In this section, the studio based their capsule research on consequential factors that would affect one’s use of Hyperloop. Starting with fundamental dimensions of precedents, such as aircrafts and trains, the studio focused on how to visualize abstract traveling experience. We are interested to combine emotion and activities with speed, time, scale, and distance, during one’s Hyperloop travel experience. This research aims is to propose a potentially reasonable arrangement within a constrained space, which would enhance both comfort and traveling experience.
WHAT IS HYPERLOOP?

01. TRAVELING TIME/SPEED + TRAVELING DISTANCE

02. INFRASTRUCTURE CONVENIENCE

03. COST + SAFETY

04. EXPERIENCE FEELING

WHAT MAKES YOU CHOOSE HYPERLOOP?
HISTORY OF THE HYPERLOOP CAPSULE

In 1863, London Pneumatic Dispatch Company design built and operated an underground railway system for the carrying of mail, parcels and light freight between locations in London. The dimension of the system was large enough to carry a person. The system was used between 1863 and 1874.

In 1870, a 300-foot subway ran beneath Broadway in New York City. It was the creation of inventor Alfred Ely Beach. Cars were propelled by a vacuum blower that pushed the car through the tunnel – similar to the system used at tank drive-up windows. The demonstration subway ran for three years.

Nowadays, travel through a high-speed tube has already been a symbol of future in people’s mind. Engineers and inventors always come up with diverse ideas to make it come true. After Elon Musk announces the hyperloop alpha document, the worldwide have a higher expectation for the China super-high-speed maglev system.
SPACE ANALYSIS
Relationship Between Human & Space

RELATIONSHIP BETWEEN HUMAN AND SPACE
In order to find out the most appropriate space for Hyperloop, it is necessary to study the relationship between human and space which includes aspects of space dimension and human emotion. We try to find out fifty analyzing the space in vertical and horizontal directions.

DIMENSION OF VERTICAL DIRECTION

ANALYSIS OF HORIZONTAL PLANE

INTERPERSONAL DISTANCE

ODOR SENSATION

- AUDITORY DISTANCE

AUDITORY DISTANCE

INDIVIDUAL DISTANCE

SOCIAL DISTANCE

PUBLIC DISTANCE

ODOR SENSATION

Human emotion is always important while designing a design. It could be influenced by six main factors: the dimension environment, user experience. It is widely accepted that different spaces could generate specific feelings. Here we are going to research the influence of space and distance to human emotion. We have already studied the relationship between human and space in dimension aspect. It would be possible for us to see a single person as a bubble and connect several bubbles in different patterns to find out the most appropriate function for different areas.

DESIGN FACTORS

Space Analysis
Basic Function
User Experience
Interaction Design
Human Engineering

SOCIAL SPACE IN VEHICLES

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SUPRA
STUDIO
CAPSULE TYPES
Water Transportation - Seamen Expedition Sixty (2001)

Seamen Expedition Sixty
Type: Cruiser
Capacity: 5 passengers
Speed: 11.5 mph (18.5 km/h)
Size (L): 61' 10"
Wide (W): 21' 2"

CAPSULE TYPES
Water Transportation - Amsterdam Canal Cruiser (1996)

Amsterdam Canal Cruiser
Type: Tourist Transportation/Attractions
Capacity: 50 varied passengers
Speed: 16.6 mph (26.7 km/h)
Size (L): 70'
Wide (W): 20'
## SUMMARY

### Layout of the Capsule and Seating Arrangement

Categorized by personal vehicles, city metro system, long-range transportation system, and local transportation system. The capacity shows how seats are arranged in the capsule and the density during rush hour. Compared with minimum living space, the layout of capsules needs to find a balance between comfort and efficiency.

- **3.6 sq ft (0.34 m²)**
  - Seats: 7
  - Density: 0.138 persons/sq ft

- **3.6 sq ft (0.34 m²)**
  - seats: 7
  - Density: 0.280 persons/sq ft

- **7.5 sq ft (0.69 m²)**
  - Seats: 8
  - Density: 0.133 persons/sq ft

- **9.8 sq ft (0.88 m²)**
  - Seats: 10
  - Density: 0.1 persons/sq ft

- **17 sq ft (1.58 m²)**
  - Seats: 18
  - Density: 0.05 persons/sq ft

- **17 sq ft (1.58 m²)**
  - Seats: 18
  - Density: 0.05 persons/sq ft

- **25 sq ft (2.32 m²)**
  - Seats: 25
  - Density: 0.125 persons/sq ft

- **52 sq ft (4.81 m²)**
  - Seats: 52
  - Density: 0.1 persons/sq ft

- **25 sq ft (2.32 m²)**
  - Seats: 25
  - Density: 0.125 persons/sq ft

### Cities

- **New York City Subway**
  - Capacity: 0
  - Seats: 0

- **London Underground**
  - Capacity: 0
  - Seats: 0

- **Sydney Metro**
  - Capacity: 0
  - Seats: 0

- **Maritime Corridor**
  - Capacity: 0
  - Seats: 0

- **Amsterdam Canal Cruises**
  - Capacity: 0
  - Seats: 0

- **City Express Train**
  - Capacity: 0
  - Seats: 0

### Manufacturing

- **Small File Two**
  - Capacity: 0
  - Seats: 0

- **Formal One**
  - Capacity: 0
  - Seats: 0

- **VX-19**
  - Capacity: 20
  - Seats: 20

- **London Metropolitan**
  - Capacity: 20
  - Seats: 20
SEATING ARRANGEMENT
Social Space in Seating Design

