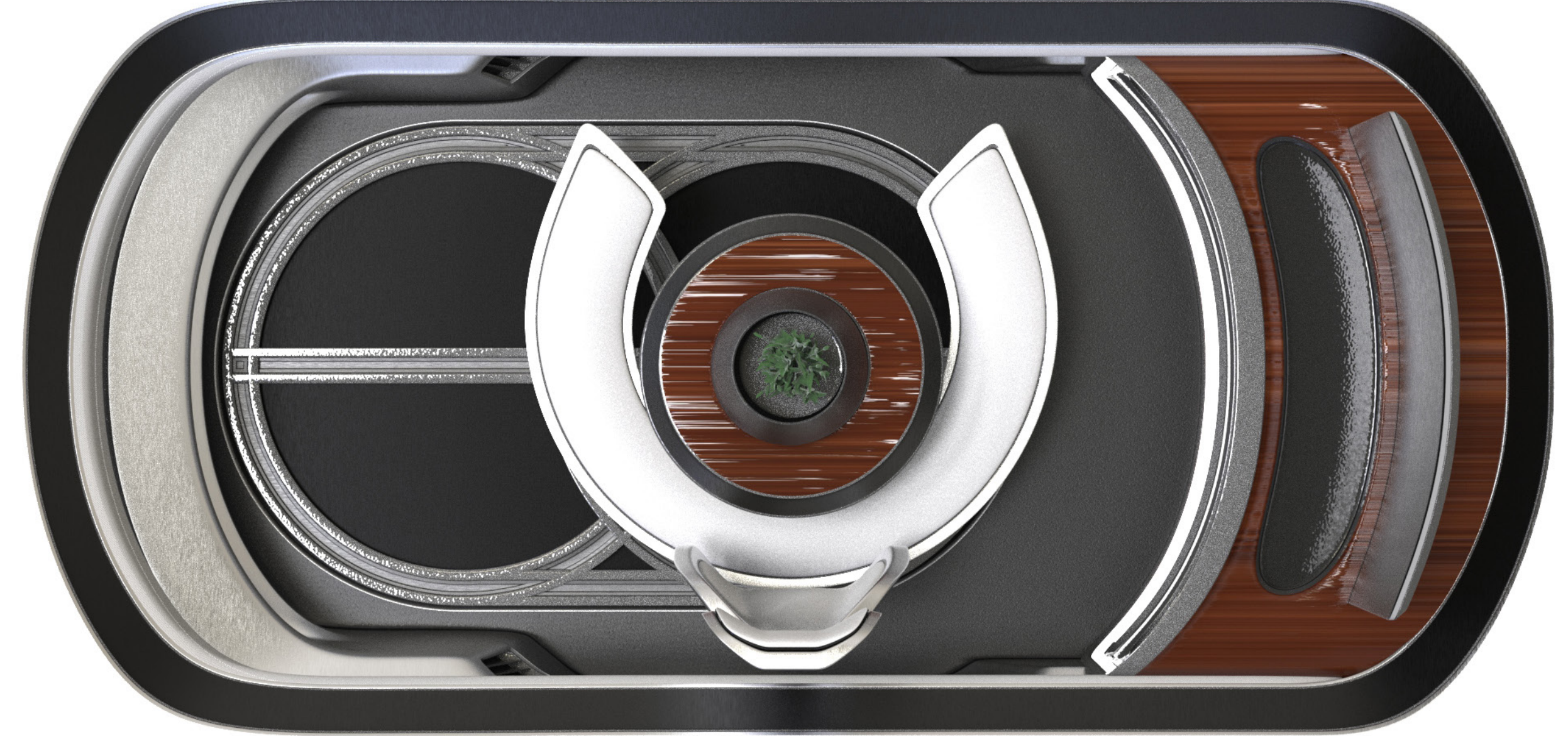
Module A

- Monitor
- Storage for bags/belongings

