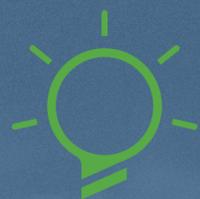


HYPER LOOP

Concept Design for Elon Musk's Hyperloop



altuitdesign

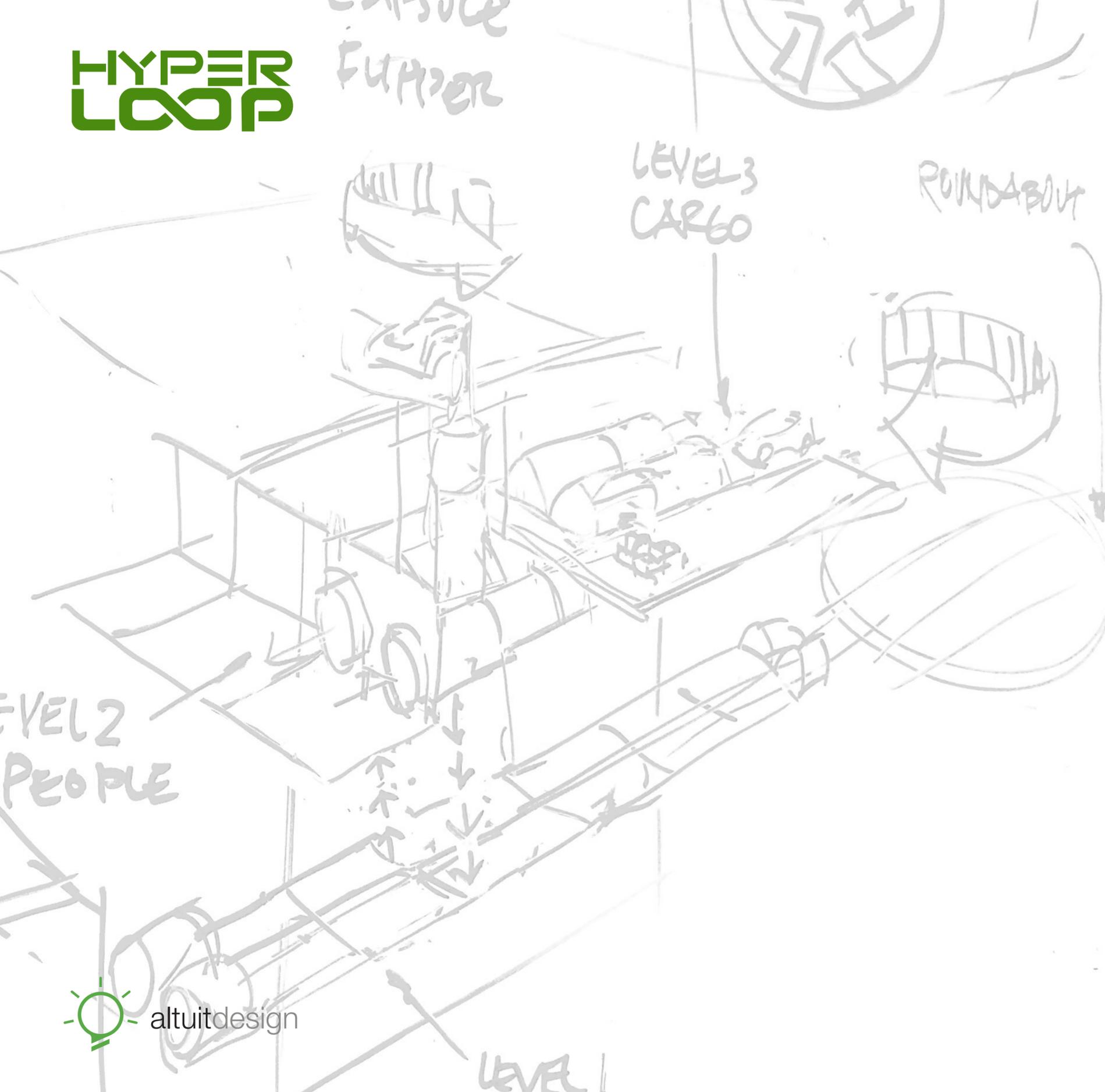


HYPER LOOP

Concept Design for Elon Musk's Hyperloop



altuitdesign



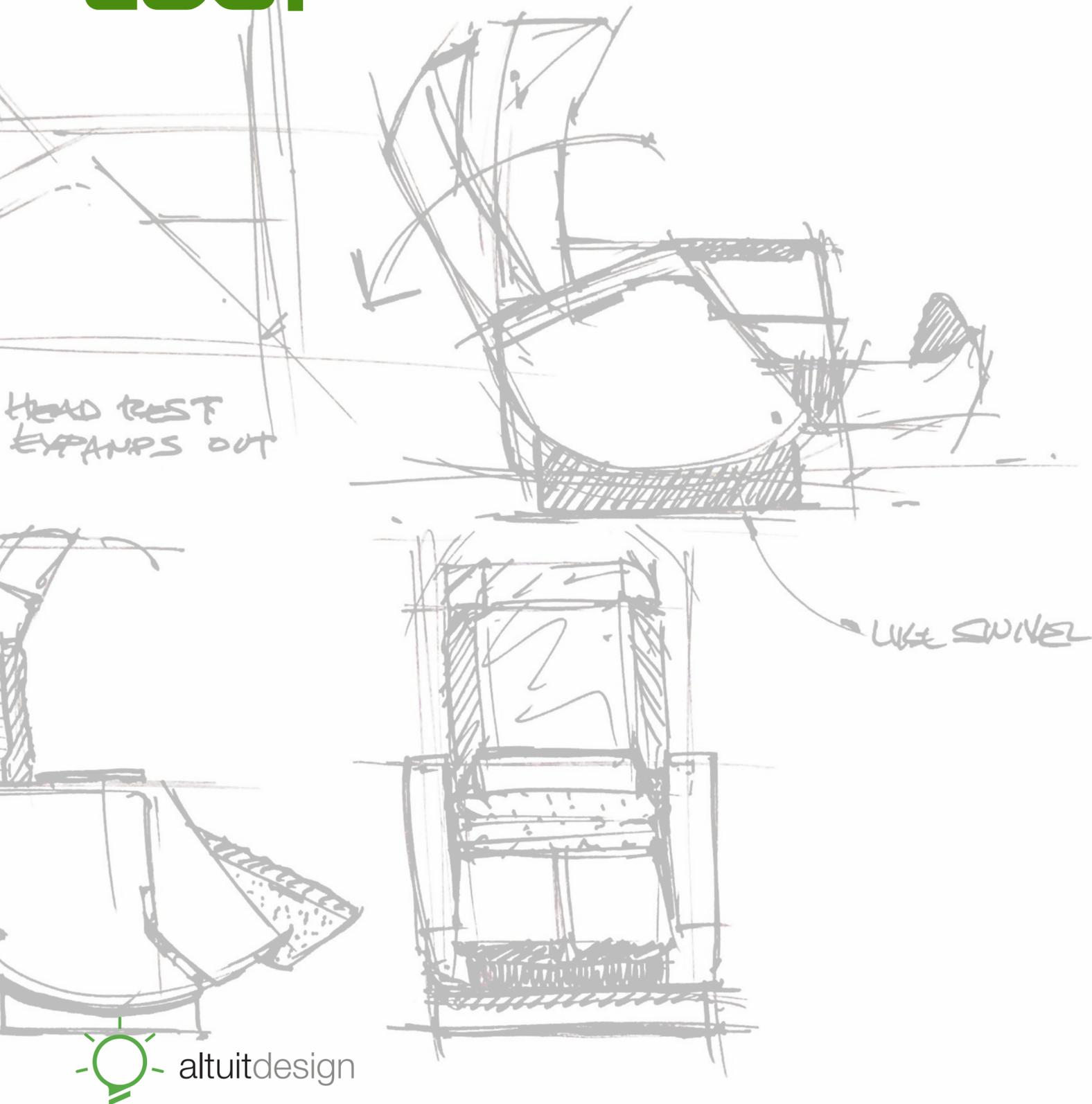
Overview

The Hyperloop is a conceptual high-speed transportation system put forward by entrepreneur Elon Musk, incorporating reduced-pressure tubes in which pressurized capsules ride on an air cushion driven by a combination of linear induction motors and air compressors.

In August 2013 Elon Musk published a 57-page document summarizing his plans for the supersonic Hyperloop that might someday traverse the space between Los Angeles and San Francisco.

His report focused on the economics and technology required to build such a system. It suggested basic sizes and configurations for Hyperloop capsules, as well as basic performance metrics. The report was a technical paper and not a design document.

