

# PORTFOLIO INDUSTRIAL DESIGN

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2023

CRAMBON STUDIO

## O1 FAZZ

Multifunctional fitness equipment for the people with lower limb disabilities

## O2 X-FLOAT

Unmanned maritime search and rescue aircraft

## O3 SYNTHROOM

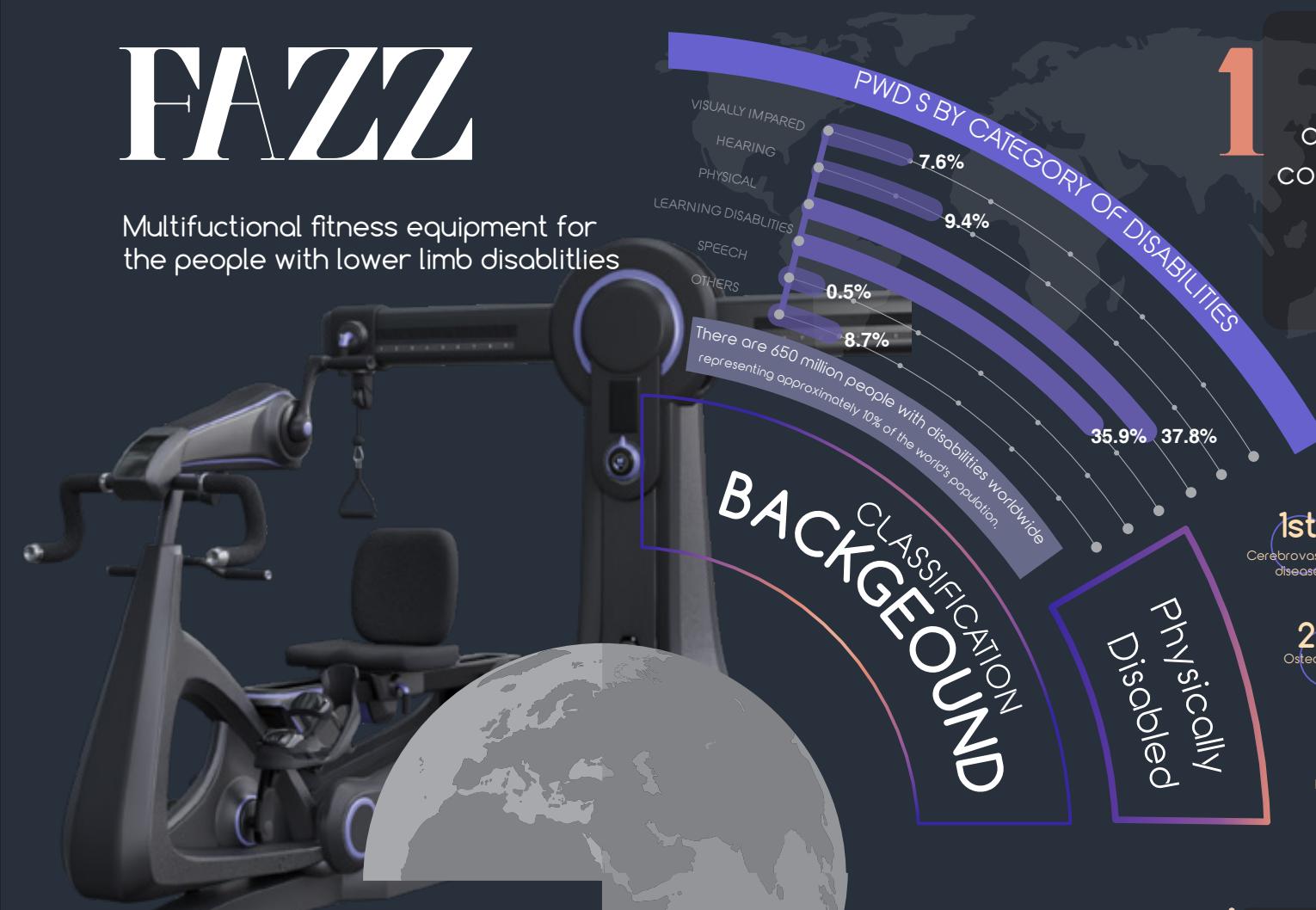
An interactive space that calls for people to address extreme heatwave issues

## O4 HUGCHAIR

Semi-automatic cuddle chair for relieving mental stress and negative emotions

# FAZZ

## Multifunctional fitness equipment for the people with lower limb disabilities

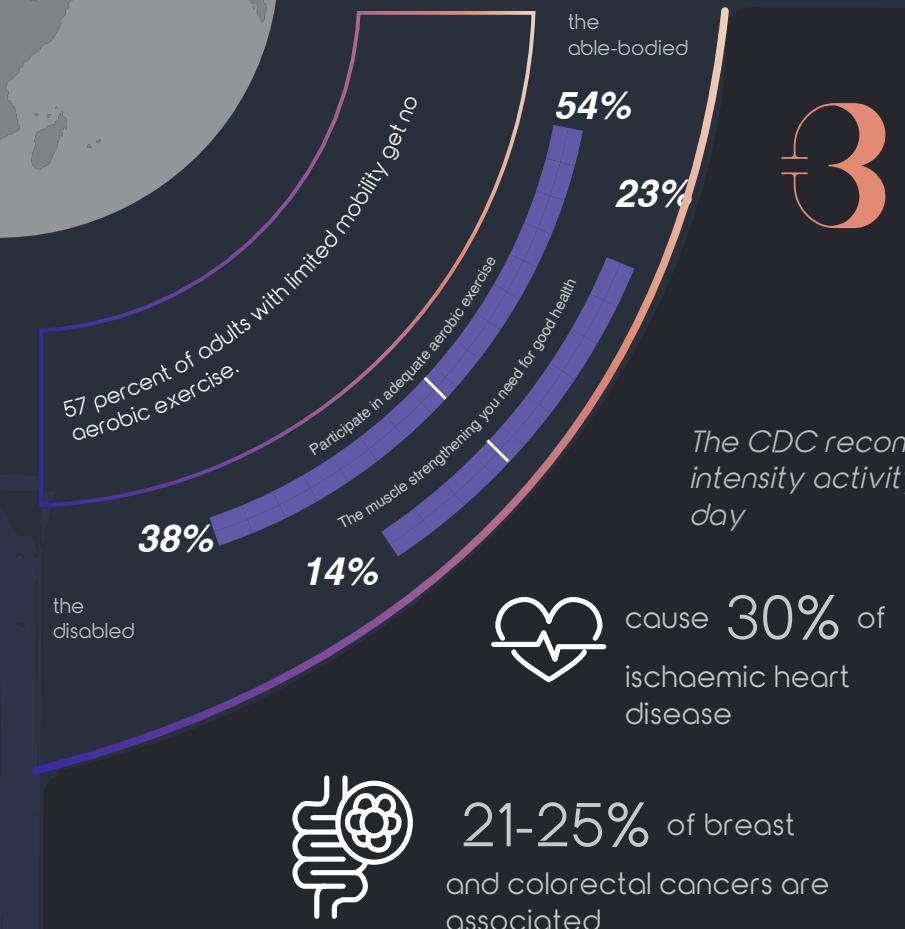


# DISABLED INDIVIDUAL

There are 650 million people with disabilities worldwide, representing approximately 10% of the world's population.

There are often barriers that prevent individuals with disabilities from getting the recommended amount of physical activity.

- Lack of Knowledge
  - Social Anxiety
  - Physical Limitations



**Lack Of Exercise** is  
a serious threat to the  
**Health** of people with  
disabilities.

*The CDC recommends 30-40 minutes of moderate intensity activity or 20 minutes of vigorous activity per day*



**27%** of diabetes  
linked to physical  
inactivity.



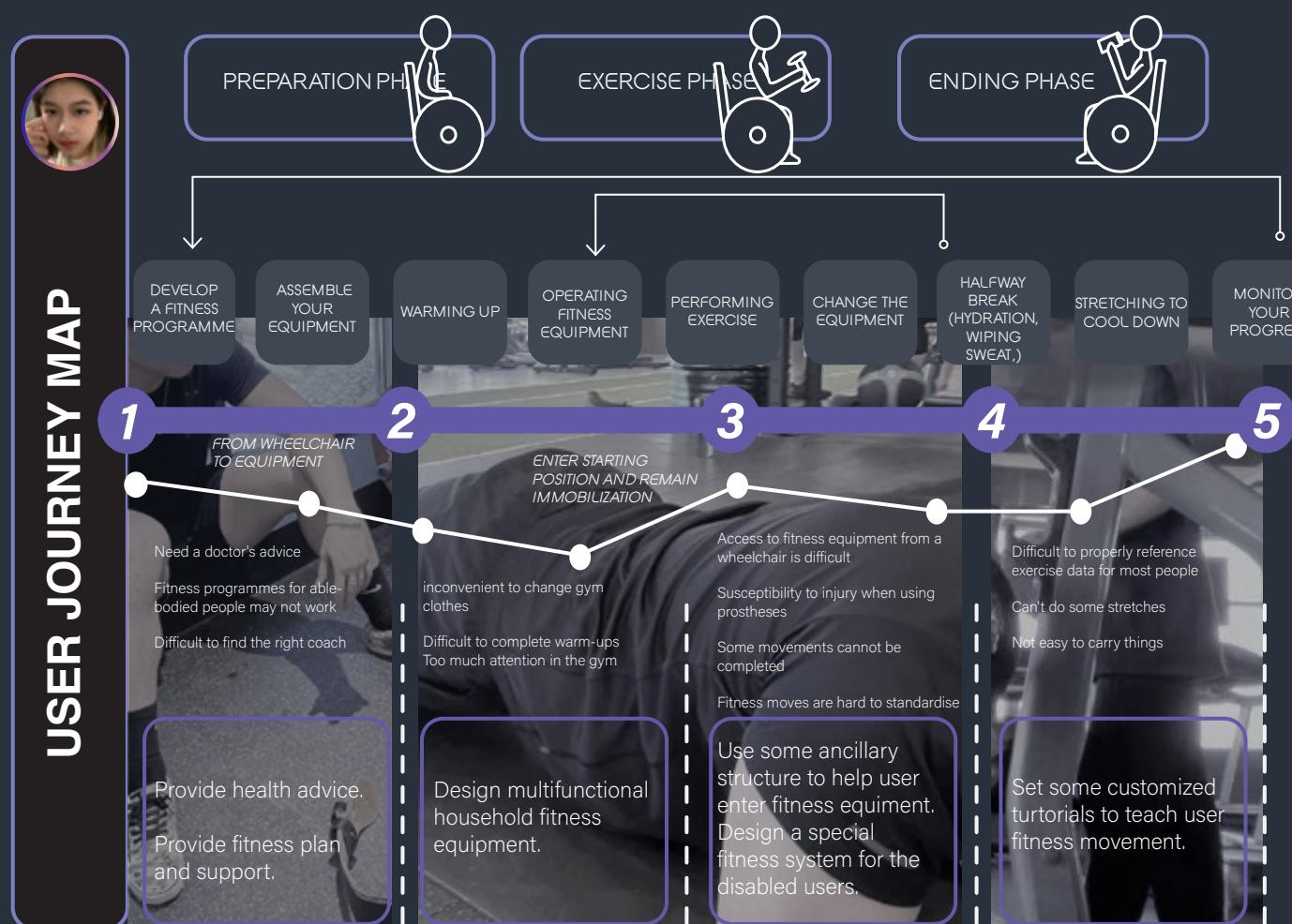
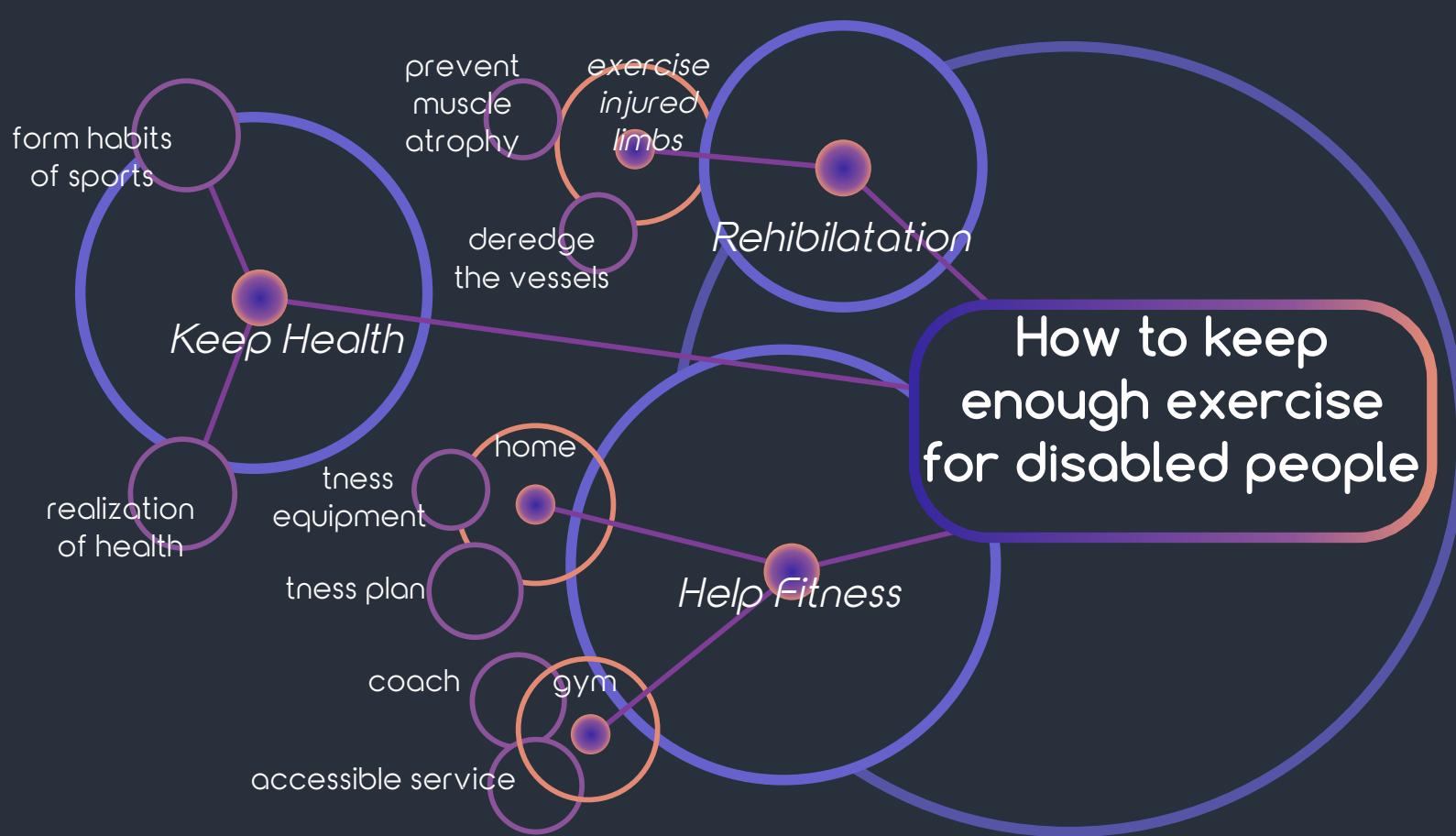
6% of annual mortality is associated with physical inactivity