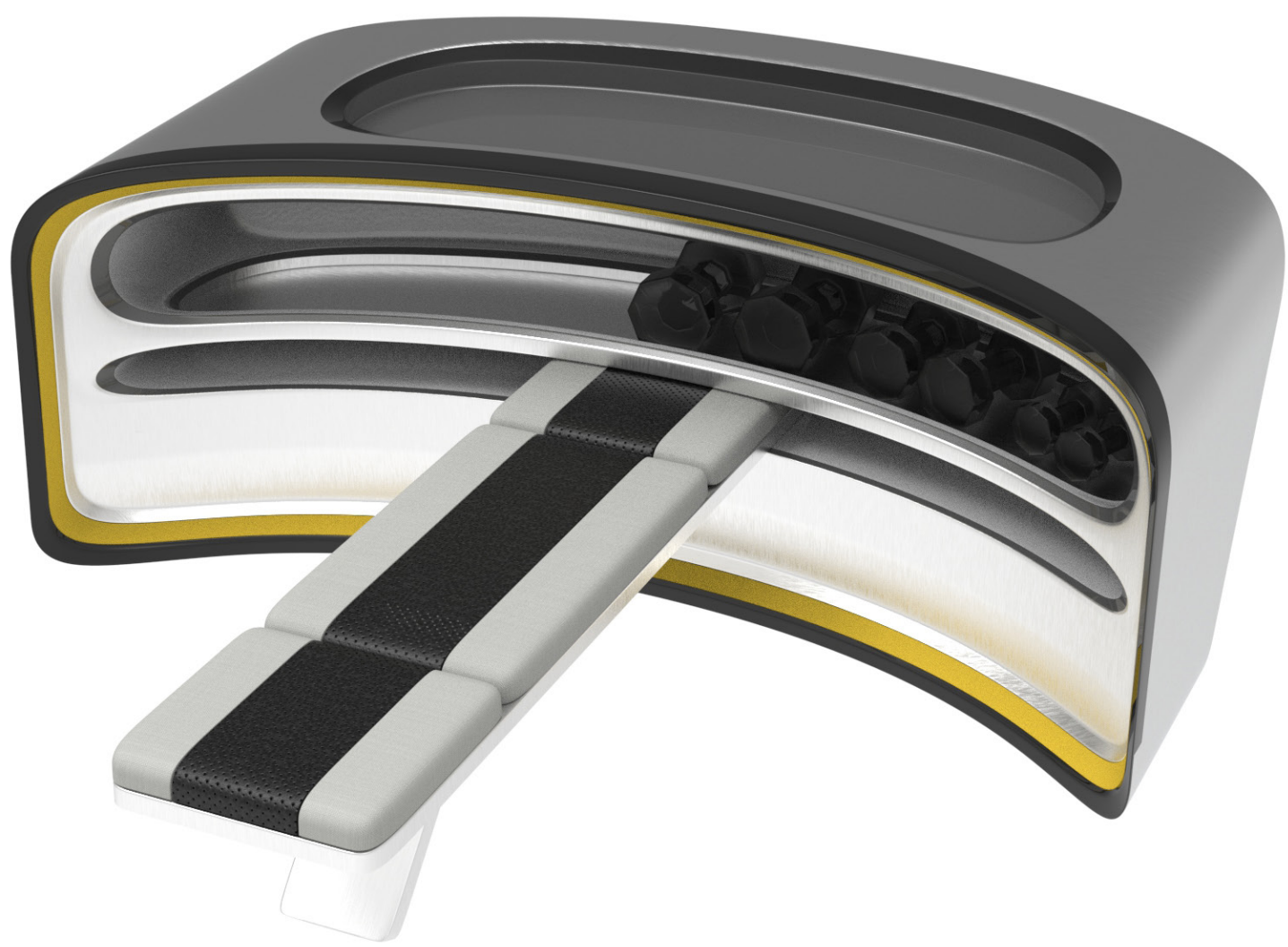


Module B

- Side table
- Control panel screen



Fitness Theme