Musk wrote in the report, "**Feedback would be most welcome.**"

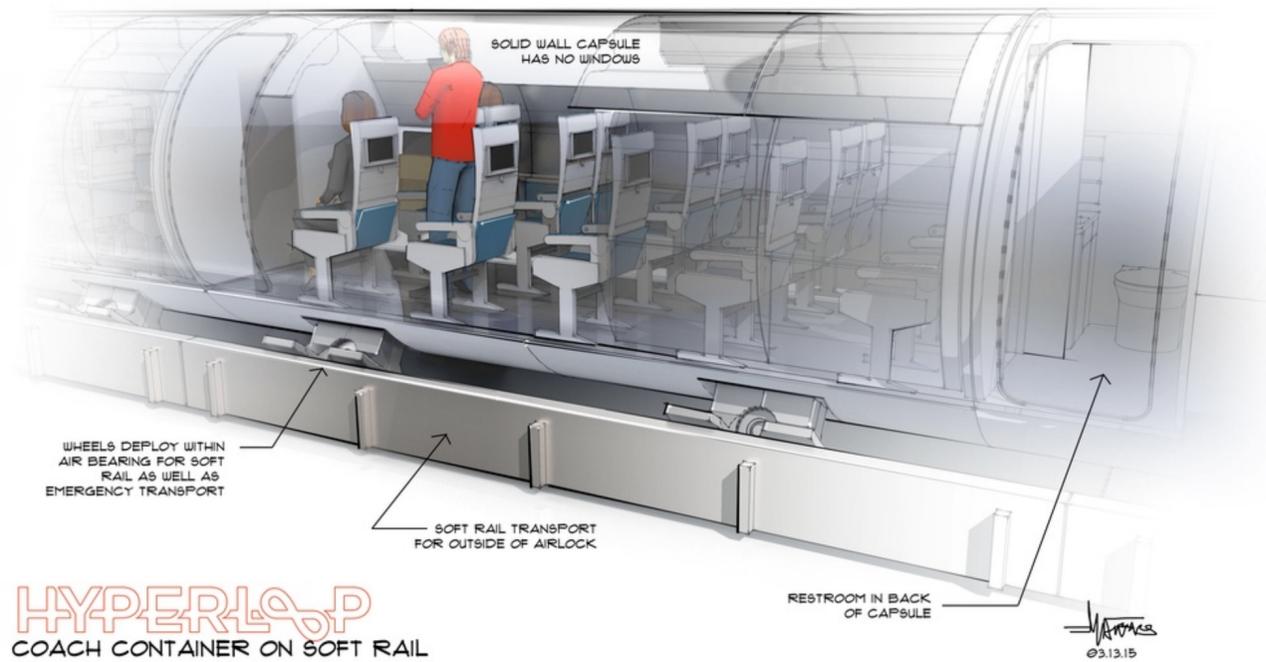


Rationale

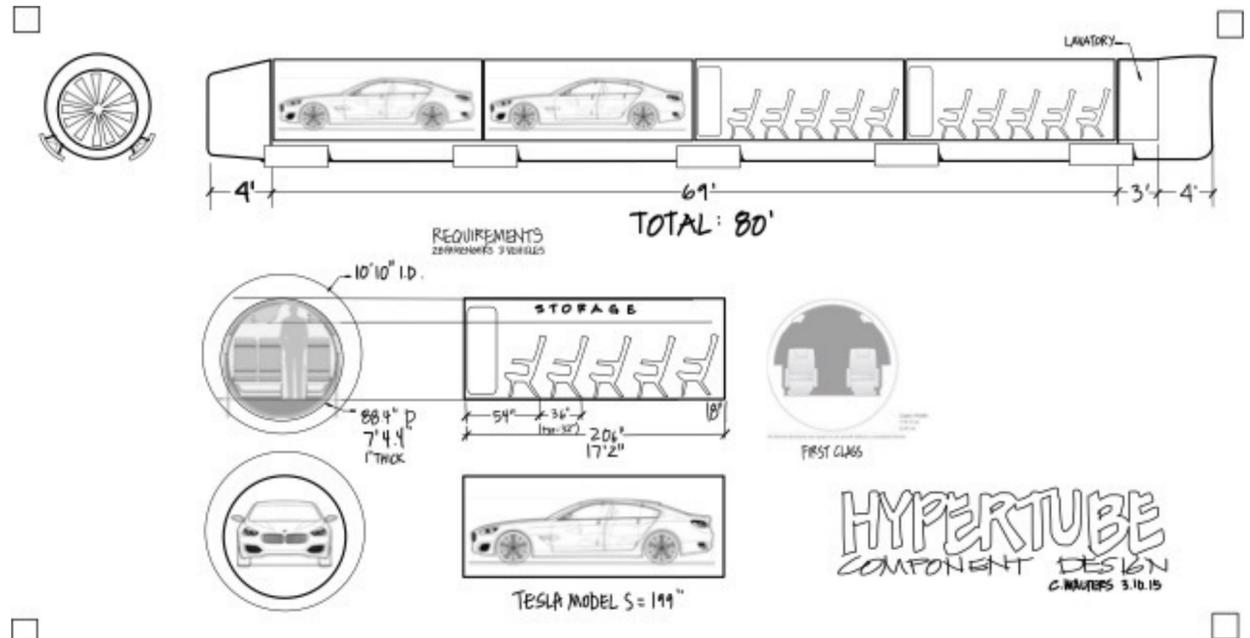
Since more work remains to determine how the Hyperloop would be designed for humans, we thought to spend some time imagining what the future design of such a transport might be. This document is the result of ideation and design sketches by designers, and reflects a possible design direction for the Hyperloop.

In order to quickly create this concept, it was first necessary to collapse the original specification and work from a reduced set of requirements. We made the following assumptions:

- We would focus on the larger diameter capsule design, the one which could transport vehicles and goods as well as humans.
- While acknowledging the theoretical speed limit is over 700 mph, we chose to instead believe a working version would travel at a top speed of 300-400 mph. This was based on further exploration of the concept by different engineering groups and the belief that speed bumps, sharp turns and g-forces may induce motion sickness. Hopefully, slowing the Hyperloop down helps to minimize these effects.
- At slower speeds, humans would be traveling for multiple hours, and more traditional passenger compartments would be necessary. There would need to be the ability during specific times to be able to get up and walk around—and use a bathroom.
- Based on the travel duration, it may be necessary to have an attendant and service, and necessary accommodations need to be provided.
- We would not at this time concern ourselves with the economics of implementation. It is still early in the process and we challenged ourselves to think outside the box to hopefully create an imaginative solution which could act as a spark for further exploration.



HYPERLOOP
COACH CONTAINER ON SOFT RAIL



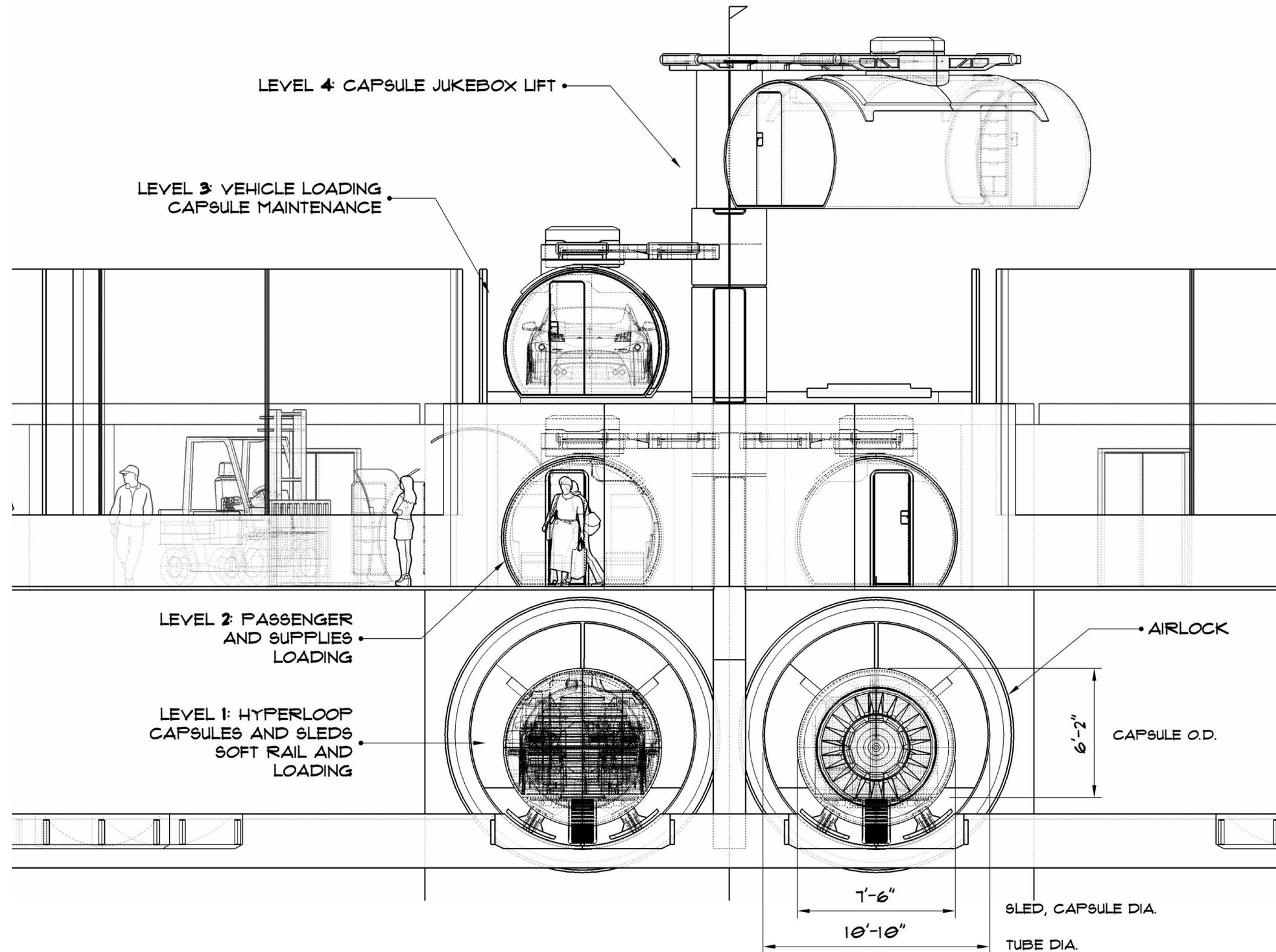
Configuration

Early on, we decided to focus on creating a modularized system—one which is easily and automatically configured, even up to the last minute, and provides the flexibility needed for multiple cargo types and people interactions.

The Hyperloop itself contains four modular Capsules. Each Capsule is removable. When engaged, the Capsules are fastened to the Hyperloop **Sled**, a single contiguous vehicle chassis which contains the front-facing intake air compressor. A static restroom and control area are located in the rear. In between the front and rear units is the Capsule mount platform, which houses the soft rail transport mechanisms as well as the battery power.

The Capsules are lifted off the Hyperloop Sled onto the departure / arrival platform by the **Capsule Jukebox**, not unlike some of the advanced parking garages popular in Japan. There they can be changed, configured, loaded, and unloaded. A second platform is used for maintenance and loading of vehicles.