**Therefore, people with disabilities  
Need to do  
More Exercise**



# BRAINSTORM



# SKEETCH DISPLAY

Parts Evolution

Transform Analyse

Recumbent Bike + Rowing Machine

+ Free Trainer

Combination

exercise bike

Final Form

Plan B

Reclining bike

A form

adjustable

B form

Width

Length

# PROTOTYPE

PROTOTYPE

120cm

50cm

10cm

Height

Height

Height

Width

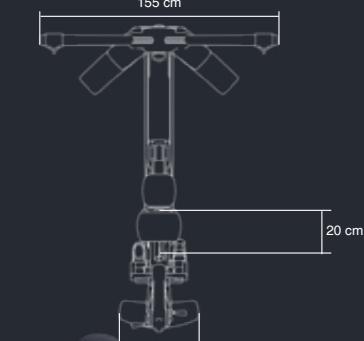
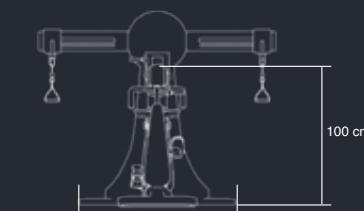
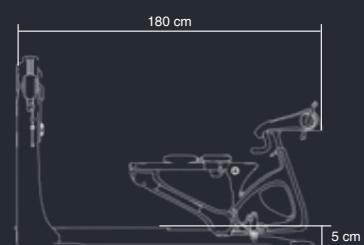
Length

Length

I use the 1:1 size wooden model for the ergonomics test, which invited true disabled person of 175cm. Through the test, I summarized the key figures of four forms.

# STRUCTURE DISPLAY

PRODUCT FIGURE



# 3-MODES

## FUNCTIONAL TRAINER



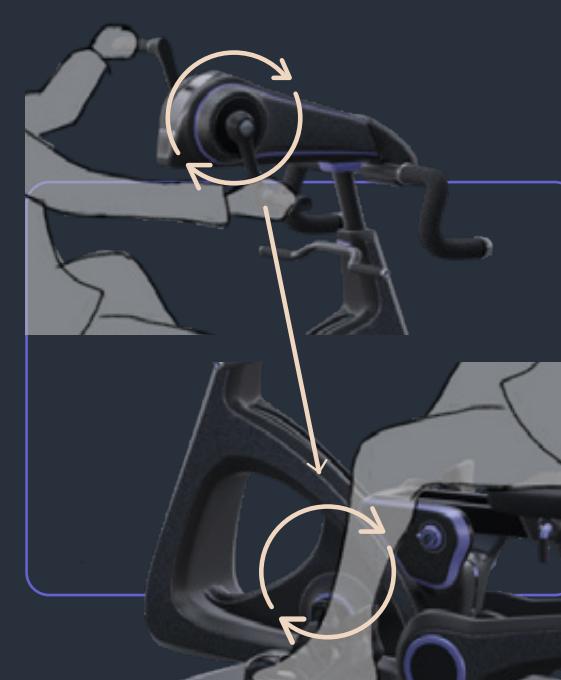
## RECUMBENT BIKE & REHABILITATION BIKE



## Bicycle pedal ⌂ Foot Holder



Bicycle footpegs can be adjusted and then locked into place as a foot hold.



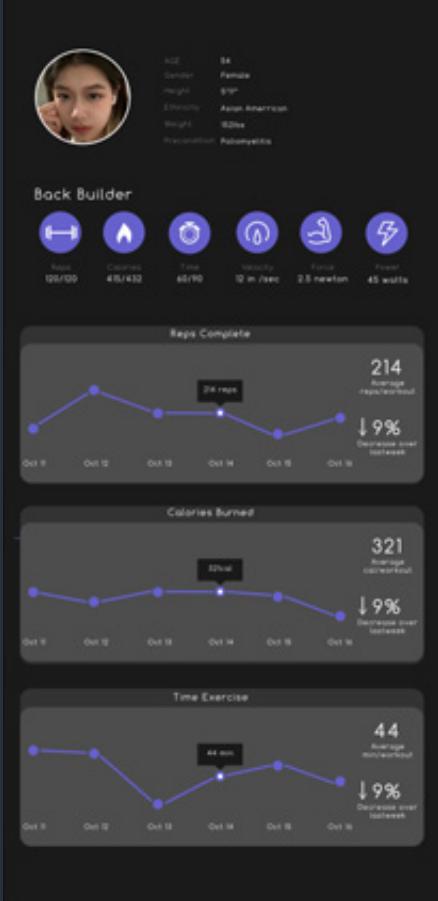
## Top & Bottom Transmission

User can use upper strength to rotate the top handle which can drive the flywheel and the pedals below to rotate, so that the lower limbs which are incapable of being controlled by the user can be exercised.

## UPRIGHT BIKE



## INTERFACE DISPLAY



Real-time motion data can be viewed on the corresponding panel in different modes.

## MUTI-MODE INTERFACE



## PRODUCT DISPLAY

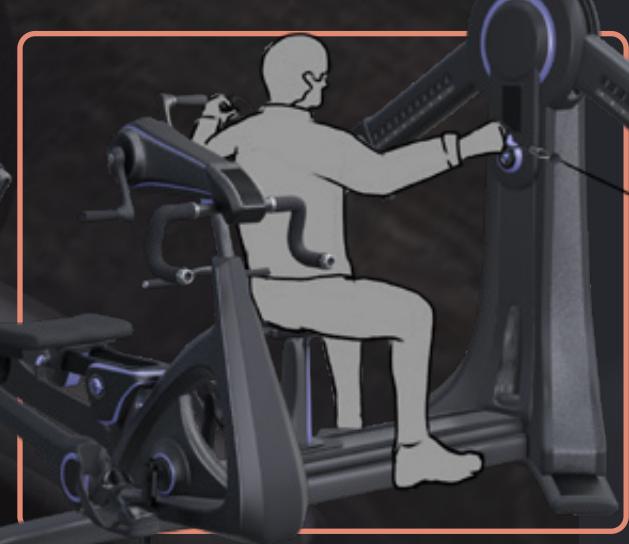


## FIVE FUNCTIONS

### ROWING MACHINE



### FUNCTIONAL TRAINER



## MAIN FEATURE



### 1 Left Wheelchair

To transfer the user from the wheelchair, the user first swivels the FAZZ seat at the right angle and adjusts it to a height flush with the wheelchair. By simply leaning forward and shifting the weight forward, the body can then be moved smoothly from the wheelchair to the FAZZ seat using the strength of the upper body.



### 2 Pan To Seat

The user simply grasps the front of the chair with both hands and allows the body to move forward to reach the seat.



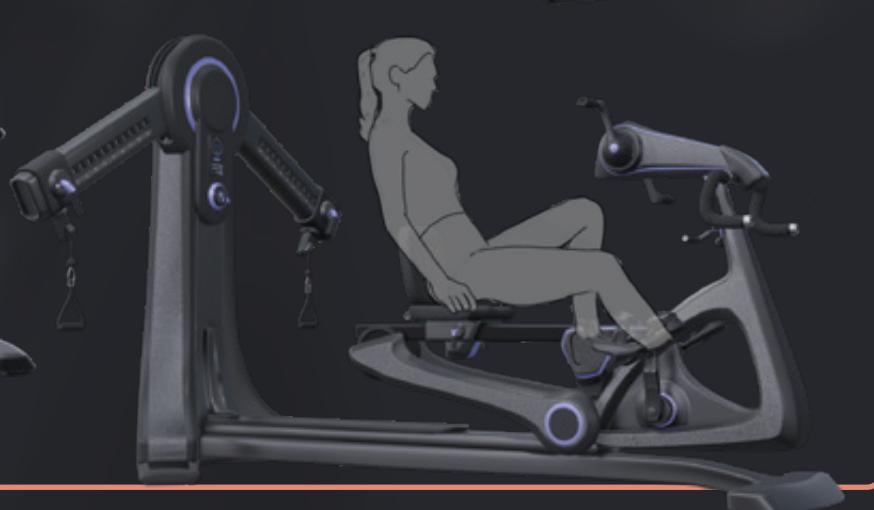
### 3 Switch To Positon

Once in the seat, the user adjusts the angle and height by using the knobs to bring the seat to a sporty position.



## REHABILITATION EXERCISE BIKE

### REUMBENT BIKE



# X-FLOAT

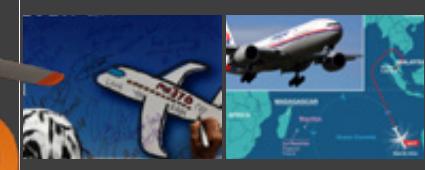
Unmanned maritime search and rescue aircraft



## BACKGROUND

On 8 March 2014, Malaysia Airlines MH370 was lost after taking off from Kuala Lumpur to Beijing, and the whereabouts of flight MH370 and the 239 passengers on board are still unknown today. The disappearance of Malaysia Airlines MH370 is one of the biggest air crash mysteries in modern aviation history.

The search for MH370 has cost more than US\$150 million, and took nearly four years, making it the most expensive air disaster search in aviation history. The advanced equipment deployed by the 26 countries included over 40 ships and 12 aircraft, satellites, search and rescue submarines and towed sonic locators.