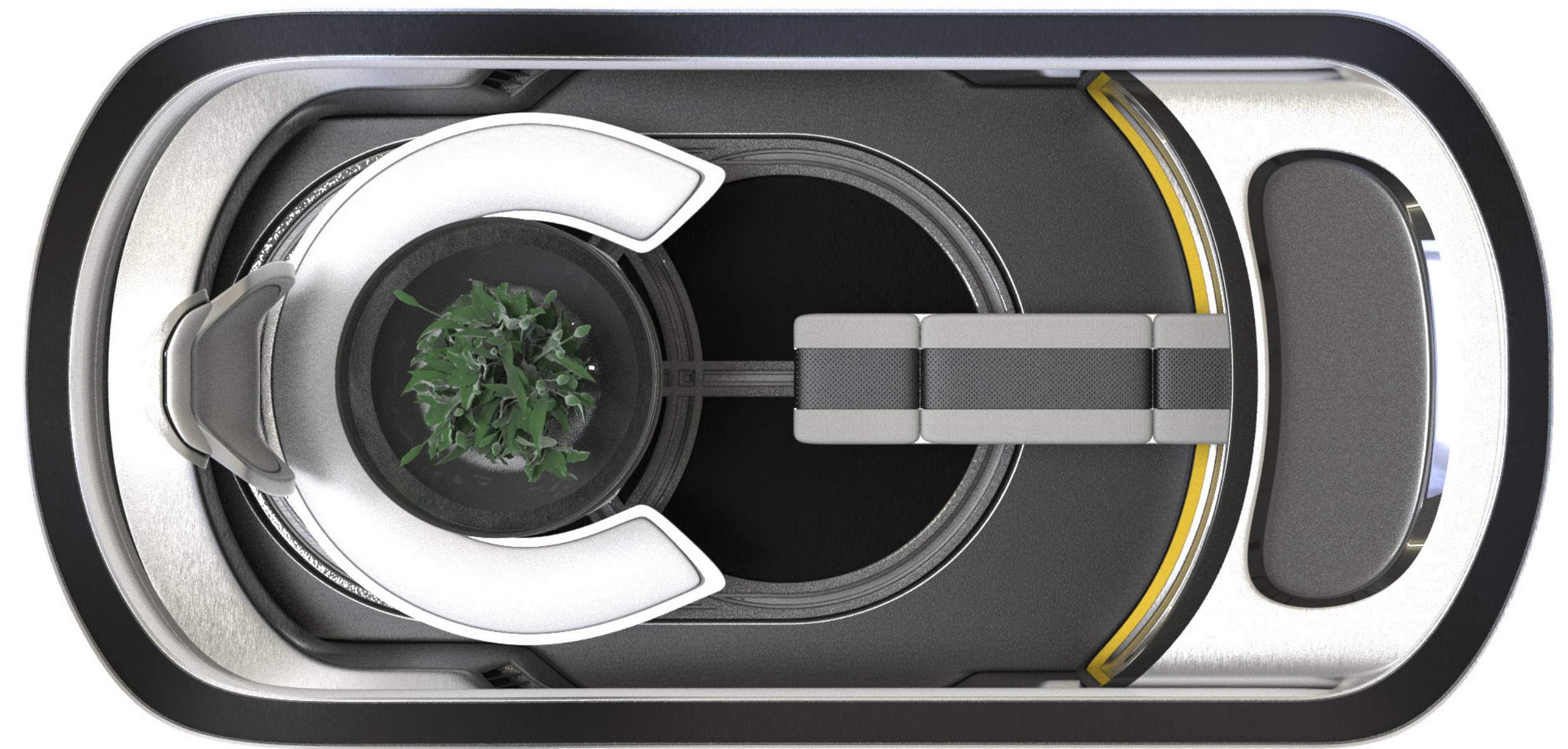
Module A

- Weight Bench
- Training equipments (Customizable)