DIMENSIONS: FRONT



Capsule Types

There could be any number of uniquely configured capsules.
We choose to show five concepts:

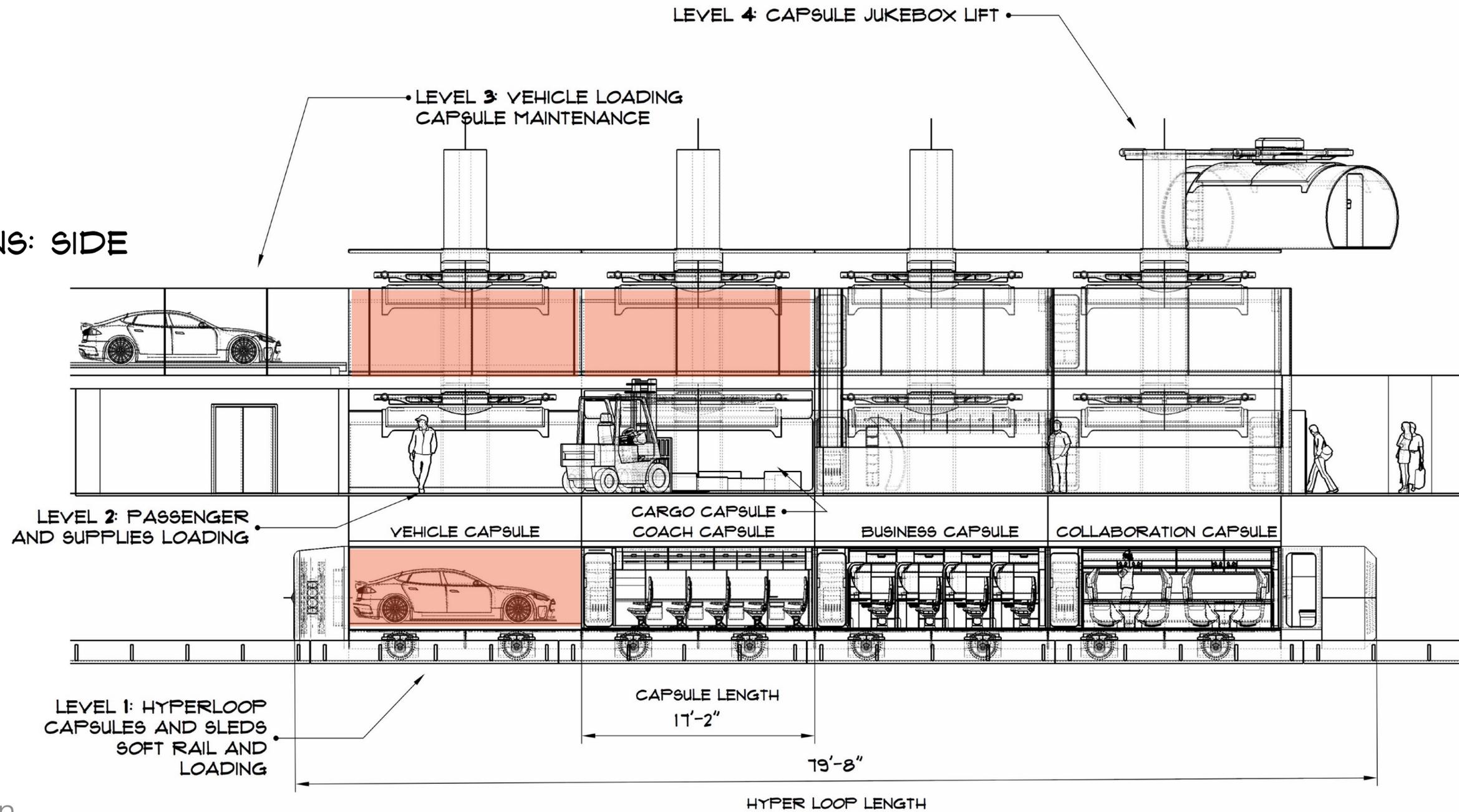
1. Vehicle Capsule
2. Cargo Capsule
3. Executive Meeting Capsule
4. Business Work Capsule
5. Coach Capsule

VEHICLE CAPSULE

The Vehicle Capsule(s) are always the closest to the front of the Sled. They are loaded on the second platform and need to be connected to be able to drive through to the last loaded capsule.

For safety, in the event of a sudden stop, the vehicles are situated in front of, and not behind the passengers.

DIMENSIONS: SIDE



LEVEL 3: VEHICLE LOADING AND MAINTENANCE

VEHICLE LOADING CAPSULE

EMERGENCY EXIT / SUPPLIES CONTAINER

LEVEL 2: PASSENGER AND CARGO TERMINAL

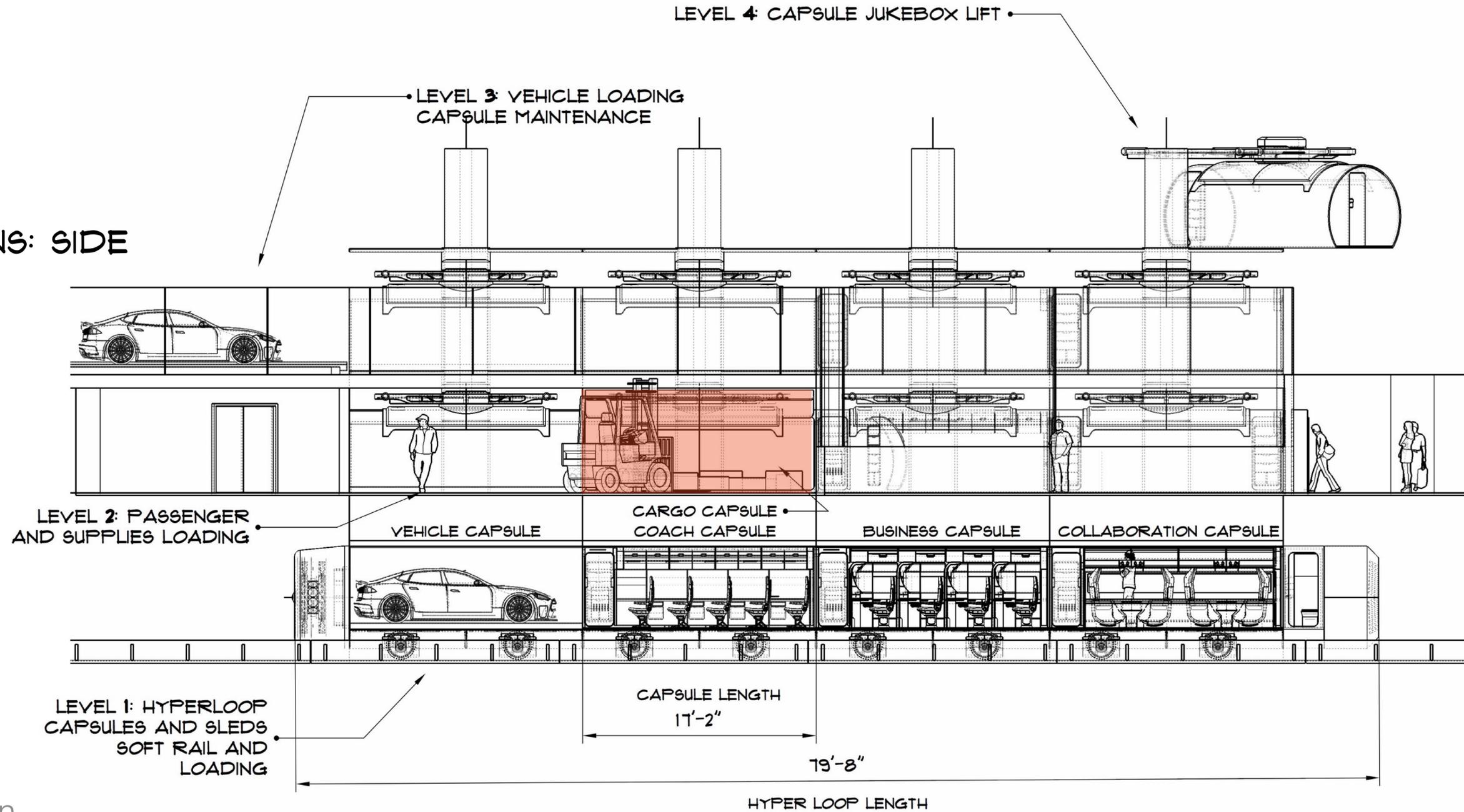


HYPER LOOP

CARGO CAPSULE

The Cargo Capsule(s) follow the Vehicle Capsule(s) and can be loaded on both the first and second platform. It is conceivable these could also be refrigerated or configured for specialty needs, like animal travel. The Cargo Capsules do not necessarily have a pass-through, but instead have a large door opening for automated loading. For safety, in the event of a sudden stop, the Cargo Capsule(s) are situated in front of, and not behind the passengers.