Accidents at sea such as these cause a great deal of loss of life and property every year. And professionals have been exposed to various environmental and climatic extremes during the ongoing search and rescue process, making it impossible to guarantee full safety.

## KEYWORDS



The five-year average for 2014–2019 is 3,282 casualties per year.

## COST RESEARCH

The search and rescue work is usually carried out by rescue vessels and affiliated aircraft. On receipt of a signal, the flotilla carries out the search and rescue through a coordinated effort between sea and sky.

### CASE: British HM Coastguard

British HM Coastguard aircraft included the AW189 and the S-29, which had been carefully planned but still cost a fortune.

ANNUAL COST PER AIRCRAFTS



### CASE: Chinese Logistics Drones



## COMPETITOR ANALYSIS

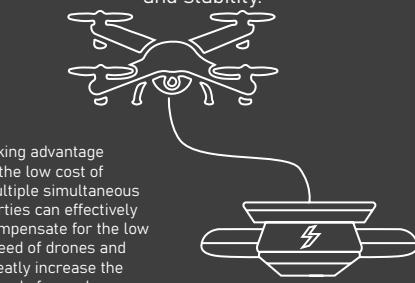


## CONCLUSION

Although the drone has the advantage of low cost, it has a weak load capacity, short endurance, low cruising speed and weak resistance to wind disturbance.



The use of a combination of drones and mobile airports can go a long way towards solving the problems of range and stability.

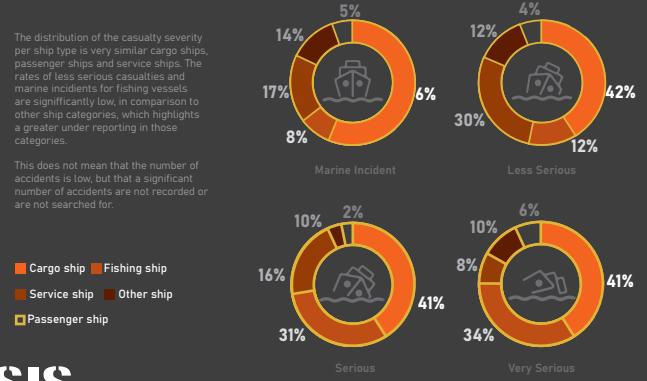


Taking advantage of the low cost of multiple simultaneous sorties can effectively compensate for the low speed of drones and greatly increase the speed of searches.

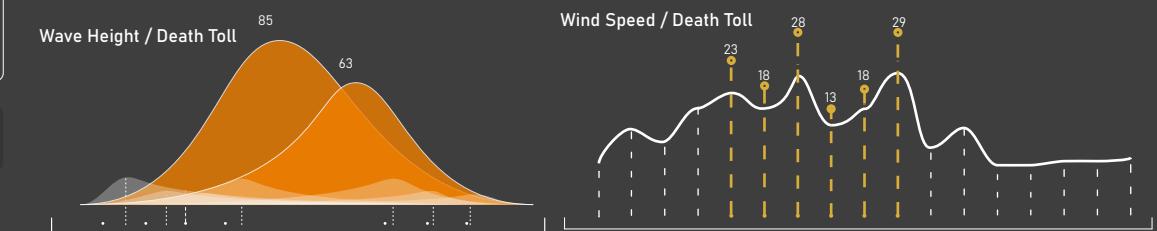
## ANALYSIS OF CAUSES



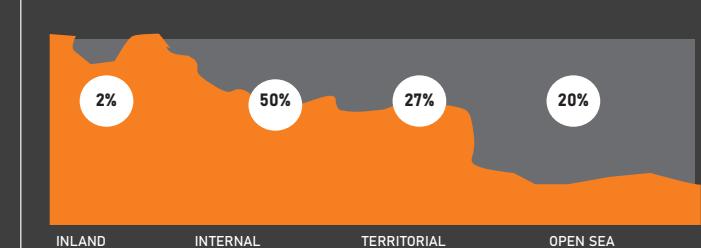
## DISTRIBUTION OF SEVERITY



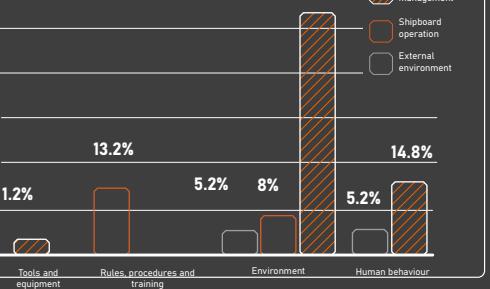
## ENVIRONMENT ANALYSIS



## Distribution By Location



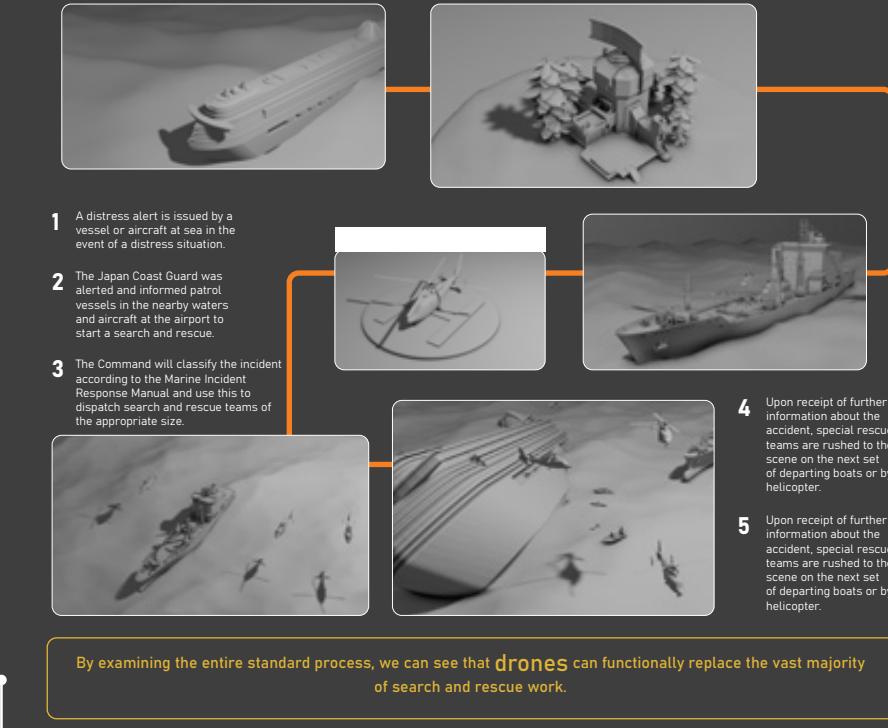
## Contributing Factors



## RESEARCH OF SAR

- Firstly, incidents are more temporal and regional in nature.
- Secondly, it is difficult and costly to rescue.
- Thirdly, maritime rescue is time-sensitive.
- Fourthly, marine hazards are diverse and complex.

### CASE: Japan Coast Guard's standard response strategy for maritime incidents



By examining the entire standard process, we can see that drones can functionally replace the vast majority of search and rescue work.

## TECHNICAL DETAIL

### CAMERA & VIDEO TRANSMITTER



Sends an HD video signal to the remote control and app.

### GPS RECEIVER



On the underside of the shell, it determines the position and height of the quadcopter.

### RADER



Detects multiple targets simultaneously and can dodge obstacles in all directions.

### FLIGHT CONTROLLER



Acts as the brains of the Phantom when it is in the air. Contains a gyroscope and an accelerometer.

### PROPELLER MOTOR & ELECTRONIC SPEED CONTROLLER



One for each motor. Controls the speed and direction of how the propeller spins. Also controls the onboard LED lights.

-Automatic generation of a large-scale image mosaic in real-time

-Automatic real-time detection of objects and ships within the camera system and a transmission of object positions and object information

-DataLink with a distance up to 50 km to transmit data into a situation room in real-time

Dimensions: 43x 30 mm

Weight: 100g

Accuracy: 1.5cm CEP

Dimensions: 102x 56 x 16.5 mm

Weight: 90g

Dimensions: 4.49 x 4.09 x 1.46 inches

Weight: 3.13 ounces

Detect Distant: 80m

Dimensions: 5.13 x 3.38 x 2.13 inches

Weight: 7 ounces

2050kv

## AERODYNAMIC STUDIES

### Wing loading ( $W_s$ )

Larger wings move more air, so an aircraft with a large wing area relative to its mass (i.e., low wing loading) will have a lower stalling speed. Therefore, a aircraft with lower wing loading will be able to take off and land at a lower speed (or be able to take off with a greater load). It will also be able to turn at a greater rate.

$$v^2 = \frac{2gW_s}{\rho C_L}$$

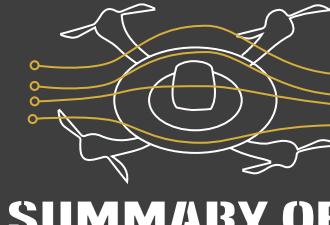


$$a = \frac{GA}{M} = \frac{G}{W_s}$$

Accelerate of gust produces an upward pressure of G

### Drone Boundary Layer

On an aircraft wing, the velocity boundary layer is the part of the flow close to the wing, where viscous forces distort the surrounding non-viscous flow. From a drag standpoint, it is advisable to have the transition from laminar to turbulent flow as far aft on the wing as possible, or have a large amount of the wing surface within the laminar portion of the boundary layer.



## SUMMARY OF THE STUDY

The effect of reaching the target requires

-Larger propellers

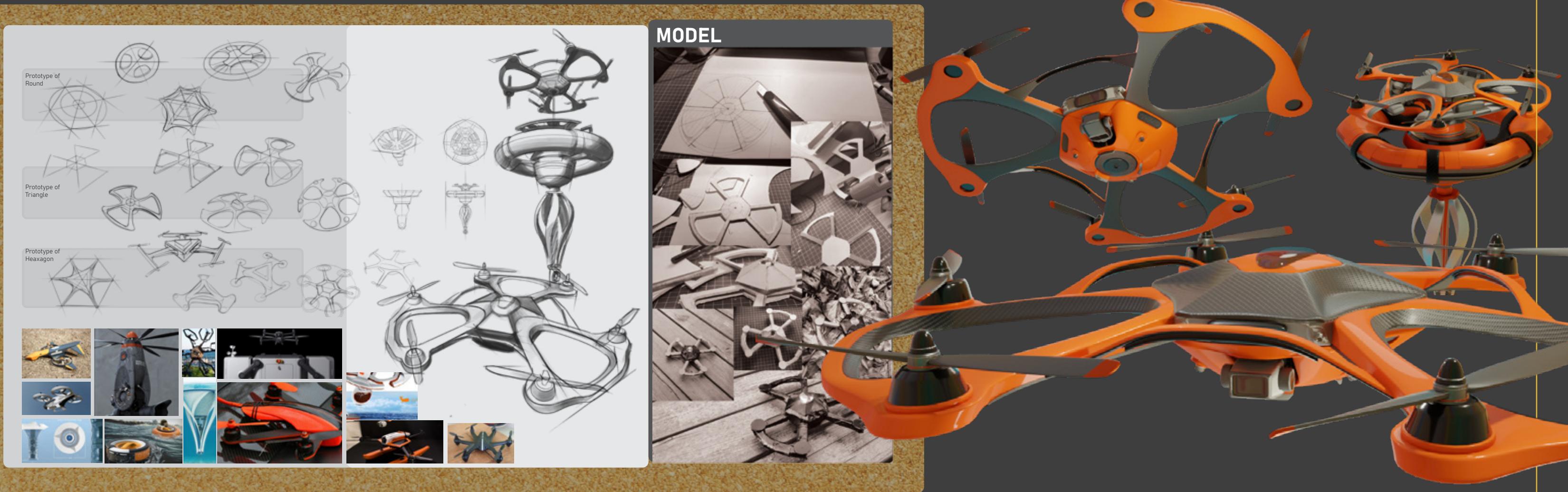
-Balanced counterweights

-Streamlined shape

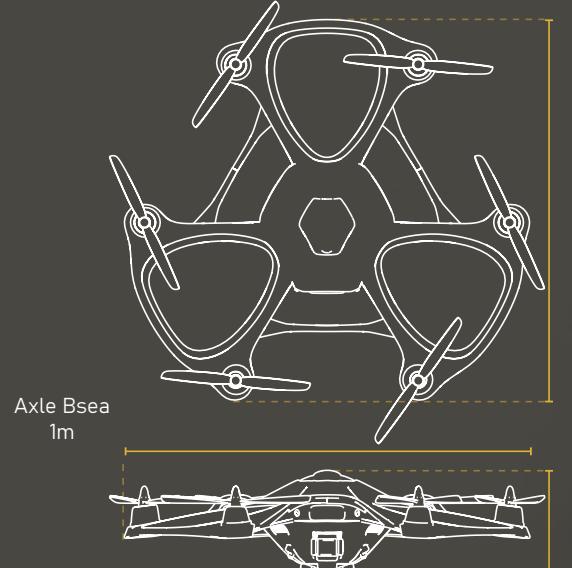
-Great power

-Extra long battery life

## SKETCH



## PRODUCT SIZE



X-AIR

## PRODUCT STRUCTURE



The camera includes an **infrared camera** that works continuously even in the dark.