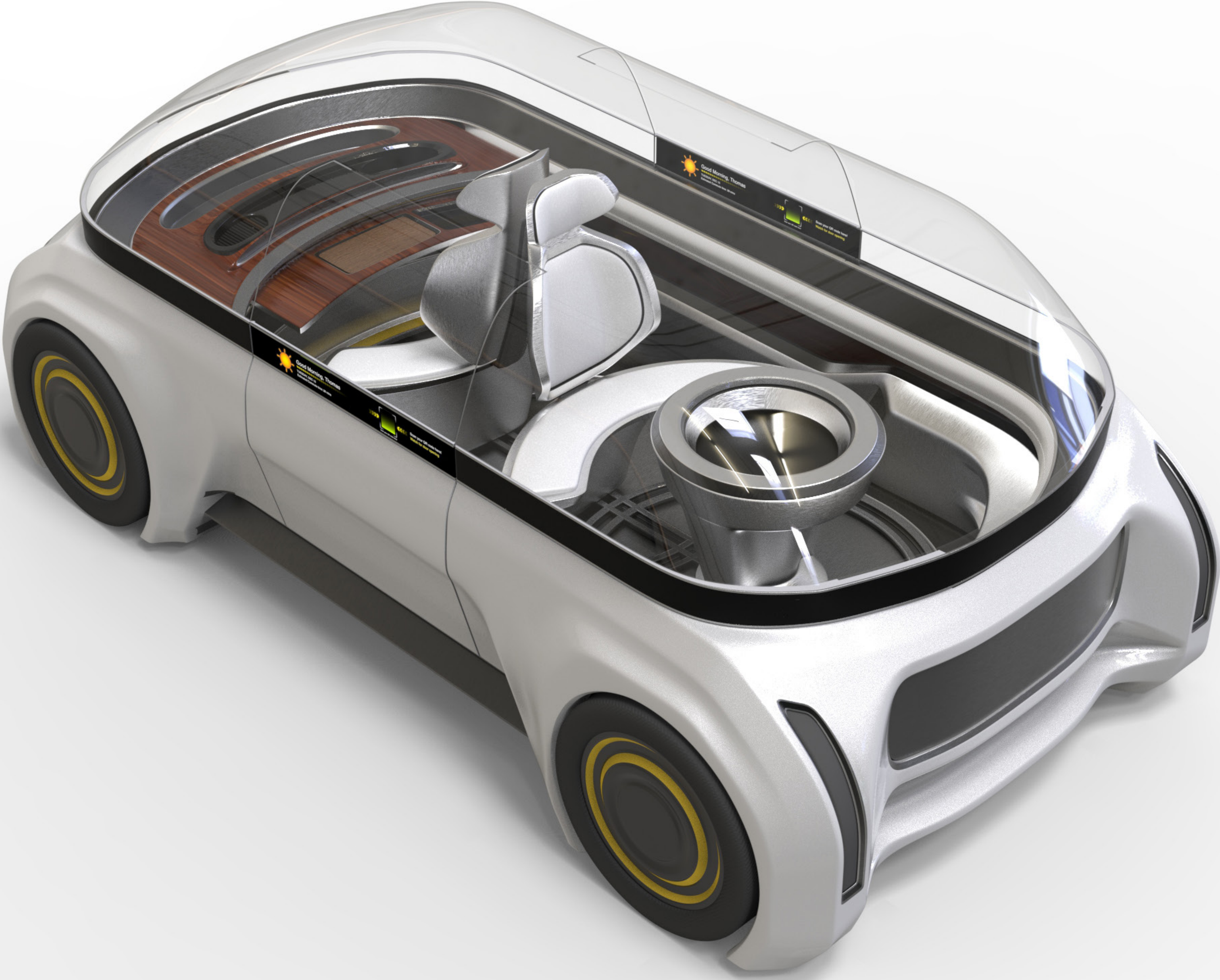


Module B

- Screen for training instruction/count down
- Personal belonging storage



Cooking Components



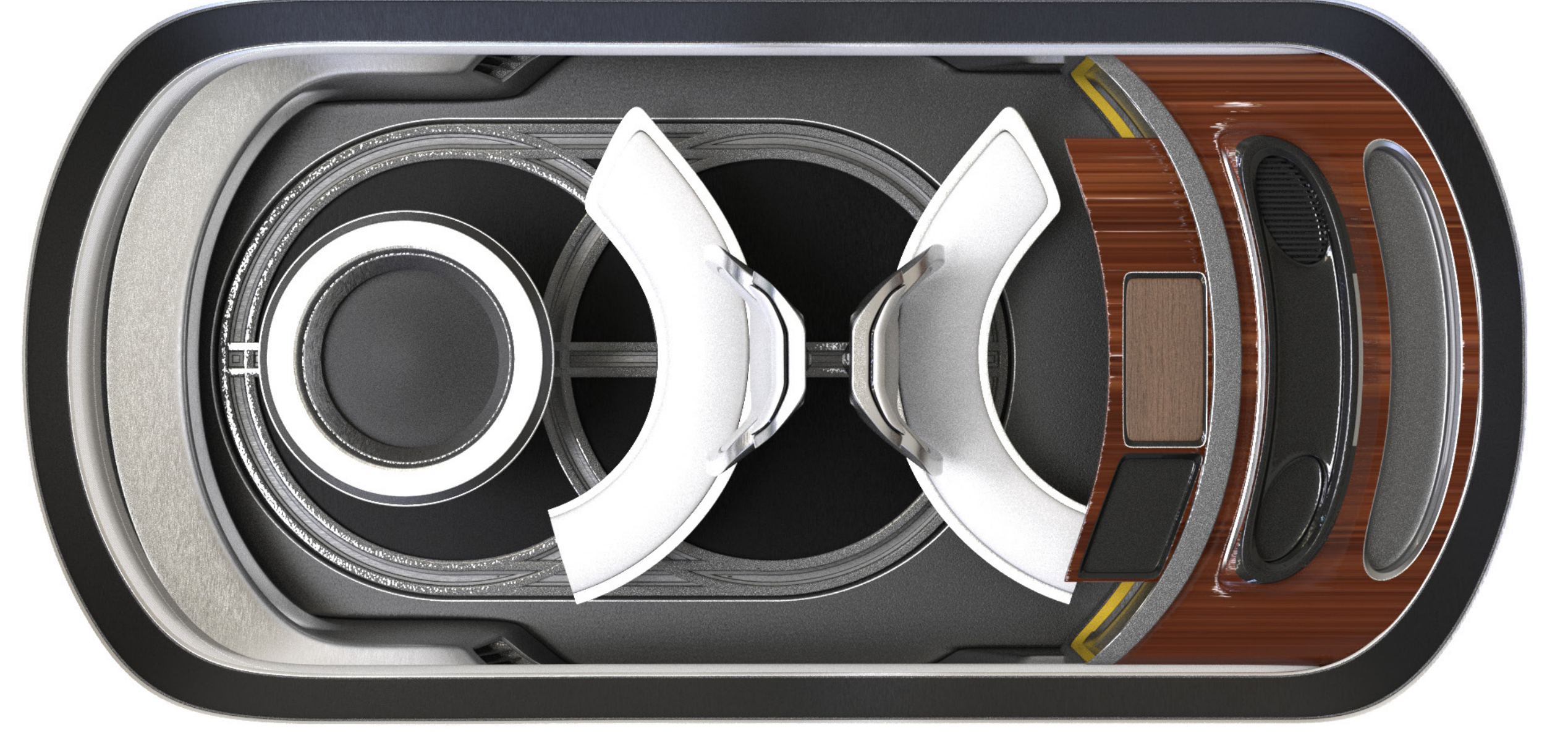
Module A

- Mini grill
- Mini pot
- Mini Stove
- Cutting board