DIMENSIONS: SIDE



LEVEL 4: JUKEBOX LOADER

CARGO CAPSULE

LEVEL 2: PASSENGER AND CARGO TERMINAL

APR 2015



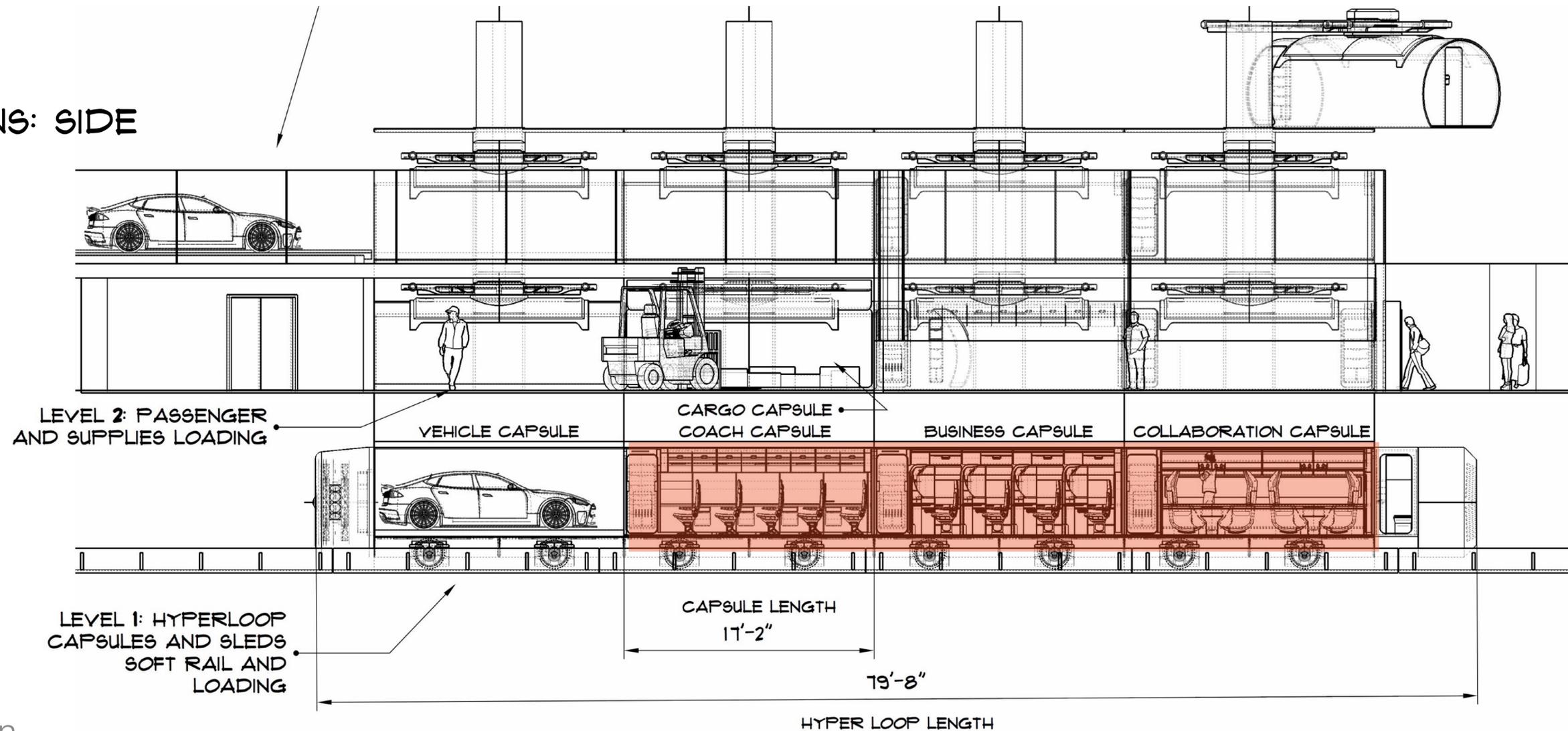
PASSENGER CAPSULE

All of the Passenger Capsule(s) are placed towards the rear of the Hyperloop. Passengers board and disembark through Level Two. The capsules are open one to another, so that passengers can all visit the restroom located in the rear compartment.

All of the Passenger Capsules utilize digital wall screens, called **Tripscenes**, to create a feeling of openness during travel. These screens have several different images displayed, in sync with travel, to help users forget the fact they are traveling in a windowless tube. **Tripscenes** can include clouds, pastures, even outer space and underwater scenes. Because they are digital, they can also display route and trip information, along with other digital data.

Each Passenger Capsule has a front pantry area with an emergency exit door, which doubles as a supply loading container. They are typically switched out at each destination. There is also an attendant jump-seat in the pantry area.

DIMENSIONS: SIDE



HYPER LOOP

TRIPSCENE DISPLAY

The Tripscene display allows for a number of different immersive and theme-based virtual environments. These environments help create a more expansive interior perception. Trip and overall status information are shown on the same display.



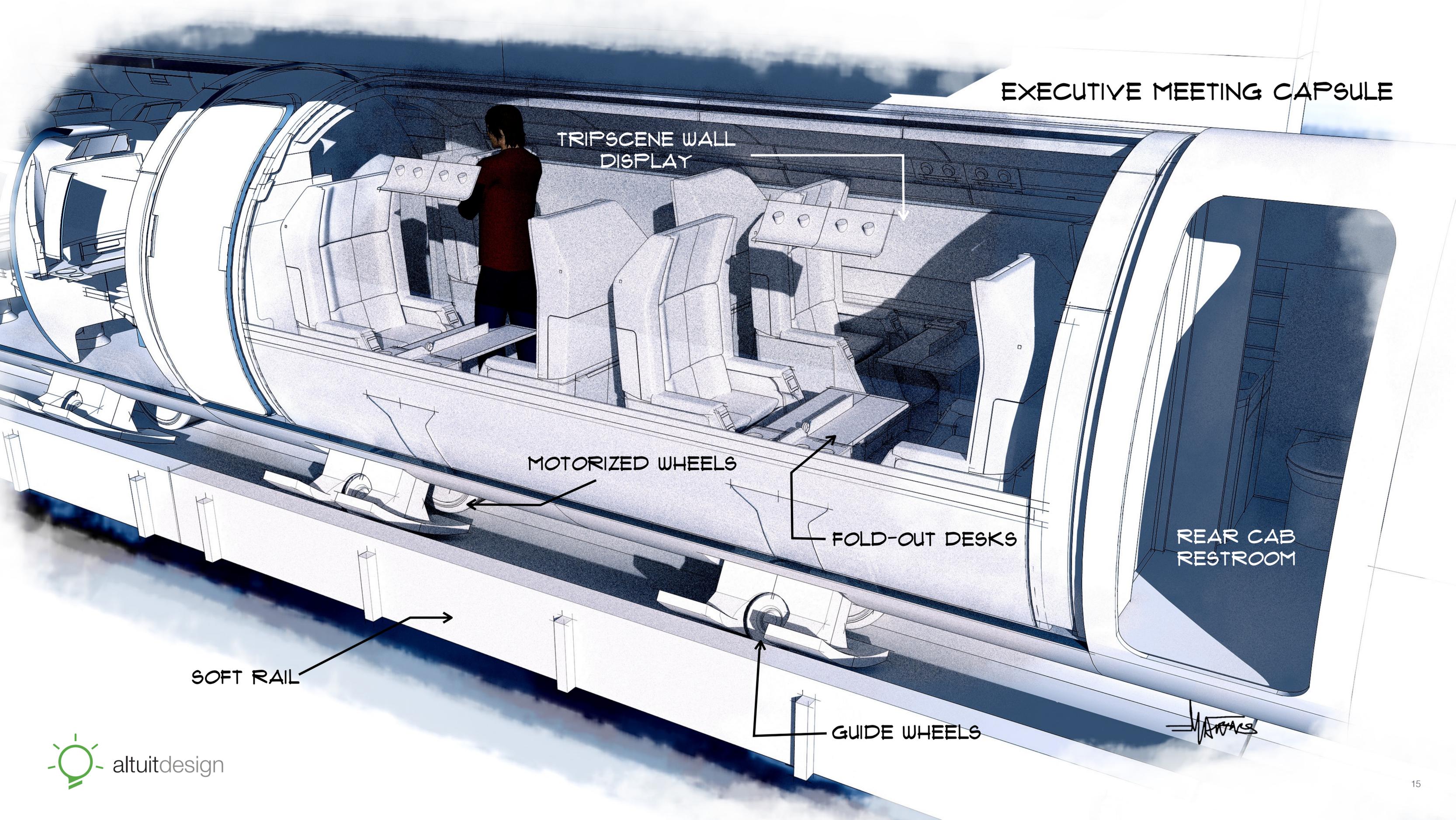
HYPER LOOP

EXECUTIVE MEETING CAPSULE

The Executive Meeting Capsule holds 8 passengers, each facing each other. There is a fold-away table between seats that houses projection displays. Chairs are fully automated with ability to recline to sleeping position without bothering the passenger across from you.



EXECUTIVE MEETING CAPSULE



TRIPSCENE WALL
DISPLAY

MOTORIZED WHEELS

FOLD-OUT DESKS

REAR CAB
RESTROOM

SOFT RAIL

GUIDE WHEELS

HYPER LOOP

EXECUTIVE MEETING CAPSULE



**HYPER
LOOP**

EXECUTIVE MEETING CAPSULE



The Business Work Capsule services 8 passengers, and contains private working areas, called **Pods**. The **Tripscene** display curves in front of the passenger providing for a working display and slide-out keyboard to do work or watch a movie. The seat rotates outward so access is easier.