**Two sets of battery modules** enable the drone to keep charging and using electricity at the same time



Carbon Fibre Casing

Casing Frame

Propeller

Shell

Aerial Photographic Camera

Battery Group

Brushless Motor

Flight Control & Radar & GPS

Battery Group

Battery Charger

Cable Case

Undercarriage

## FINAL DISPLAY



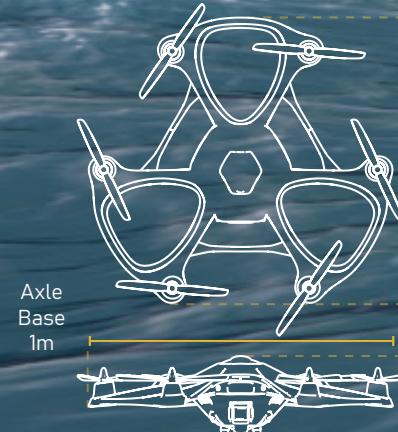
1

The X-port will drift with the currents and sometimes it will follow a predetermined course. The aircraft takes off from the airport and starts cruising when it reaches the next check position.

The aircraft will cruise and search at an altitude of around 100 metres. In the event of extreme weather, the aircraft will land at its airfield to take shelter and await the next take-off.

3

After reaching the search area the aircraft took off from the airport and the aircraft will continue the search work.



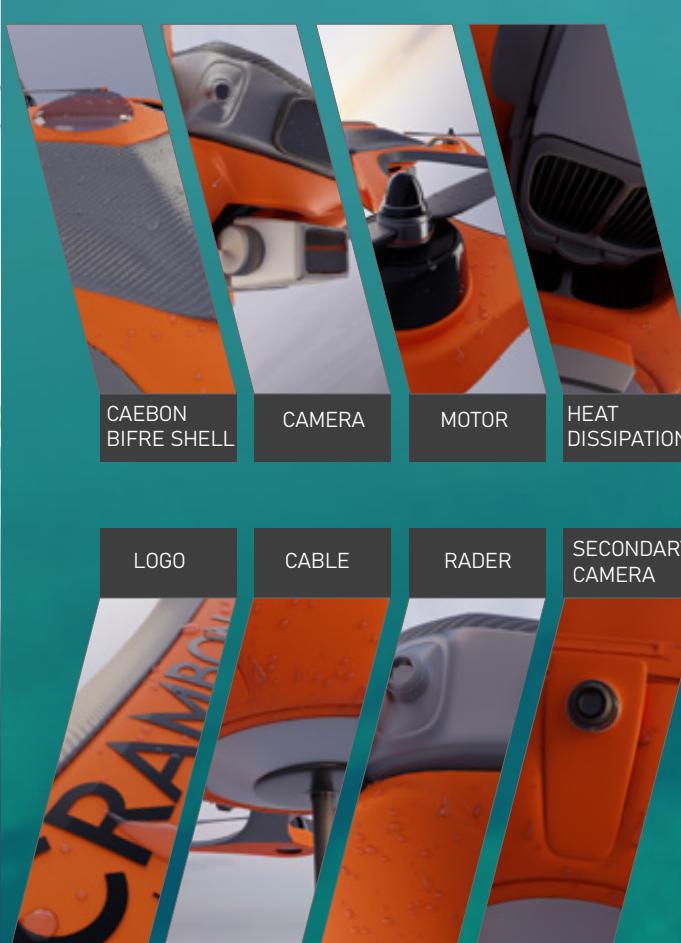
Ultra-long Distance Signal Transmission



The image signal can be transmitted over greater distances using the UAV array to achieve ultra-long range real-time image transmission.



## PRODUCT DETAILS



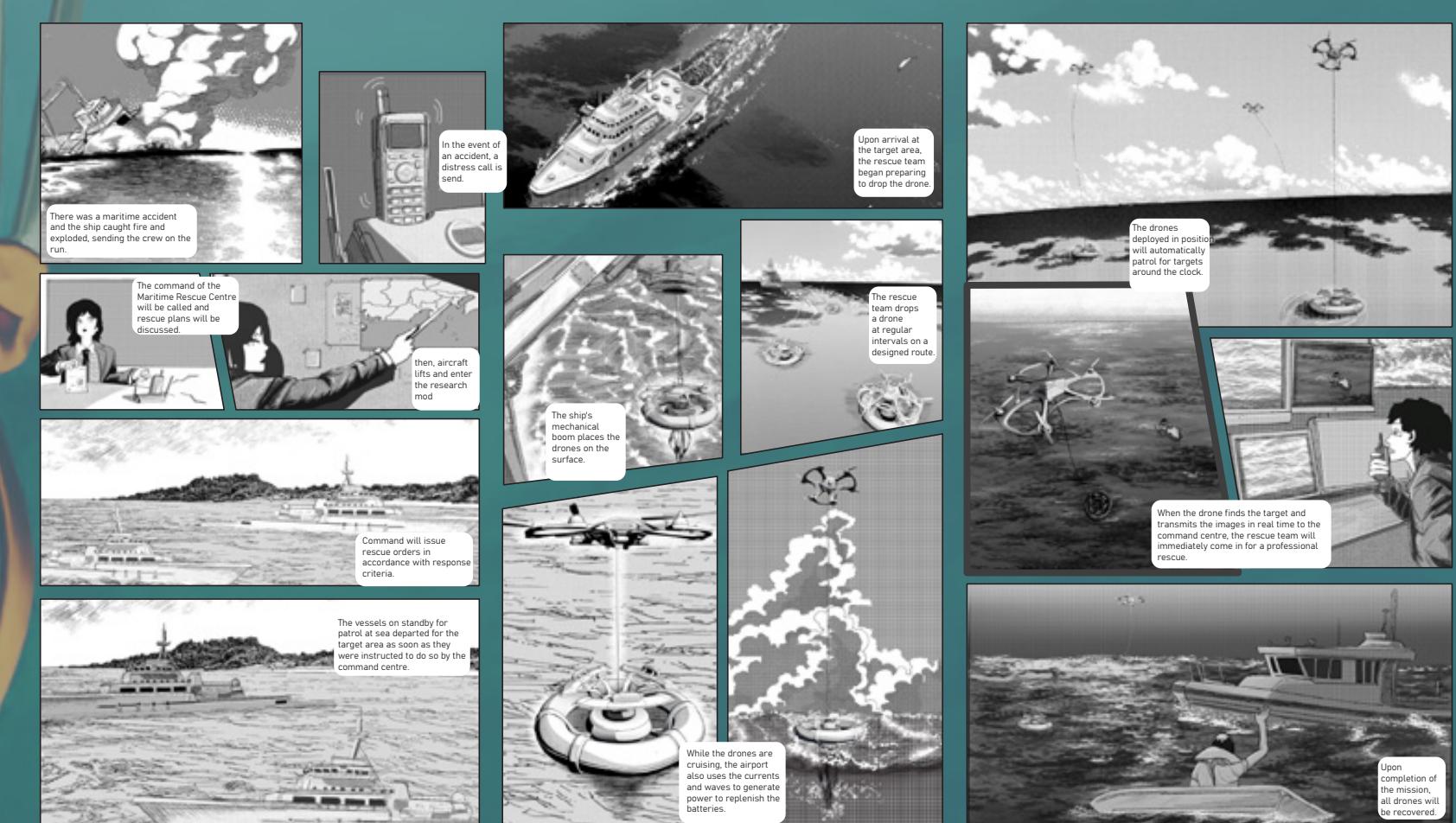
When landing, the aircraft is guided in space by cables to precisely align with the airport.

After landing, the clamping grooves of the three cross beams on the airplane are interlocked with the corresponding structures on the airport, so that the airplane and the airport are integrated.

Helical turbines beneath the airport harness the flow of water to generate electricity, which is stored in batteries at the airport.

Cables connect the aircraft to the airport, drawing power from the airport while in the air and while parked.

## STORY BOARD



# SYNTHROOM

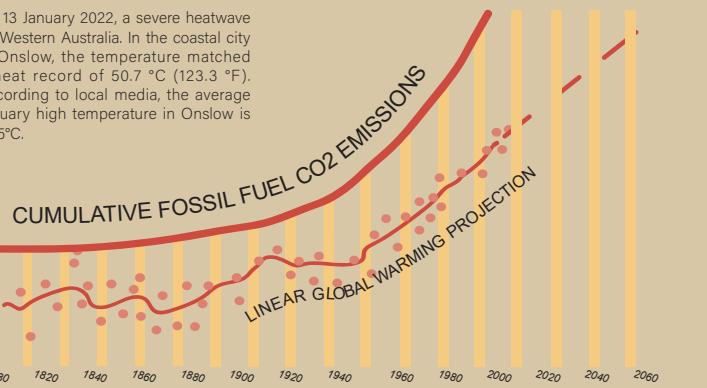
An interactive space that calls for people to address extreme heatwave issues

The sensory impact of the game in this interact device is an opportunity to reflect on the damage caused by human activity to the natural environment.

## BACKGROUND



Carbon emissions are the main cause



The growth curve of carbon emission and the growth curve of annual average temperature show obvious consistency and correlation. So there is no doubt that people's industrial emissions are the biggest cause of extreme heat weather.

## INTERVIEW

He believes that everything is related to carbon emissions, which are causing global warming.



"I've never been particularly concerned about the environment and climate before, but the weather seems to be getting warmer. It used to be that we would have holidays due to snow, but now there are fewer."

"People have destroyed the environment and many small animals have lost their living space as a result, so humans will be punished."

I hate those rhetorics who claimed mankind was not responsible for climate change.

I have written several novels and made them public in an attempt to bring to light the seriousness of the current environmental situation.

"Recently the summer has been getting hotter and hotter and I have gotten sunburned several times."