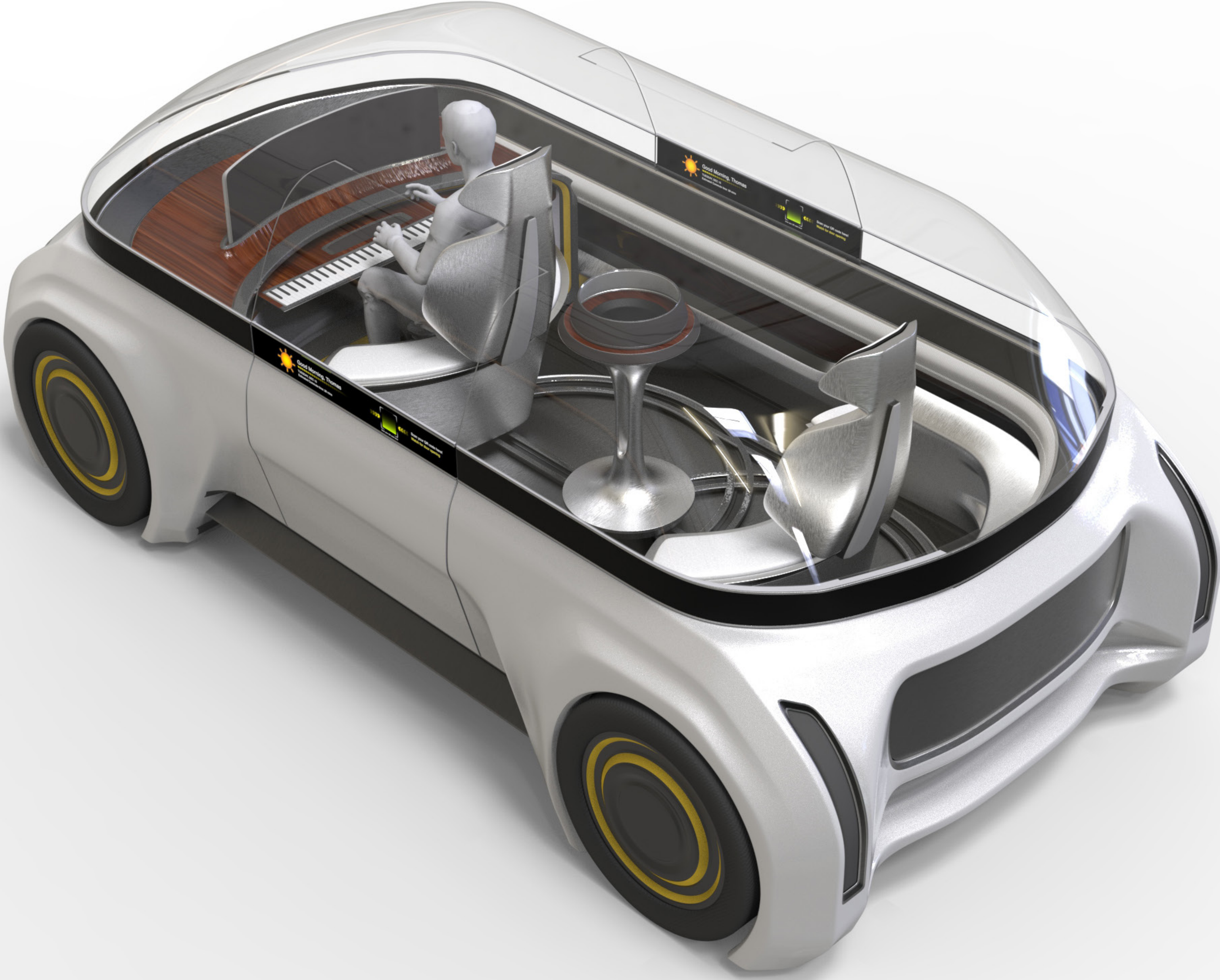


Module B

- Washer fountain



Daily Hobby Theme

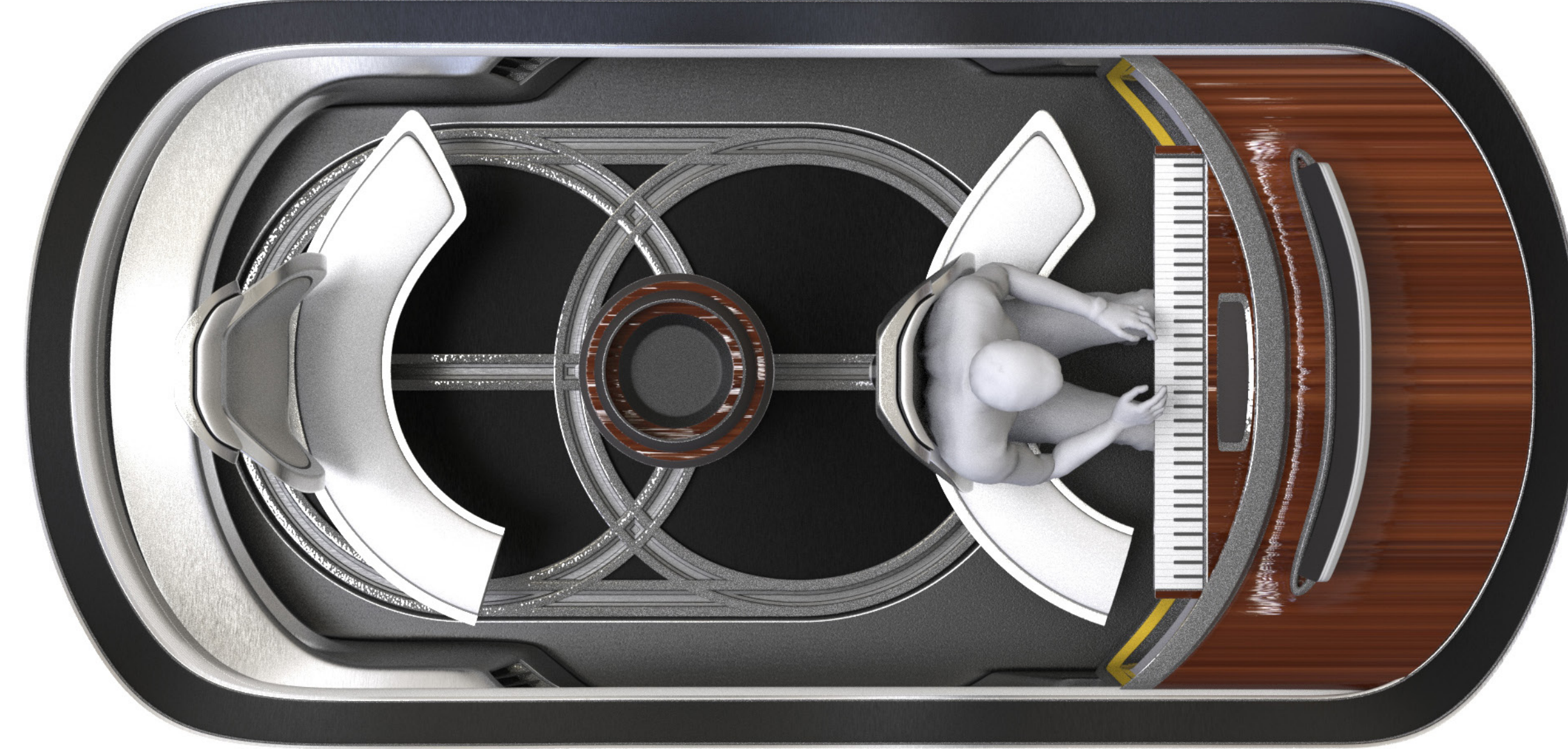


Importing to Unity

After the modeling, texturing, rigging, giving physics and animating, I imported the blender file into Unity. Then I scaled and positioned the models to the correct position within my marker.

Importing to Unity

After the modeling, texturing, rigging, giving physics and animating, I imported the blender file into Unity. Then I scaled and positioned the models to the correct position within my marker.