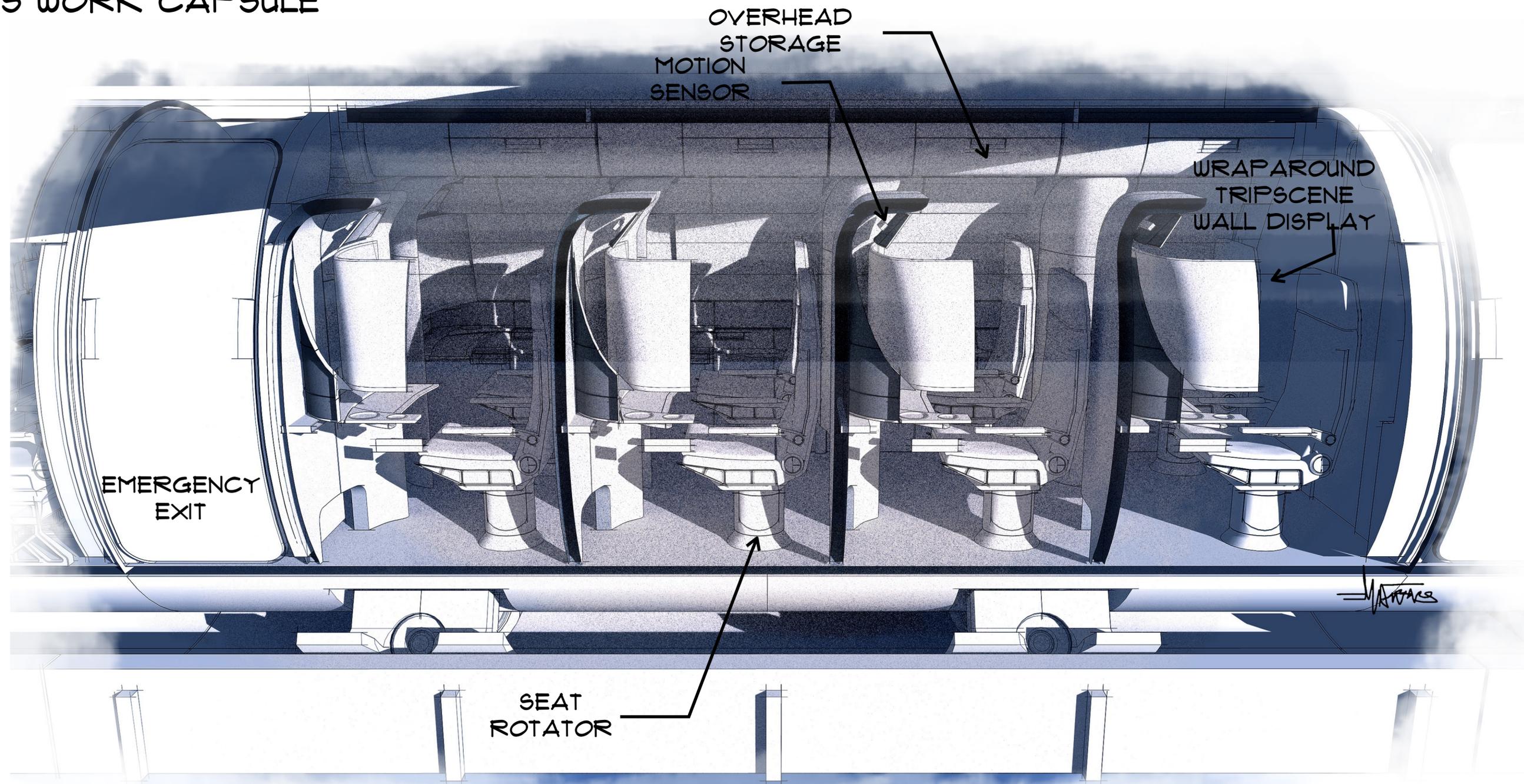
A cursor eye-tracking and motion sensing device sits above the display, and can parallax-correct the **Tripscene** visuals for when a passenger's head or eyes move, thus creating an augmented reality. The **Tripscene** can be synced with outside cameras to provide a view of the outside landscape. If desired, the **Tripscene** can also provide route and trip information, along with other digital data.

A storage compartment is located above each **Pod**.



HYPER LOOP

BUSINESS WORK CAPSULE



HYPER LOOP

BUSINESS WORK CAPSULE



HYPER LOOP

BUSINESS WORK CAPSULE



HYPER LOOP

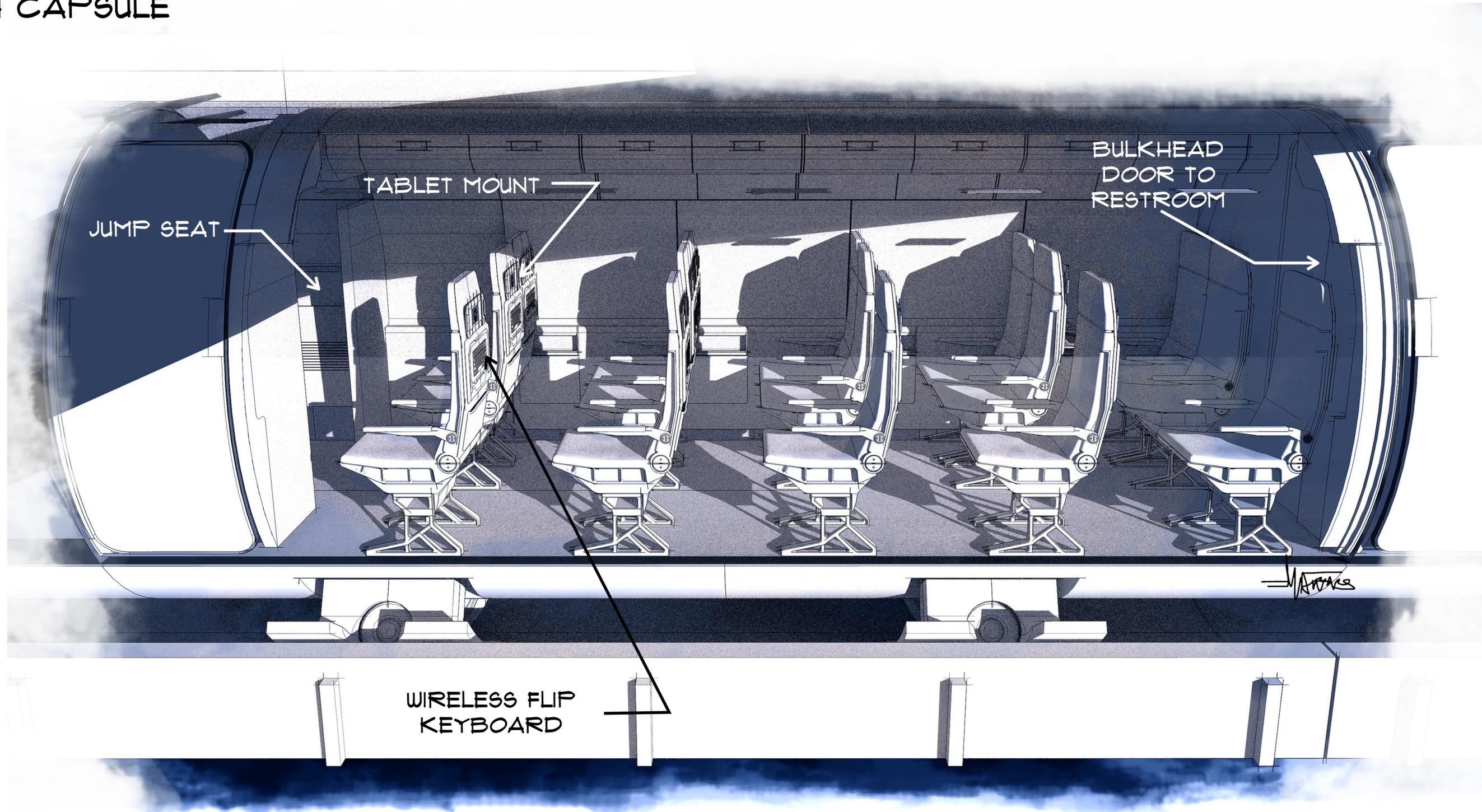
COACH CAPSULE

The Coach Capsule holds 15 passengers. Leg room and seat spacing is significantly greater than air travel. Each seat back has a wireless flip keyboard tray and includes a tablet mount. Storage compartments are located above the seats.



HYPER LOOP

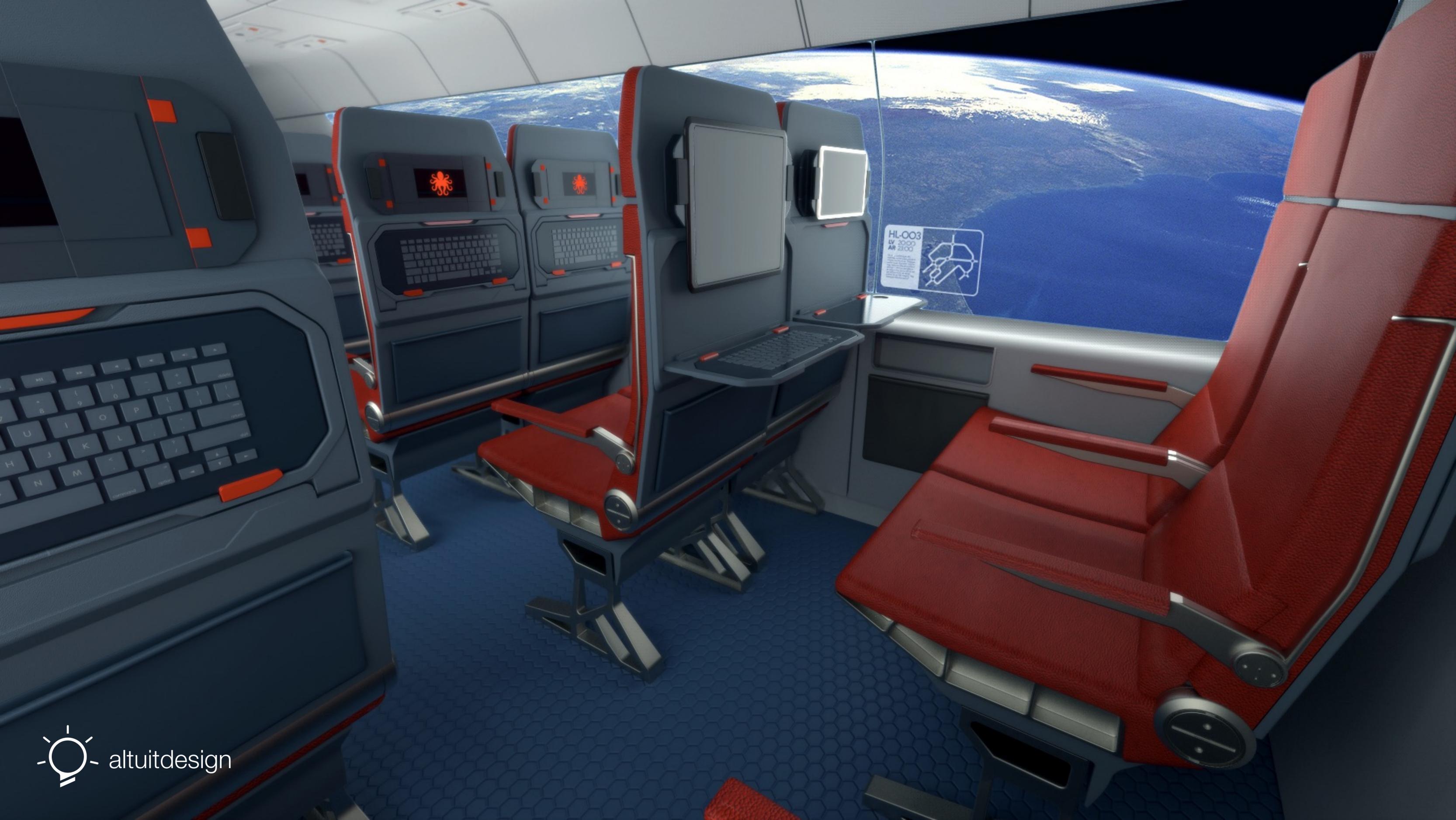
COACH CAPSULE



HYPER LOOP

COACH CAPSULE





HYPER LOOP

COACH CAPSULE



HYPER LOOP

COACH CAPSULE



Platform Levels

This concept design has 4 different platform levels:

1. Soft Rail and Turntable
2. Passenger and Cargo Terminal
3. Vehicles and Maintenance
4. Capsule Jukebox

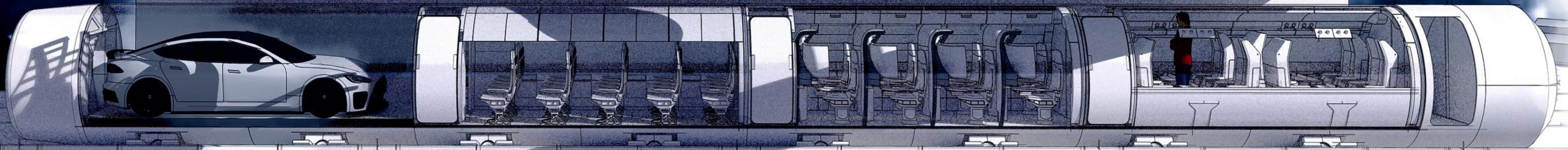
LEVEL 3: VEHICLES AND MAINTENANCE

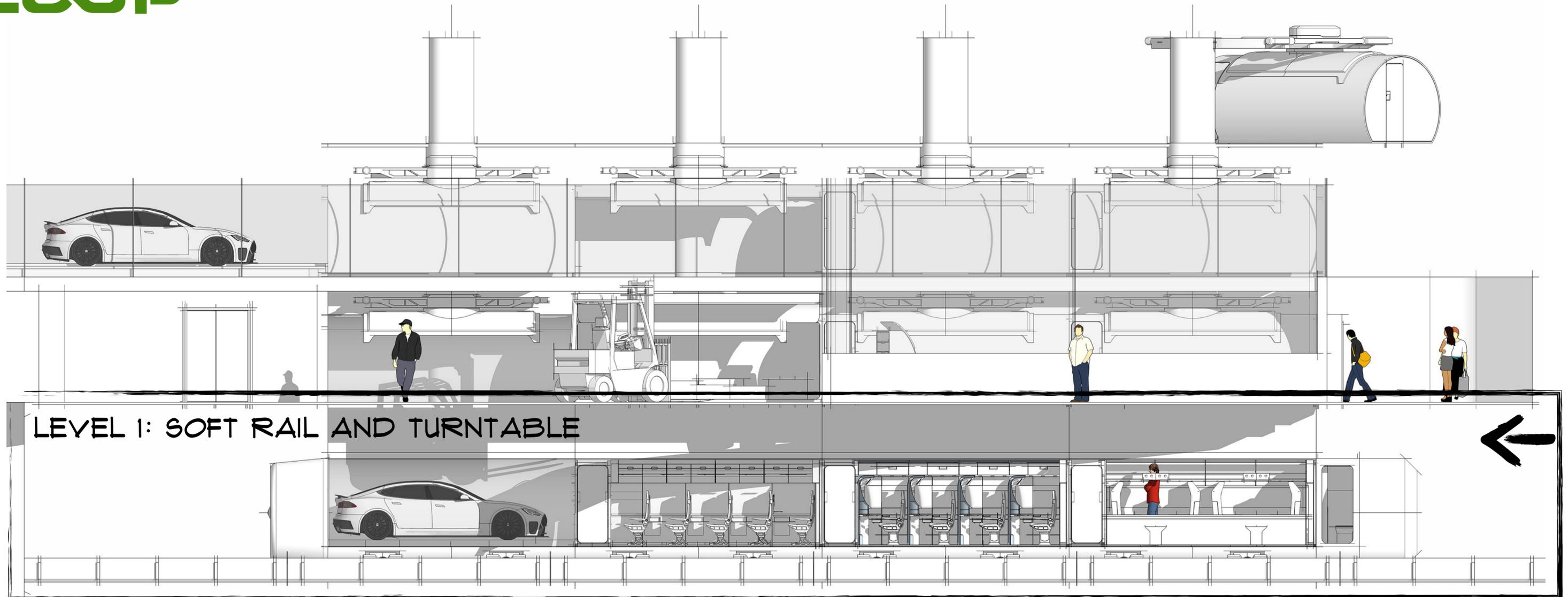


LEVEL 4: CAPSULE JUKEBOX

LEVEL 2: PASSENGER AND CARGO TERMINAL

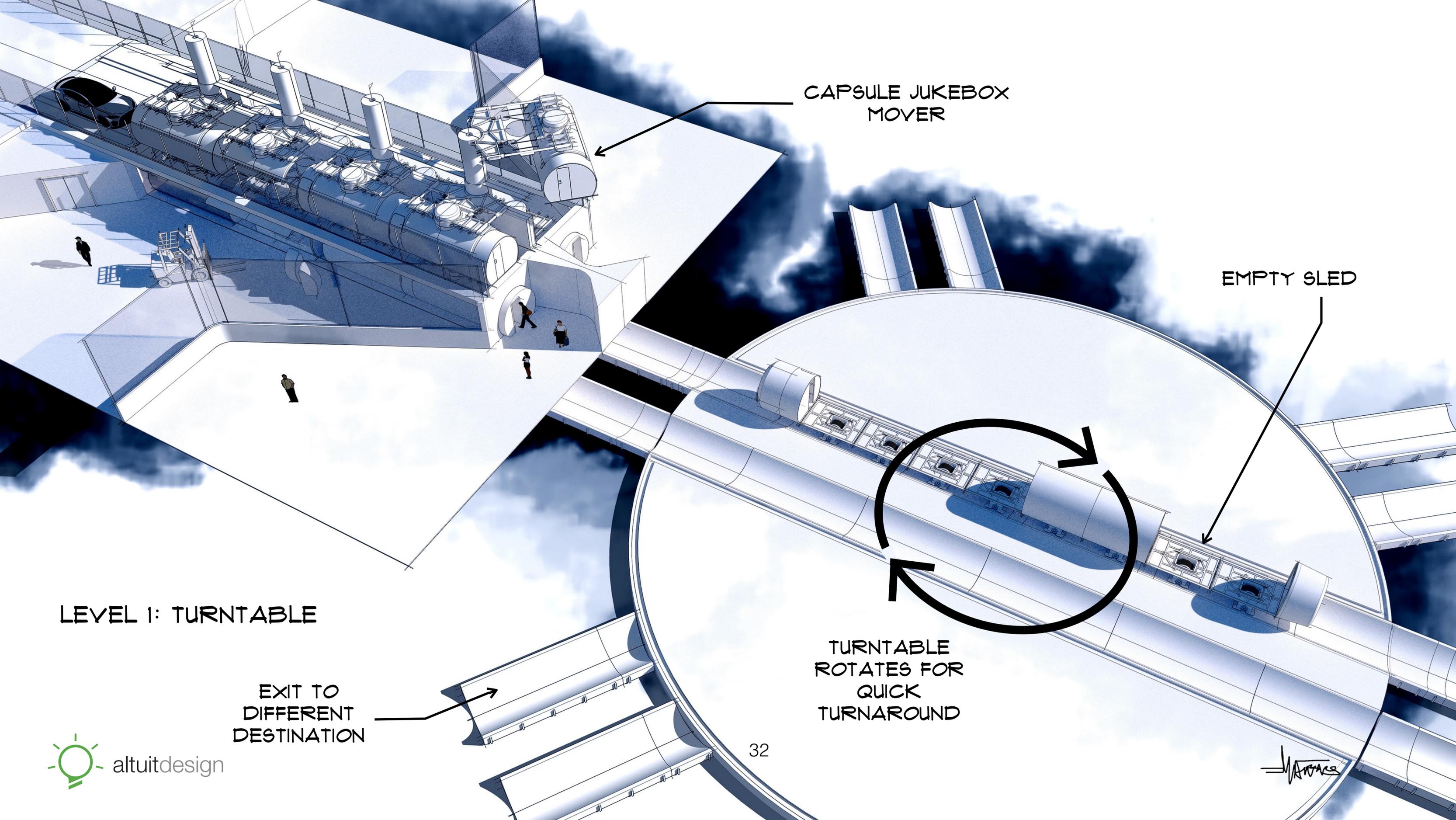
LEVEL 1: SOFT RAIL AND TURNTABLE





Each Hyperloop tube is actually a pair of tubes—one going, another coming. The Hyperloop travels in a limited vacuum tube. In order to enter and leave, it must first pass through an airlock. The airlock is the point at which the Hyperloop enters a station. Once depressurized, the Hyperloop can no longer operate on its air-bearing rails. Guide wheels deploy through the air bearing rails and an electric motor drive wheel descends from the Sled chassis which enables the Hyperloop to travel on the soft rail while inside the station. There are a pair of soft rails, one for each tube coming and going.

Once the Hyperloop comes to a stop, the **Capsule Jukebox** immediately moves all capsules scheduled for transit simultaneously to Level Two. Once Capsules are moved, the Hyperloop Sled moves onto a **Turntable** where it can be reversed in direction or sent on another path. During the time the **Capsule Jukebox** is transferring capsules, an automated cleaning robot changes out the restroom and collects all waste.