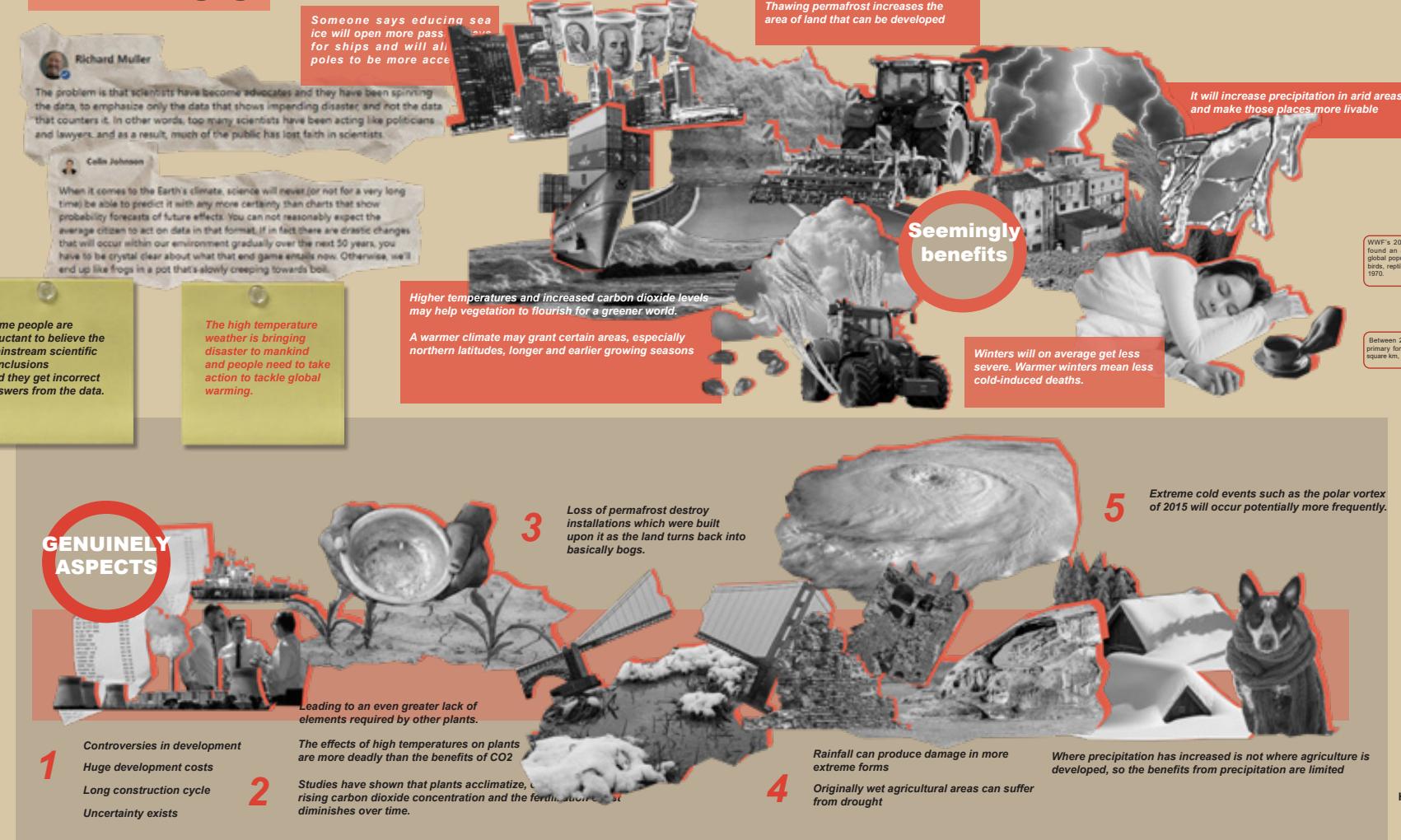
"The hot weather has led to people preferring to order takeaways rather than come to his restaurant, affecting my business."

He believes that such ecological damage should be severely punished.

He is very supportive of the national policy on carbon neutrality, but don't actually express it in my life.

"He attributed the high temperatures to the El Niño phenomenon and the urban heat island effect."

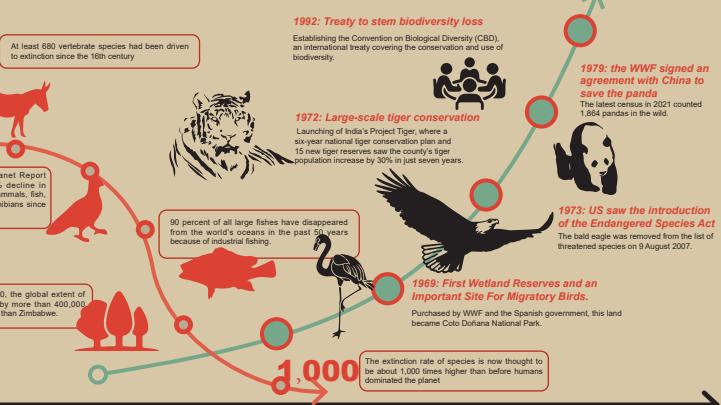
## ANALYSIS



## CASE STUDY

### Biodiversity

Human activities in the past have seriously damaged the ecology. Data reveals an average 69% decrease in monitored wildlife populations since 1970. Yet it is never too late to act. As a result of people's efforts, the rate of extinction is decreasing and the populations of some animals are even rebounding.



## OBSERVATION



A named heat wave makes you sit up and pay attention

Seville is working on a new cooling system for heatwaves based on projected negative health outcomes. The idea is to avoid scientific jargon that most people don't understand and link alert levels to what a heat wave is likely to do to people.

Use old cooling techniques and modernize them  
Abu Dhabi use an ancient Arabic architectural cooling technique called Mashrabiya in Al Bahar Towers. When the sun hits the shades, they unfold like an umbrella to ward off the heat. The technique has helped reduce the building's need for air conditioning by 50%.

A named heat wave makes you sit up and pay attention  
Los Angeles went a step further and is painting Los Angeles roads white. Painting the asphalt white would theoretically trap that process in the bud, and lead to cooler air temperatures. That technique did cool the streets themselves by around 10 degrees.

### GENUINELY ASPECTS

1 Controversies in development  
Huge development costs  
Long construction cycle  
Uncertainty exists

2 Loss of permafrost destroy installations which were built upon it as the land turns back into basically bogs.  
Leading to an even greater lack of elements required by other plants.

3 The effects of high temperatures on plants are more deadly than the benefits of CO<sub>2</sub>  
Studies have shown that plants acclimate, rising carbon dioxide concentration and the fertilization effect diminishes over time.

4 Rainfall can produce damage in more extreme forms  
Originally wet agricultural areas can suffer from drought

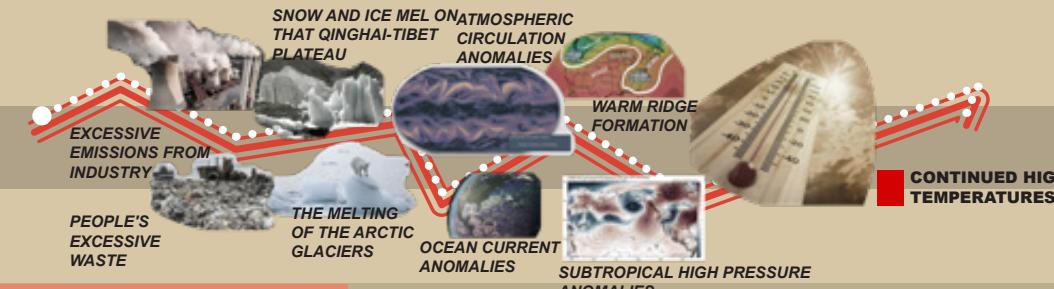
5 Where precipitation has increased is not where agriculture is developed, so the benefits from precipitation are limited  
Extreme cold events such as the polar vortex of 2015 will occur potentially more frequently.