Front & Rear Indication

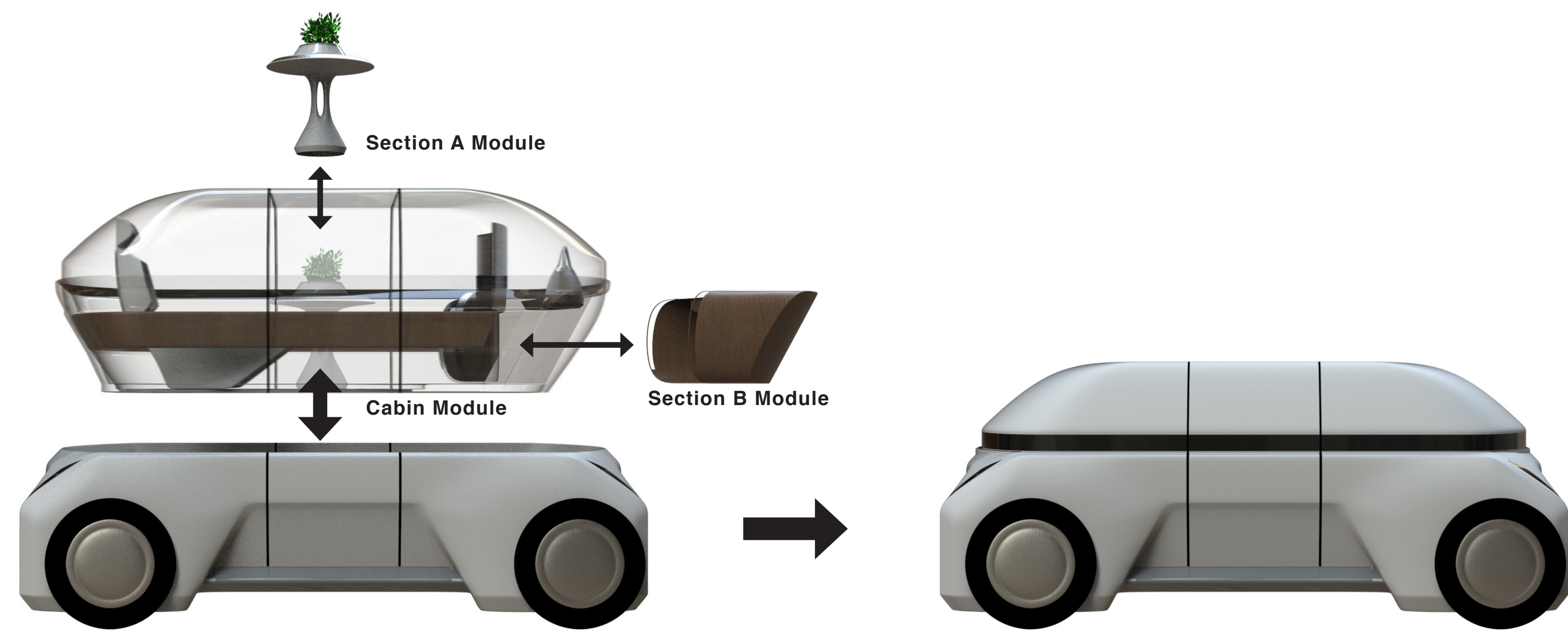


Information Panel

Screens located at both front and rear of the vehicle that communicate with pedestrians.



Exterior



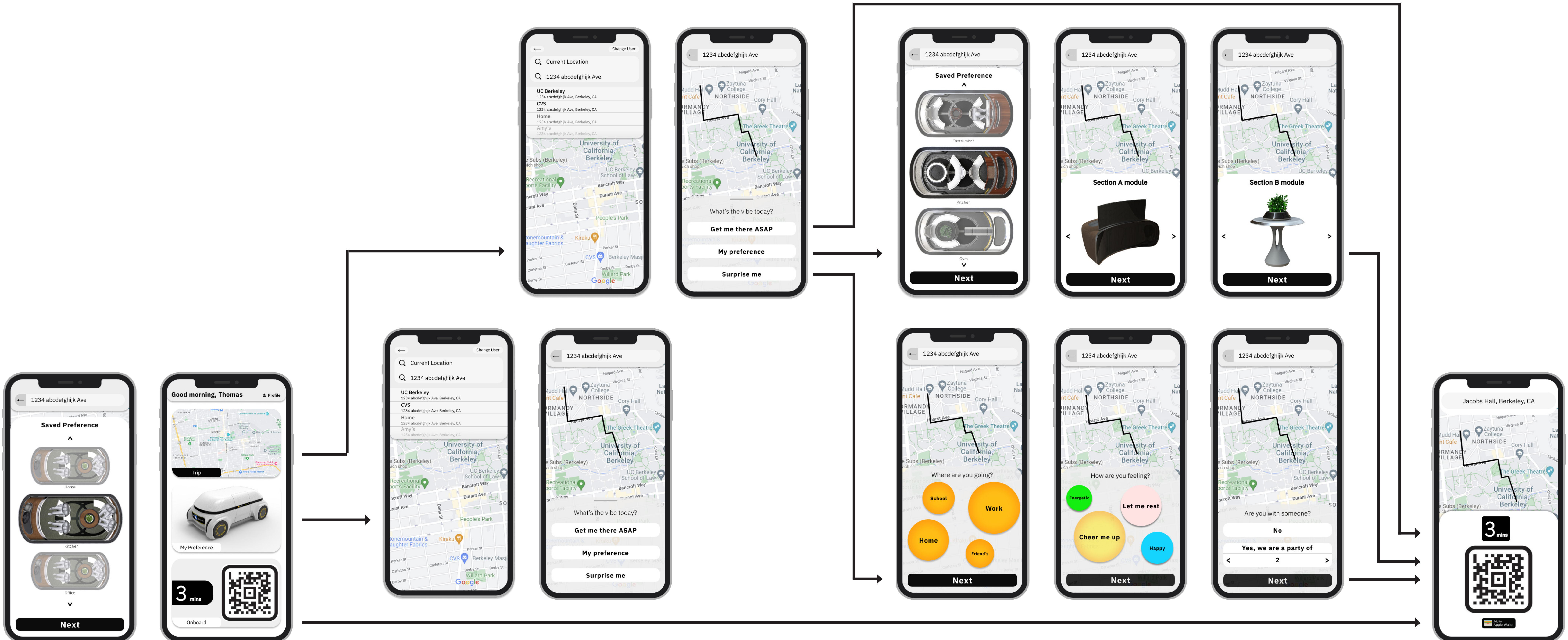
Symmetrical Design

Exterior screen panel

This central belt panel contains head & rear light indicating which way the vehicle is heading toward, boarding code and passenger greetings.