CAPSULE JUKEBOX MOVER

EMPTY SLED

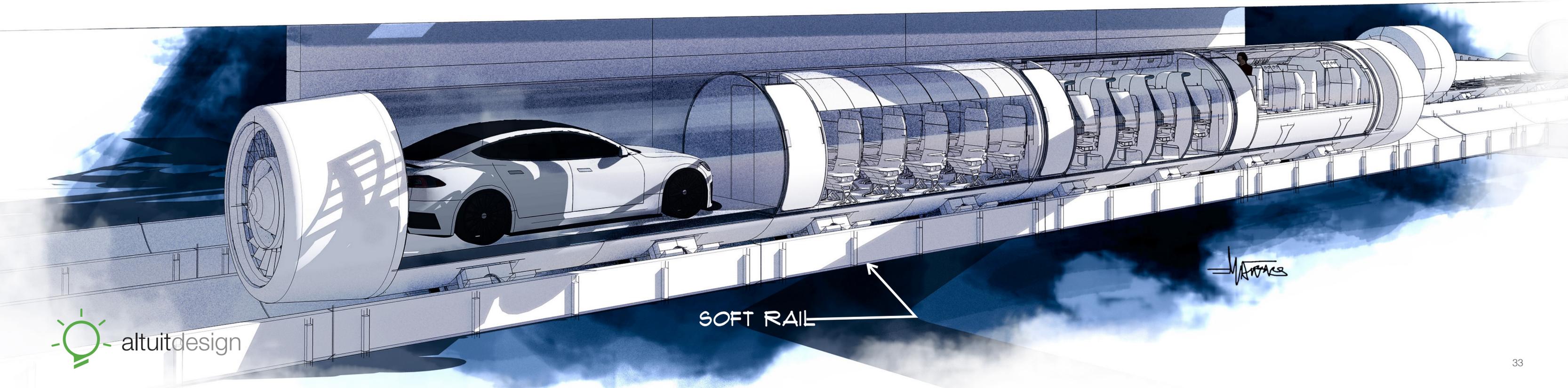
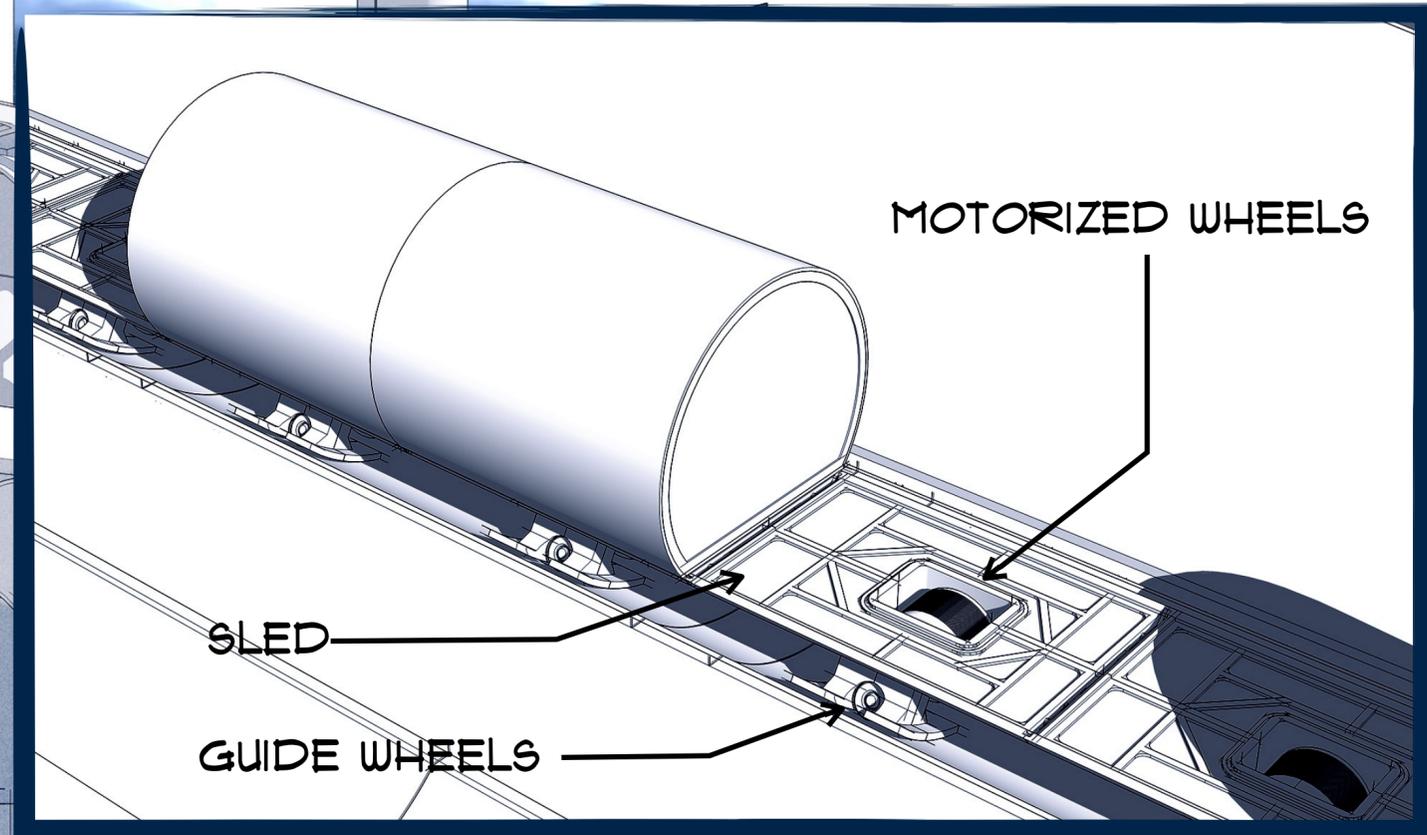
LEVEL 1: TURNTABLE