## DESIGN GOAL

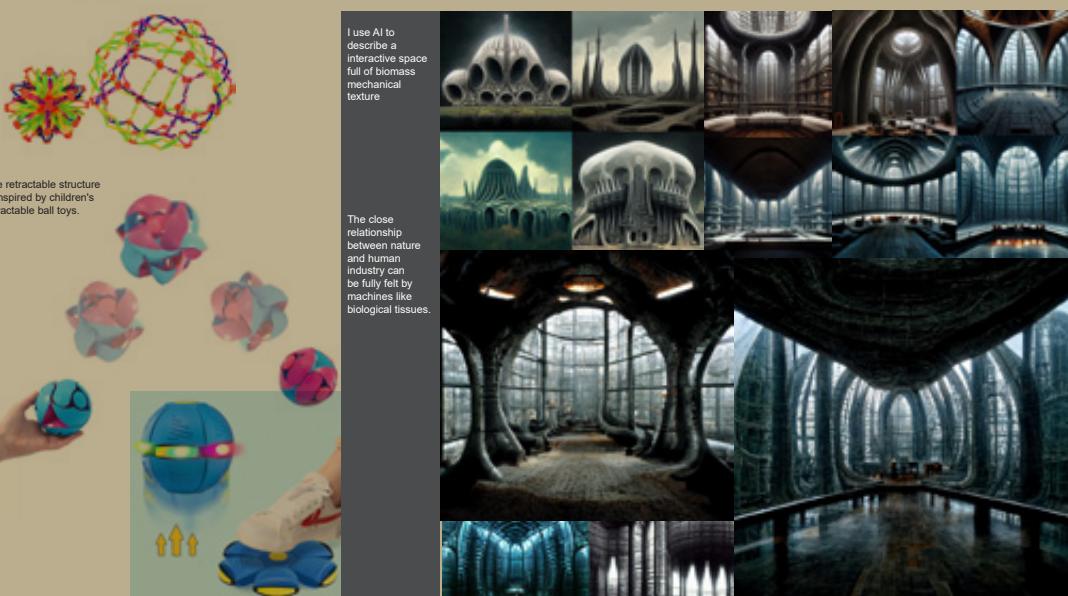
PEOPLE SHOULD REALIZE THAT



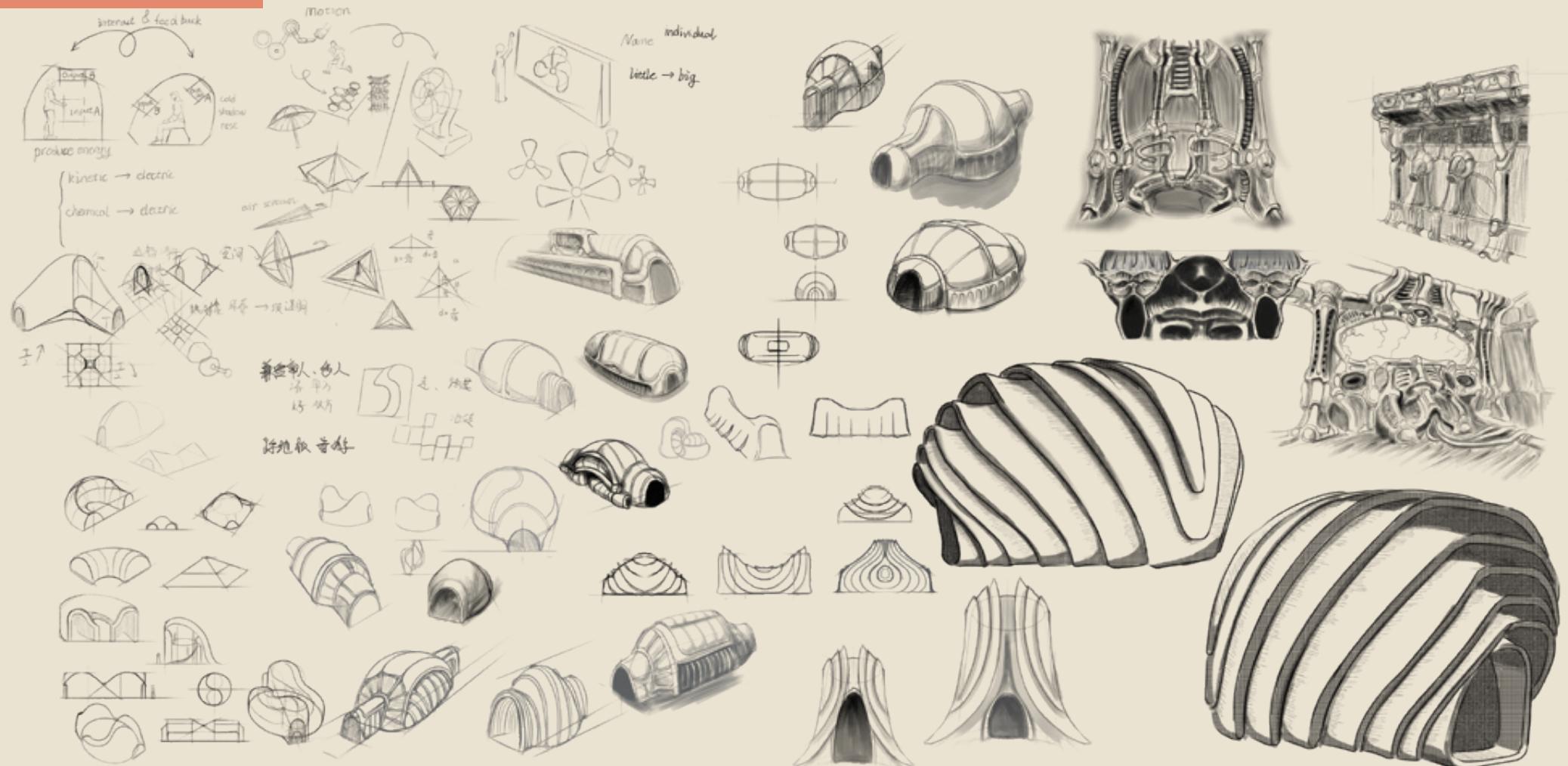
## BRAINSTORM



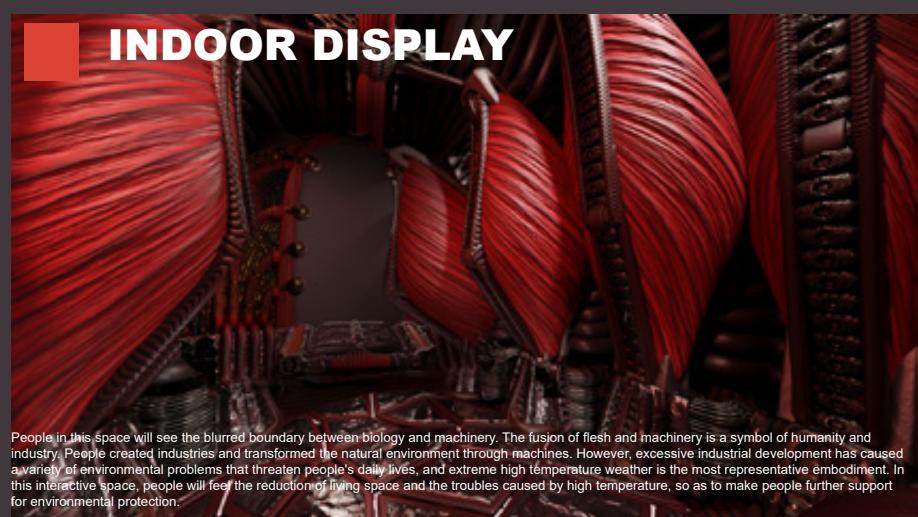
## MOODBOARD



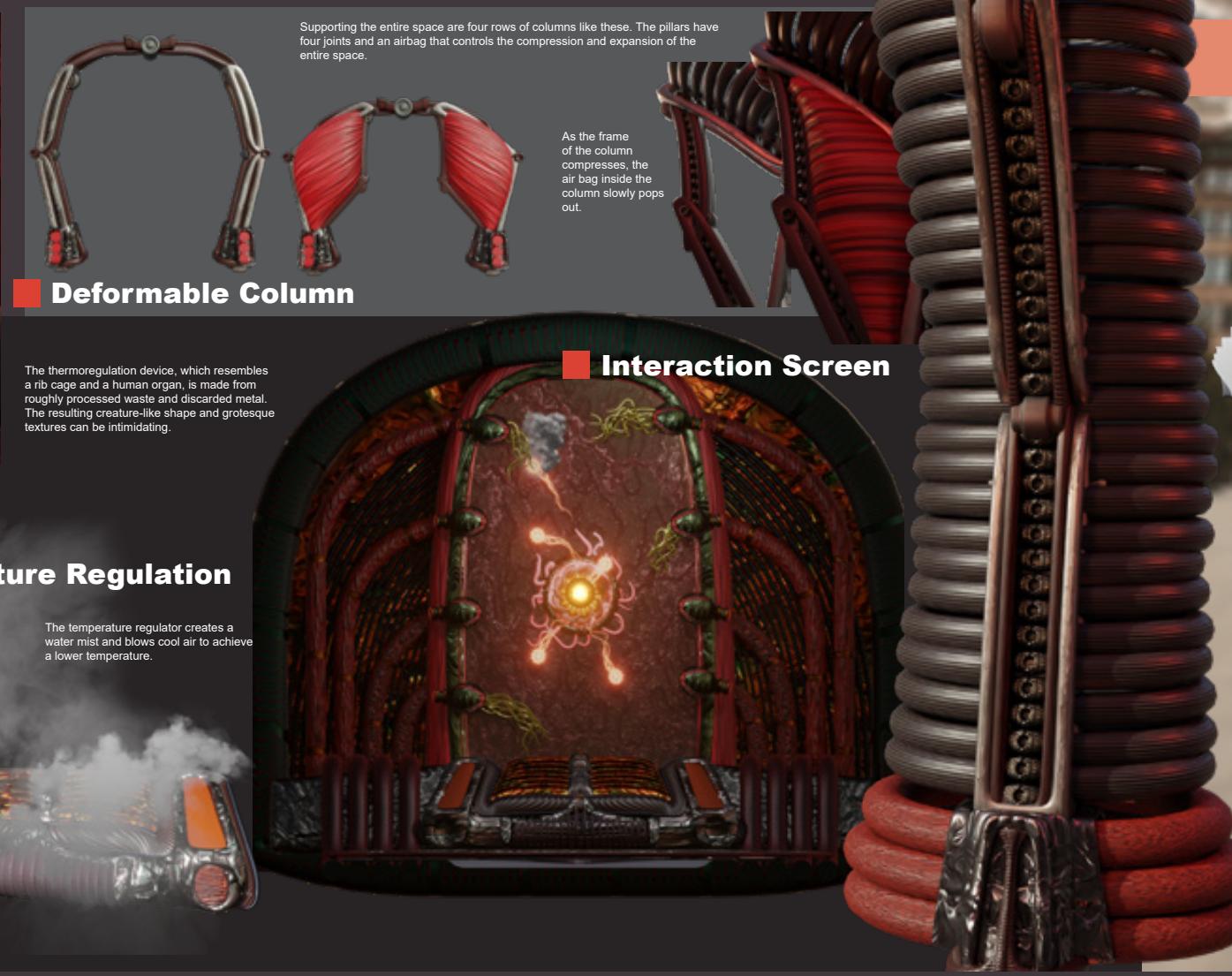
## SKETCH



## INDOOR DISPLAY



People in this space will see the blurred boundary between biology and machinery. The fusion of flesh and machinery is a symbol of humanity and industry. People created industries and transformed the natural environment through machines. However, excessive industrial development has caused a variety of environmental problems that threaten people's daily lives, and extreme high temperature weather is the most representative embodiment. In this interactive space, people will feel the reduction of living space and the troubles caused by high temperature, so as to make people further support for environmental protection.



Supporting the entire space are four rows of columns like these. The pillars have four joints and an airbag that controls the compression and expansion of the entire space.

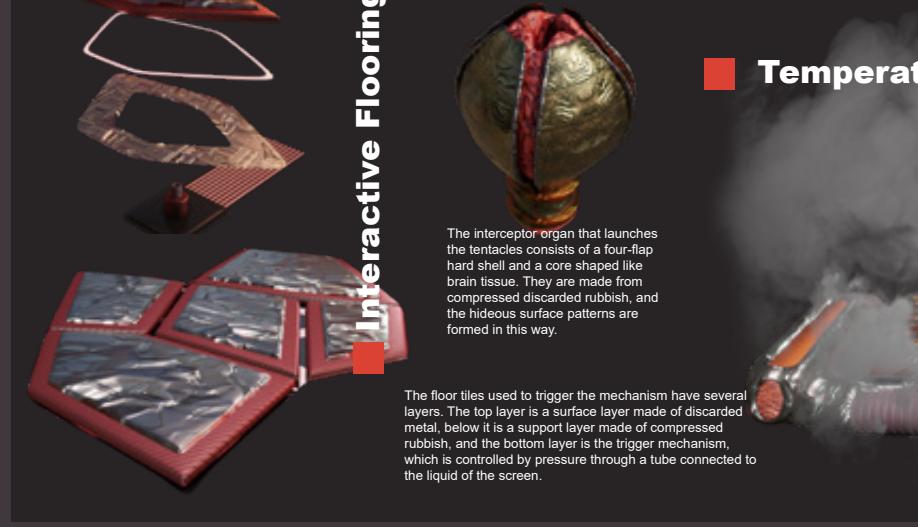
As the frame of the column compresses, the air bag inside the column slowly pops out.

## OUTDOOR



Some architectural structures similar to human organs will make people feel vulnerable as creatures and alienated strangeness. Some architectural structures similar to human organs will make people feel vulnerable as creatures and alienated strangeness. Some architectural structures similar to human organs will make people feel vulnerable as creatures and alienated strangeness. Some architectural structures similar to human organs will make people feel vulnerable as creatures and alienated strangeness.

## Catapult Launch



The interceptor organ that launches the tentacles consists of a four-flap hard shell and a core shaped like brain tissue. They are made from compressed discarded rubber, and the hideous surface patterns are formed in this way.

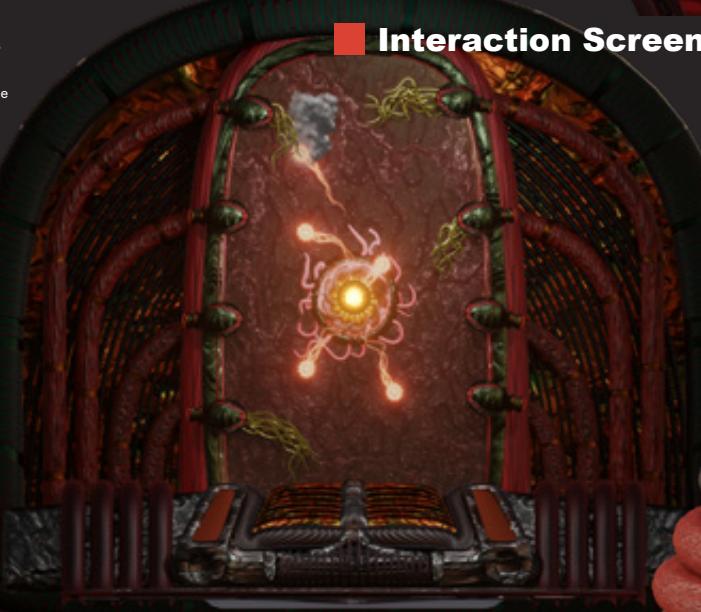
The floor tiles used to trigger the mechanism have several layers. The top layer is a surface layer made of discarded metal, below it is a support layer made of compressed rubber, and the bottom layer is the trigger mechanism, which is controlled by pressure through a tube connected to the liquid of the screen.

**Interactive Flooring**

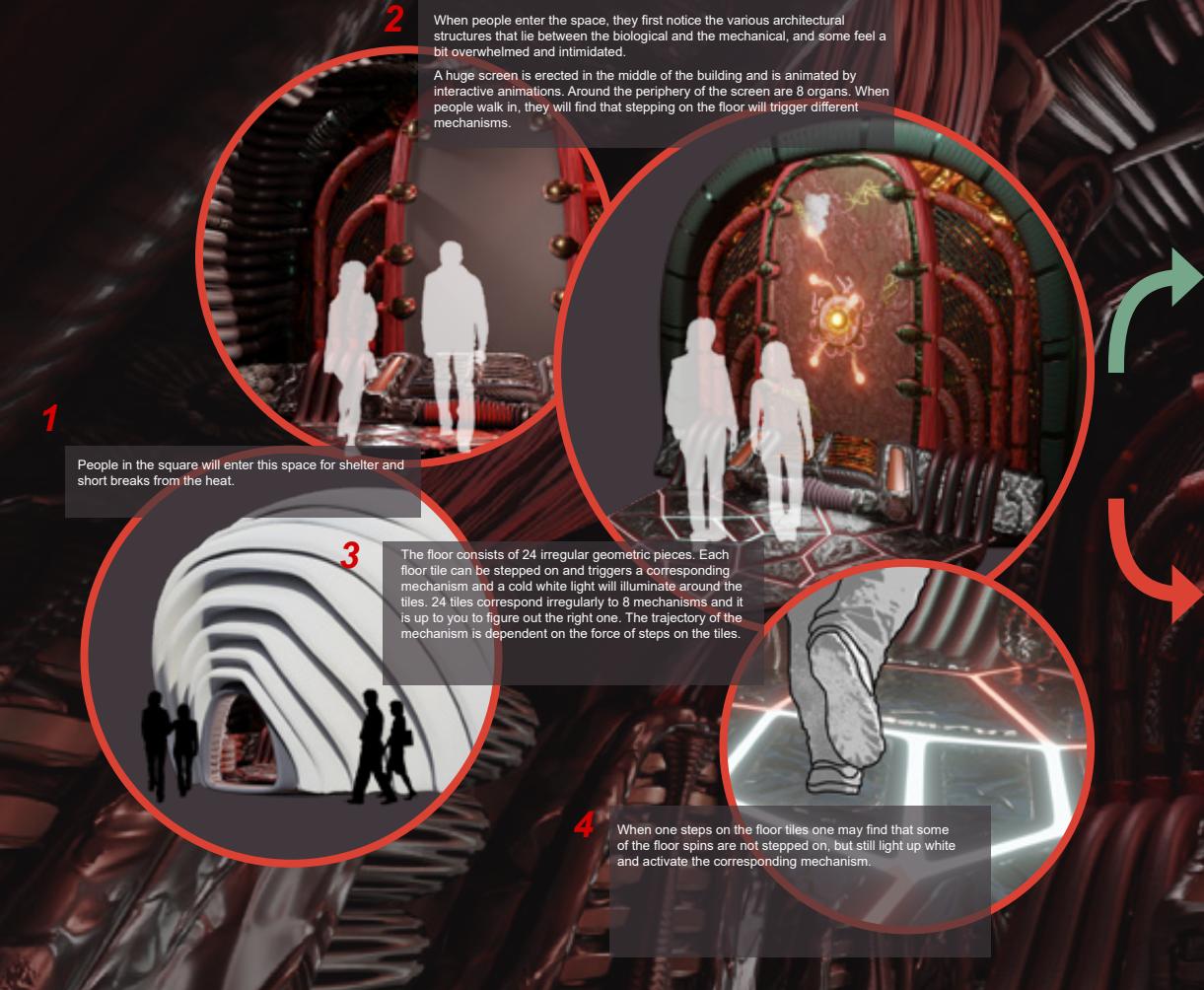
## Temperature Regulation

The temperature regulator creates a water mist and blows cool air to achieve a lower temperature.