User Flow



Design@Large

Creative Digital Sculpting Intern-GM

Worked collaboratively with designers, sculptors, and engineers to interpret sketches and develop digital models of an automotive theme using established and emerging digital sculpting best practices and techniques.

Supported general sculpting assignments within studio environment.

WORK PENDING FOR APPROVAL



Thomas Chen

929-281-5828

EDUCATION

University of California, Berkeley
Master of Design

Expected Graduation Date: 12/2022

Berkeley, CA

Pratt Institute
Bachelor of Industrial Design
Minor in Sustainability

- Department Representative for Student Government (2019)
- President's List (2021)
- Dean's List (2018-2020)

Completed: 05/2021

New York, NY

HONORS & AWARDS

MDes Distinguished Scholar Award
University of California, Berkeley

2021

IDSA Student Merit Award
2021 Northeast District Student Merit Award Finalist

2021

International Design Award 2020
Silver Place

2021

Lexus Design Award 2021
Shortlisted Candidate

2020

European Product Design Award 2020
Top Design winner in Industrial and Life Science Design
Winner in Safety Design (Student Category)

2020

Hong Kong Design Awards
Gold Place

2020

NASA Wearable Technology Project
Pratt Institute & NASA Johnson Space Center

2020

Lexus Design Award 2020
Shortlisted Candidate

2019

WORK EXPERIENCE

Creative Digital Sculpting Intern
General Motors Company-Cadillac

05/2022-08/2022

GM Global Technical Center-Design Ctr, Warren, MI

- Worked collaboratively with designers, sculptors, and engineers to interpret sketches and develop digital models of an automotive theme using established and emerging digital sculpting best practices and techniques.
- Supported general sculpting assignments within studio environment.

Product Design Engineering Intern
Candylab Toys

01/2021-5/2021

New York, NY

- Designed and engineered custom toy cars in collaboration with brands such as Starbucks Reserve (currently on sale), Rivian, Jimmy's coffee, etc.
- Designed and prototyped the company's best-selling lines of toy cars. (2D + 3D).
- Engineered all designs, created production-ready technical drawings for mass production and examined samples sent back from factories.
- Partially engineered the company's autonomous production and assembly lines.

Industrial & Mechanical Designer
Brooklyn Navy Yard-Consortium for Research and Robotics

01/2020-01/2021

New York, NY

- Designed and prototyped components & tool heads for ABB robots with CNC machining, 3D Printing, laser cutting, wood and metal fabrication.
- Translated existing/source tool heads (CNC Spindle Motor, sheet metal forming tool, pneumatic gripper, etc.) into high precision CAD models for various robotic operations.
- Provided technical support and logistics to consortium educators. Brought together education and industry for technology-driven research, small business incubation and STEM programs.
- Developed and maintained promotional content, both video and image-based.

SKILLS

Computer Software

CAD & Analysis: Solidworks, Rhino, Fusion 360.
Nurb Modeling: Alias
SubD Modeling: Alias SubD, Maya, Blender
Adobe Creative Suite: Ps, Ai, Pr, Id, Lr, Ae.
Microsoft Office tools: Teams, Word, Excel, PowerPoint.
UI/UX: Figma, Miro, Mural, Android Studio, Webflow.
Animation & Visualization: Alias Visualization, Vred, KeyShot, Cinema 4D, Unity, Blender, Maya.

Design Skills

Industrial Design: DFA, DFM, Process flow, Tech pack & Technical drawings; CAD engineering: Product visualization/Rendering; Manufacturing processes, Rapid prototyping, Mood board, Storytelling, Paper engineering; Freehand sketching, Retouching, Sample examination.

Graphic Design: Color theory, Composition, Hierarchy, Typography, Branding, Website design, Illustration, Social media promotion.

Research: Customer research, Market research, Competitive analysis, User test, life cycle analysis.

Prototyping

Wood & Metal fabrication (Hand/Power tools & machines); Molding & Casting; CNC machining; 3D printing & scanning; Laser cutting, Vacuum forming, Robotic fabrication, Foam prototyping.

CERTIFICATE

G-60 Operation of Flammable Gases
New York City Fire Department