Critical factors in human scale

Sight
Dimension
Backrest Angles

Medical Class
Business Class
Economy Class

Most Comfortable Seat Width
Most Efficient Seat Pitch

Collective experience
Individual experience
Collective experience

AUDITORY DISTANCE

Social Space in Vehicles

CONVERSATION

LECTURE

LEISURE

SPACE EXPERIENCE

Human emotion is always important while making a design. It could be influenced by so many factors like dimensions, environment, user experience, etc. It is widely accepted that different spaces could generate specific feelings. Here we are going to research the influence of space and distance to human emotion. As we have already studied the relationship between human and space in dimension aspects, it would be possible for us to view a single person as a bubble and combine several bubbles in different patterns to find out the most appropriate function for different areas.

DESIGN FACTORS

Human Experience
Interaction Design
Human Engineering

Space Planning

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SUPRA STUDIO

The whole journey

UCLA A+D
SUPRA STUDIO
SEATING ARRANGEMENT
Flexible Seating Arrangement

Flexible arrangement

Fig 20
Flexible material

Stack while not passenger
Boarding with friends

Different seat pitch with different seating position
Boarding as large group

18” 28”
Adjustable seat width

Sensory Sensor
Personal Control
Footrest
Ticket System
Adjustable seat support
Adjustable pitch and stowage

CAPSULE DIMENSION
Capsule Dimension Based On Seating Arrangement

Crowded
5 sq/Person
Airline average
6.6 sq/Person
Aircraft Coach
6.5 sq/Person
Coach average

Spacious
12.5 sq/Person
Airline First-class average

Available Space
Passenger Number
Seat Arrangement
Interior Width
External Width
Length
Diameter

21
5.6
6.8
5.5
2.2
609
249
283
271

361
430
619
21
8
6
4
2
11
108
21
6
4
2
**Passenger Interface**

To realize a human-centered passenger interface, 80% of passengers aged between 18-24 use social media. 31% of passengers find security the most stressful part of the passenger journey. 44% of passengers are stressed due to concerns over loss of time.

**What do passengers want?**

In today’s mobile connected world, passengers demand the same comforts in the Hyperloop as they do at home or the office.

**Features of Interface**

Passengers are presented with a variety of choices in Hyperloop Capsule. From controlling lighting and temperature to experiencing advanced information, entertainment, and management functionalities, you will decide what happens in your journey and have a fulfilling time and a wonderful experience.

1. Wide variety of entertainment and information choices:
   - DVD, CD, MP3, TV and radio
   - Full digital audio and video distribution
   - 3D virtual office features
   - Flexible configuration
   - Interactive moving map
   - Touchscreen control of all system capabilities

**Light and Illumination**

Color, emotion, and illumination system.
**VISUALIZATION**

**To Realize a Virtual Visual Environment: Windows vs. Windowless**

![Diagram of a capsule with projectors mounted on the side. The diagram illustrates how projectors could be used to display images on the capsule's side, allowing passengers to view virtual scenery.](image)

**Moving Projector**

The moving screen proposal has projectors mounted outside each window. Several lower projection screens would be installed on the tube corresponding with the moving projector. With the moving projector, visual images would keep pace with passengers. This proposal reduces the cost of installing screens along the tube.

**A Transparent Capsule Without Camera**

With the no camera proposal, two layers of screens are installed in the system. Interior screen on both sides will display notification, travel information, and public service advertisement. Screen mounted on the tube follows the speed of the capsule. It could be seen only when the window shelter is lifted, which would protect individual privacy. Passengers could watch their own videos or adjust their personal device to the screen.

When the capsule is operating in urban areas, window shelters would allow passengers to admire cityscapes and experience speed changes.

![Diagram of a transparent capsule with screens and projectors.](image)
A Transparent Capsule Without Windows

The Hyperloop has cameras mounted on the tube to capture a full 360-degree view, and then project that on the inside of the capsule walls and ceilings covered by flexible screens. The hyperloop could also enable passengers to display any panoramic views on the screen. Themes are also adjustable, which would allow different scenes to be changed, a 360-degree view of the sky, a lush forest or even a trip in space etc.

Removing windows has its engineering advantages. It would reduce the weight of the capsule, for a lower cost.

With camera rotation, passengers can capture a 360° view side view and a 360° whole view of city.

Passengers can interact with the capsule, using their iPad, phone, laptop, etc.

When these devices connect with the capsule via wireless, just simply drag the image, game, movie, music onto the wall, then they will be projected.

Passengers can actually interact with these projected images. There are a set of camera track the fingers on the projected wall. The tracking is very accurate, with similar performance as the iPad.
DESIGN STRATEGIES BASED ON TIME
Passenger Experience During The Journey

**ACTIVITY**

Station

Urban Route

InterCity Route

**LIGHTING**

Boarding: 04:30

Leaving: 04:30

Acceleration: 12:30

**ENVIRONMENT**

Station

Urban Route

InterCity Route

**SOUND**

Station

Urban Route

InterCity Route

**TEMPERATURE**

Station

Urban Route

InterCity Route

**ENTERTAINMENT**

Station

Urban Route

InterCity Route

*UCLA X AUD SUPRASTUDIO*