## Interaction Screen



## PROJECT PROCESS



1

People in the square will enter this space for shelter and short breaks from the heat.

2

When people enter the space, they first notice the various architectural structures that lie between the biological and the mechanical, and some feel a bit overwhelmed and intimidated.

A huge screen is erected in the middle of the building and is animated by interactive animations. Around the periphery of the screen are 8 organs. When people walk in, they will find that stepping on the floor will trigger different mechanisms.

3

The floor consists of 24 irregular geometric pieces. Each floor tile can be stepped on and triggers a corresponding mechanism and a cold white light will illuminate around the tiles. 24 tiles correspond regularly to 8 mechanisms and it is up to you to figure out the right one. The trajectory of the mechanism is dependent on the force of steps on the tiles.

4

When one steps on the floor tiles one may find that some of the floor spins are not stepped on, but still light up white and activate the corresponding mechanism.

## Award Feedback



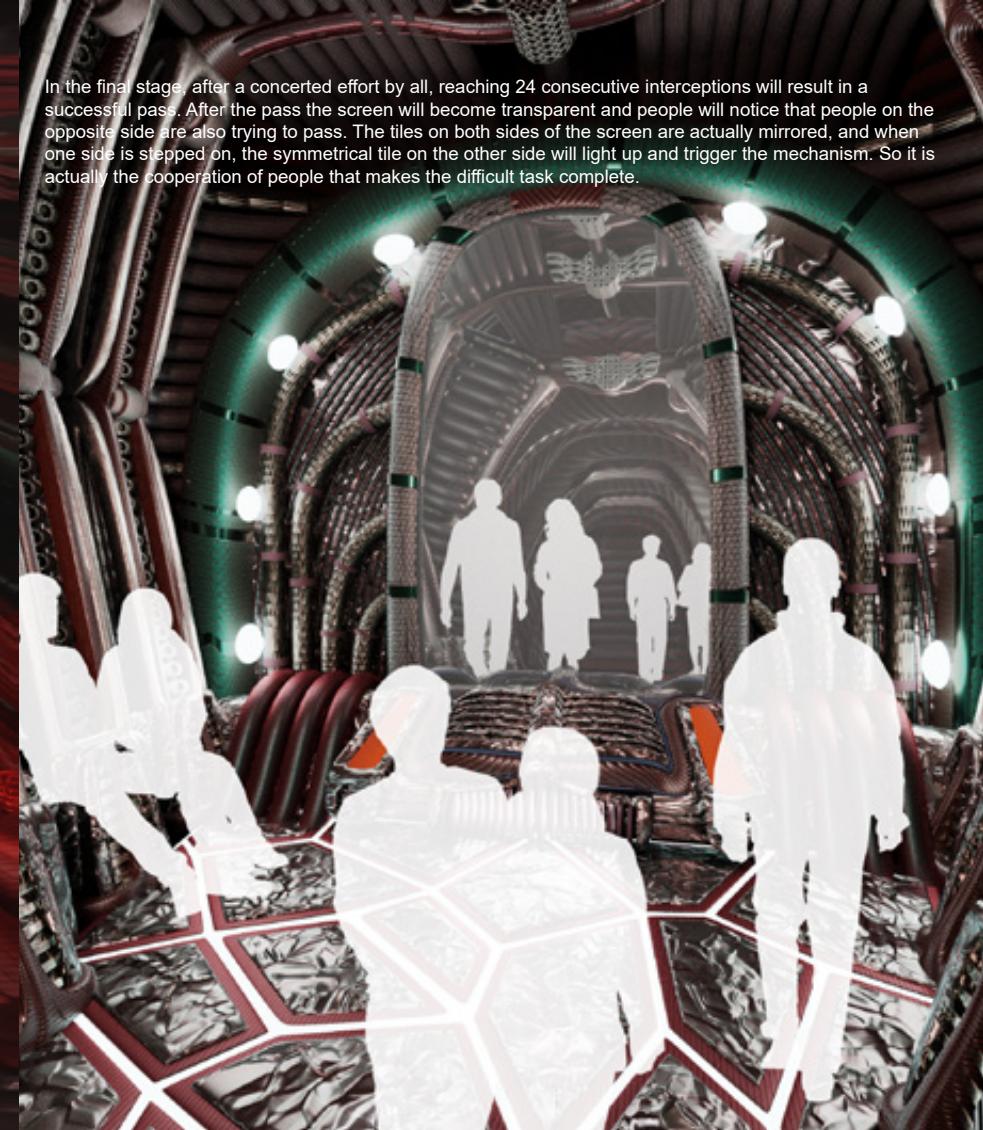
A bonus mechanism is triggered when successive successful interceptions of the bounces are made.



## Penalty Feedback



The penalty mechanism mechanism is triggered when successive failures to intercept the pop-ups are made.



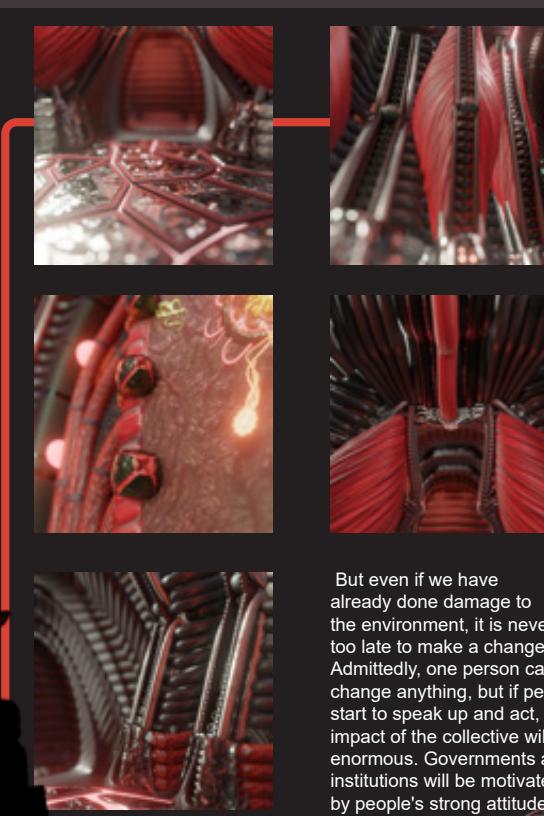
## FINAL DISPLAY



Where is the boundary between biology and machinery? People in such a space can not help but think like this.

Is it people who control industry, or is it industry that governs people? And I want to use this interactive device to get you thinking about these questions.

After the Industrial Revolution, people over-transformed the environment through industry. The emissions of industrial production and the unchecked scale of expansion have caused dramatic changes in the biosphere and the environment in which we live. Among the changes, high temperatures are one of the most concerned aspects. There is no doubt that our living environment is getting worse and worse, as evidenced by the frequent high temperature and heat wave weather in recent years. People use industry to improve the quality of life, but eventually cause the deterioration of the environment, but make our life worse and worse.



## WHY DESIGN INTERACTION DEVICE

But even if we have already done damage to the environment, it is never too late to make a change. Admittedly, one person cannot change anything, but if people start to speak up and act, the impact of the collective will be enormous. Governments and institutions will be motivated by people's strong attitudes to carry out large-scale environmental protection and restoration projects in a planned way.

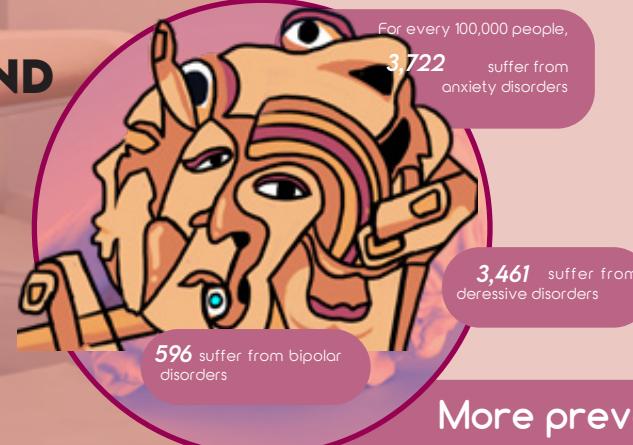


# HUG CHAIR

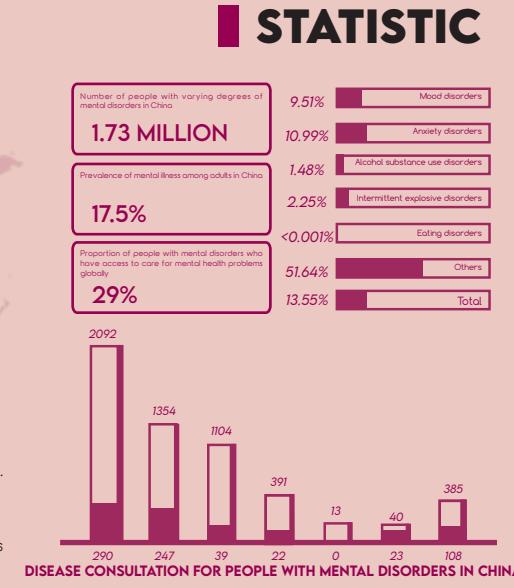
Semi-automatic cuddle chair for relieving mental stress and negative emotions



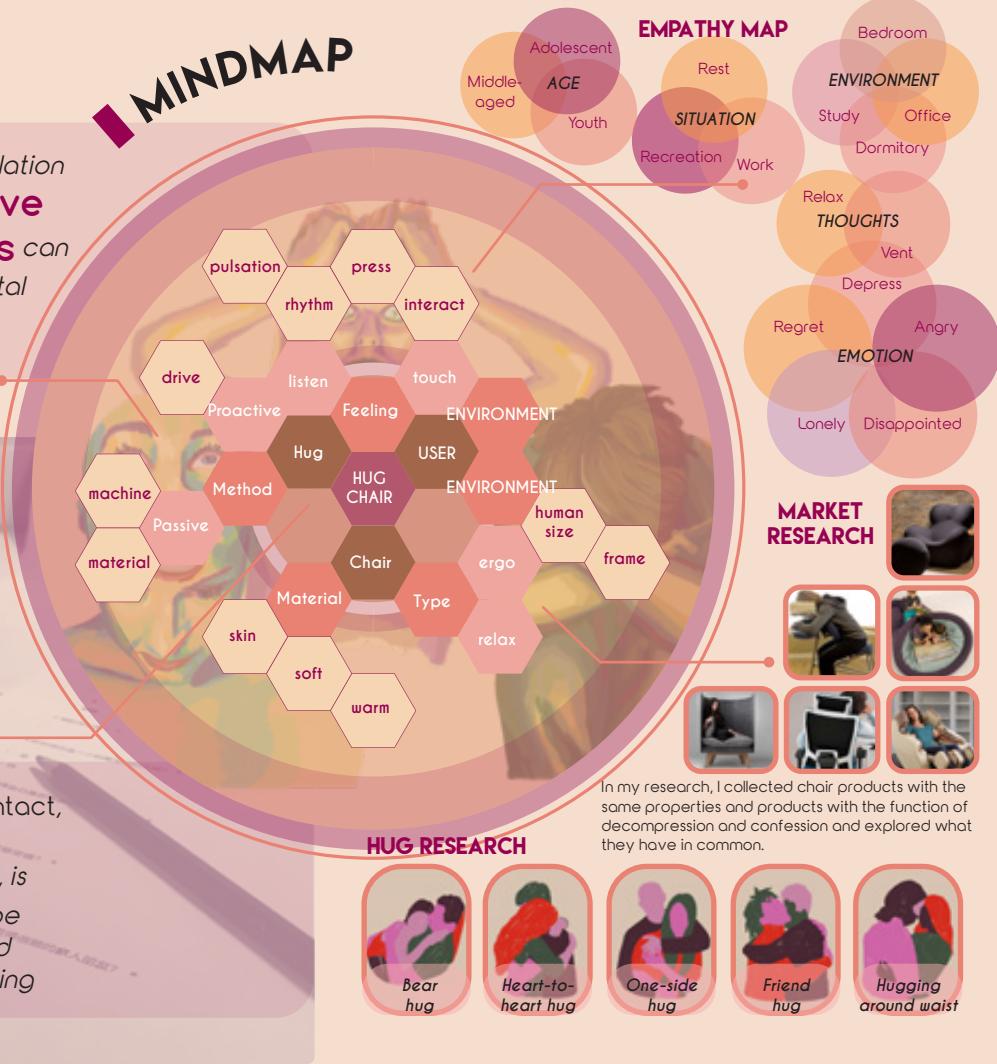
## BACKGROUND



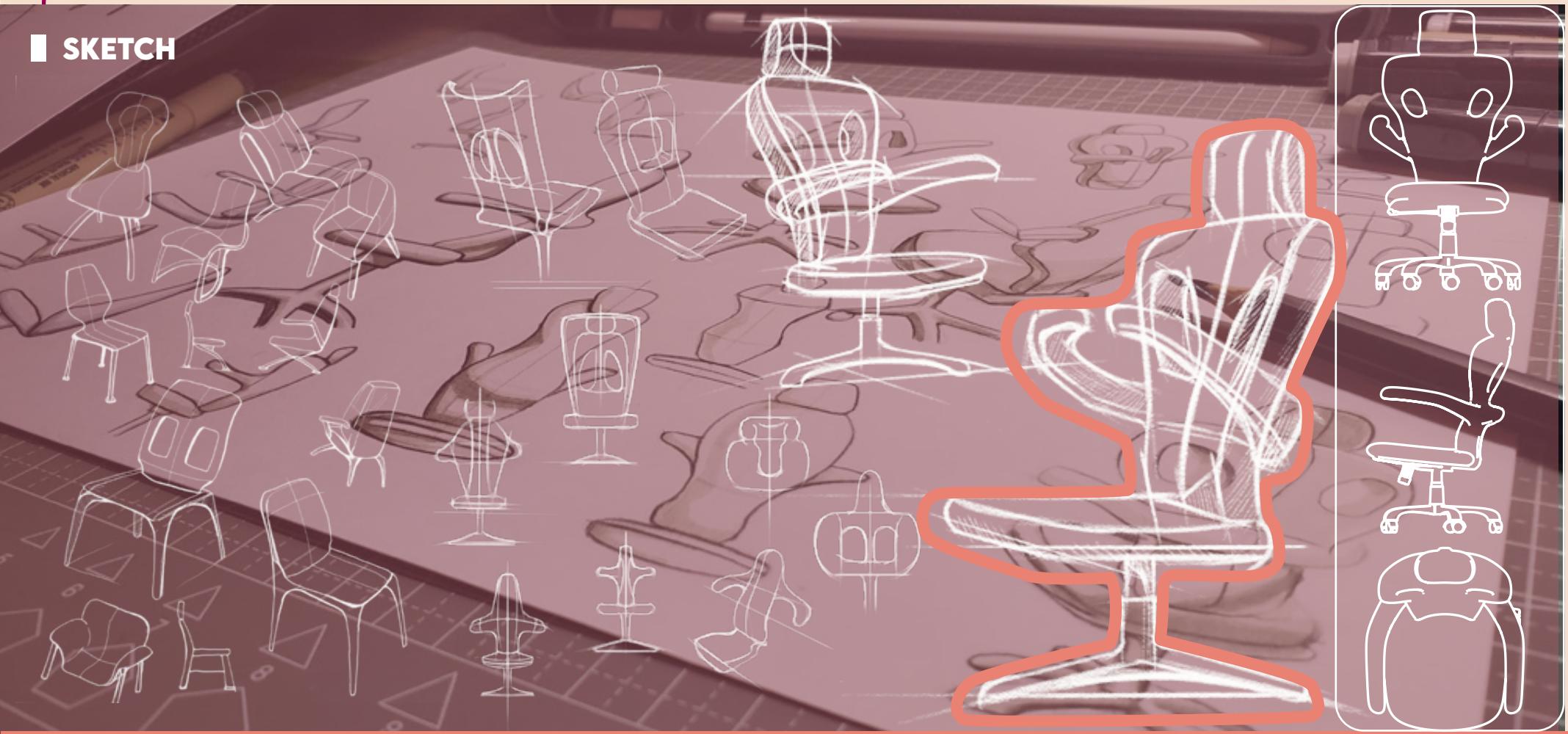
More prevention & treatment are needed



## MINDMAP



## SKETCH



## DETAILS

The frame is equipped with pressure-sensing mechanisms at various points, which sense the pressure generated by the person hugging the chair and bend the armrests through the internal mechanics to achieve a mutual hugging effect.

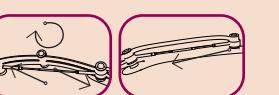
### AUTOMATIC STRENGTH ADJUSTMENT



Flexible frame in many places, allowing the user to stretch out more freely and have more space to move around.

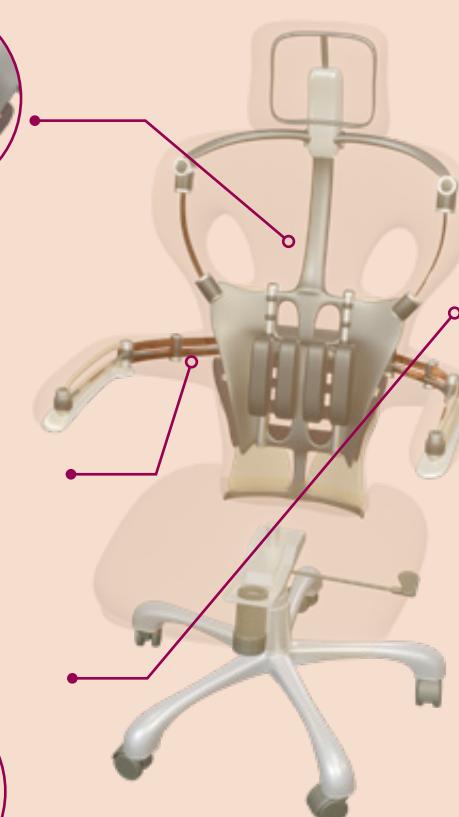
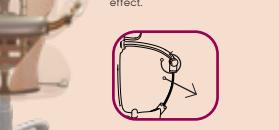
### BENDABLE ARM

A control mechanism consisting of a series of pumps and sliding rods is tightened by the control rod, causing movement, which rotates the shaft structure in the horizontal and bends the elastic skeleton.



### FLEXIBLE JOINTS

The elastic support with bionic skeleton structure creates an easy bending effect laterally and maintains the longitudinal support effect.



All structures ensure feedback when hugged like a human being

## DIFFERENT HUGS

The user can use a variety of poses to achieve various hugging styles, through which different feelings and emotions can be conveyed or expressed. Through hugging, the user can achieve pure emotion confession, thus alleviating loneliness and reducing the accumulation of negative emotions, and achieving the effect of preventing and alleviating mental illness.

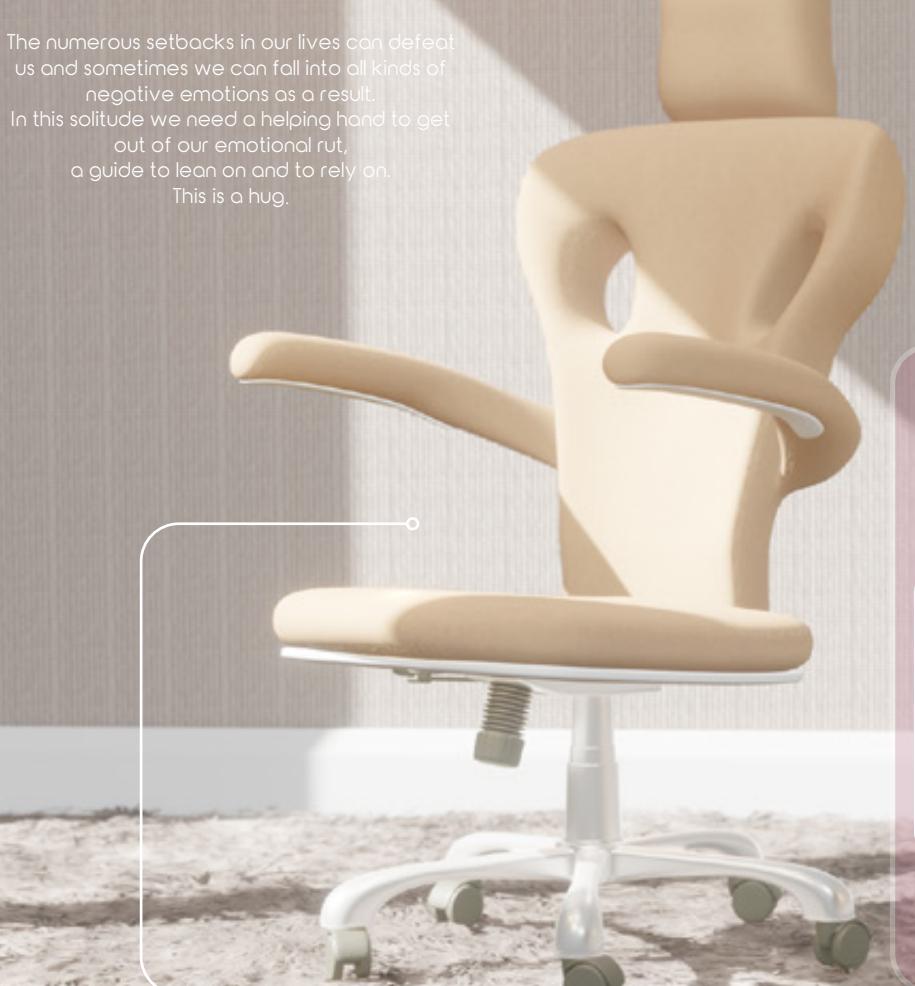


### PULSATION SENSING & MORE HUG MORE TIGHTER

When hugging, the internal mechanical structure of the chair receives the sound of the user's heart and pulse beating and amplifies the rhythmic sound effect through the internal structure conduction so that the user can hear the rhythmic sound effect, giving the chair a life-like character, bringing the human-machine distance closer and allowing the user to relax and vent negative emotions.

Reflection Of Temperature & Sound  
Handrail bend

## RENDERING



YOU HUG CHAIR,  
CHAIR HUG YOU TOO

Mimics  
All The Senses Of A Human Embrace

The Act Of Hugging

The Strength Of Hugging

The Touch & Sound Of The Human Body



# OTHERWORK

1. Hand Drawing 1920\*1080
2. Scene Rendering 1920\*1080
3. Anime NPR
4. Concept Garden 3D Drawing
5. Arrangement Composition
6. Sci-fi Concept Scene Artwork 3840\*2160 <https://www.artstation.com/artwork/9NEmqq>
7. Stylized Rendering 1920\*1080 <https://www.artstation.com/artwork/9NJLKo>
8. Robot concept design <https://www.artstation.com/artwork/n05PdE>
9. Packing design
10. Sci-fi Concept Scene Artwork 3840\*2160 <https://www.artstation.com/artwork/L30n4P>