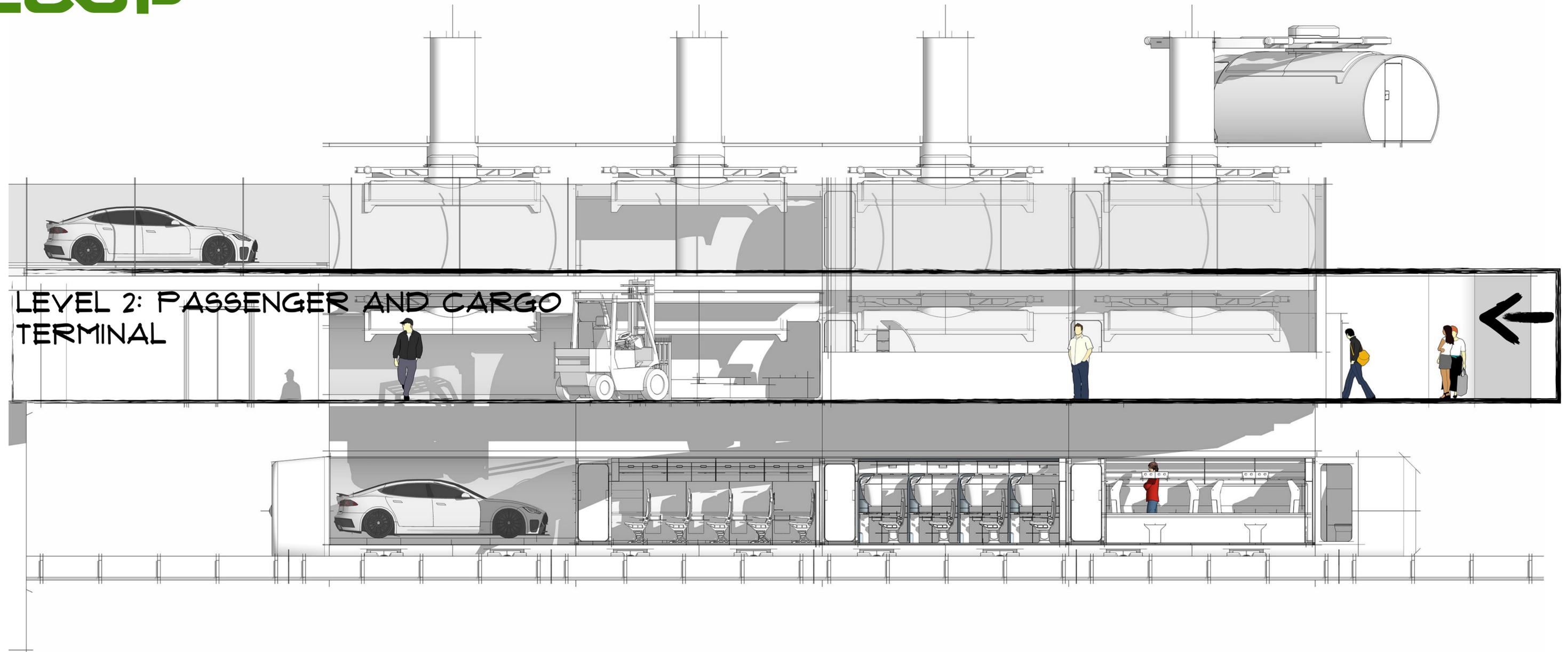
EXIT TO DIFFERENT DESTINATION

TURNTABLE ROTATES FOR QUICK TURNAROUND

32

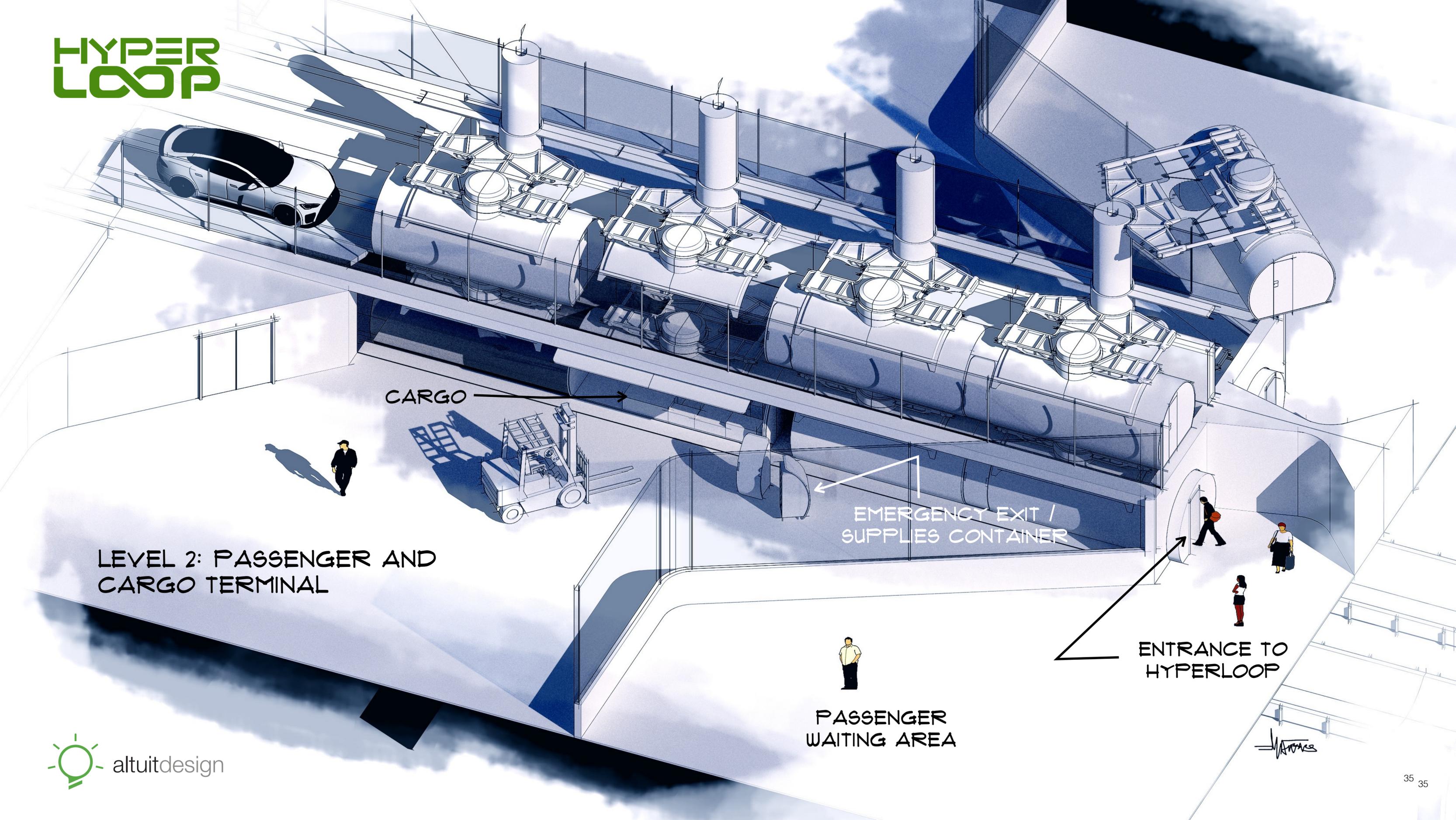
LEVEL 1:
SOFT RAIL





Upon arrival, the Capsule is removed from the Sled and moved up to the departure and arrival platform by the **Capsule Jukebox**.

At Level Two, Passengers embark and disembark from the waiting area, to the right of the station. In the center of the station, cargo is loaded and unloaded and the combo passenger emergency door / supply container is removed, restocked, and replaced.



CARGO

EMERGENCY EXIT /
SUPPLIES CONTAINER

LEVEL 2: PASSENGER AND
CARGO TERMINAL

PASSENGER
WAITING AREA

ENTRANCE TO
HYPERLOOP

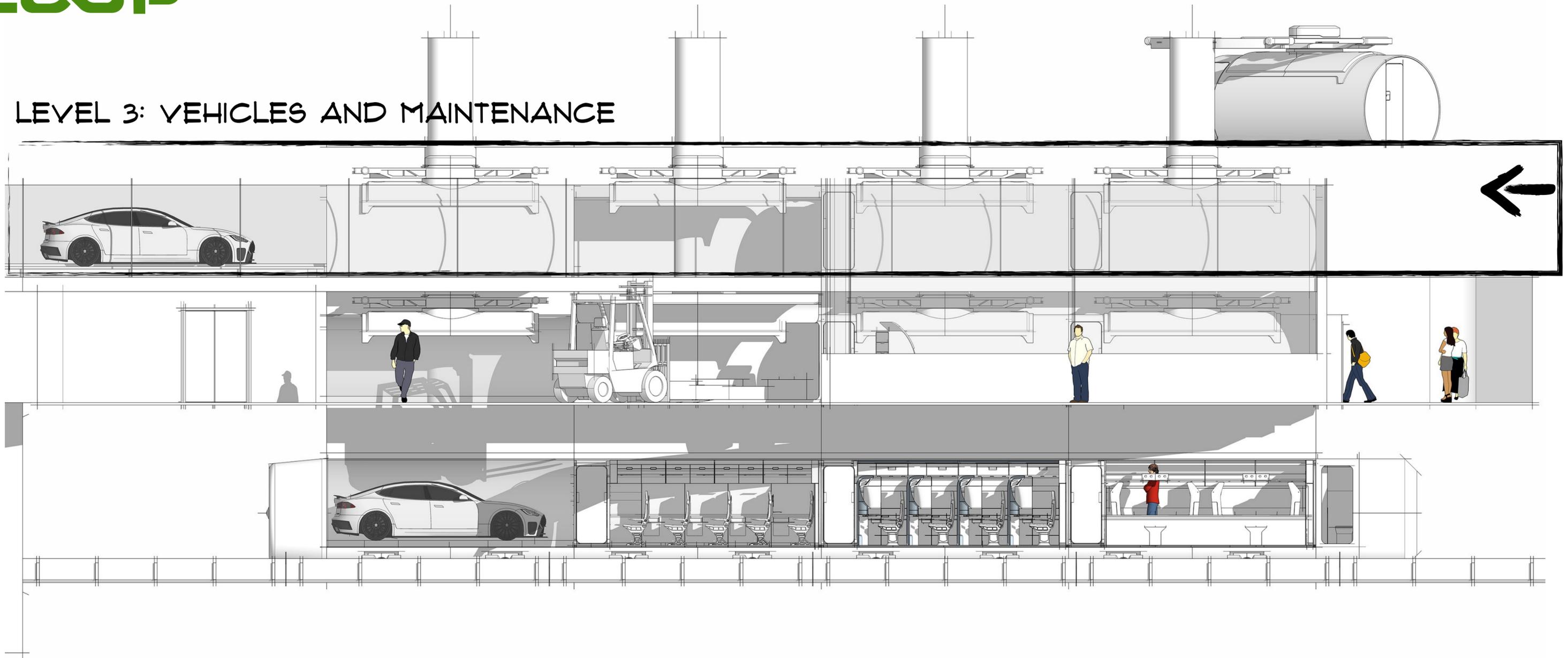
CARGO

DEPARTURES

LEVEL 2: PASSENGER AND CARGO
TERMINAL

ARRIVALS

LEVEL 3: VEHICLES AND MAINTENANCE



At Level Three, vehicles are loaded and unloaded, capsules are repaired and/or swapped out, and overall capsule maintenance takes place. If more than one car is to be

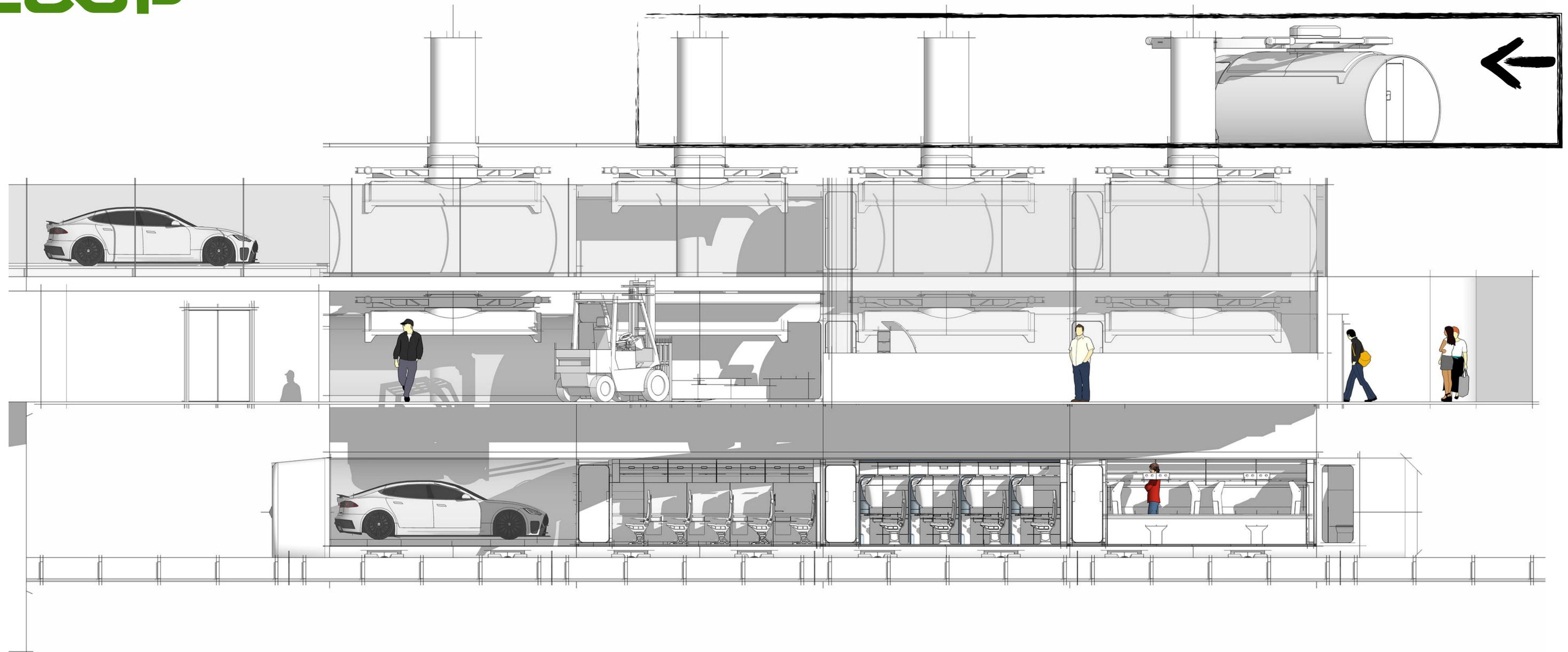
transported, the Vehicle Capsule bulkheads will stay open so that cars can drive through to the farthest empty capsule.

CAPSULE
JUKEBOX MOVER

VEHICLE CAPSULE

LEVEL 3: VEHICLES AND
MAINTENANCE

LEVEL 4: CAPSULE JUKEBOX



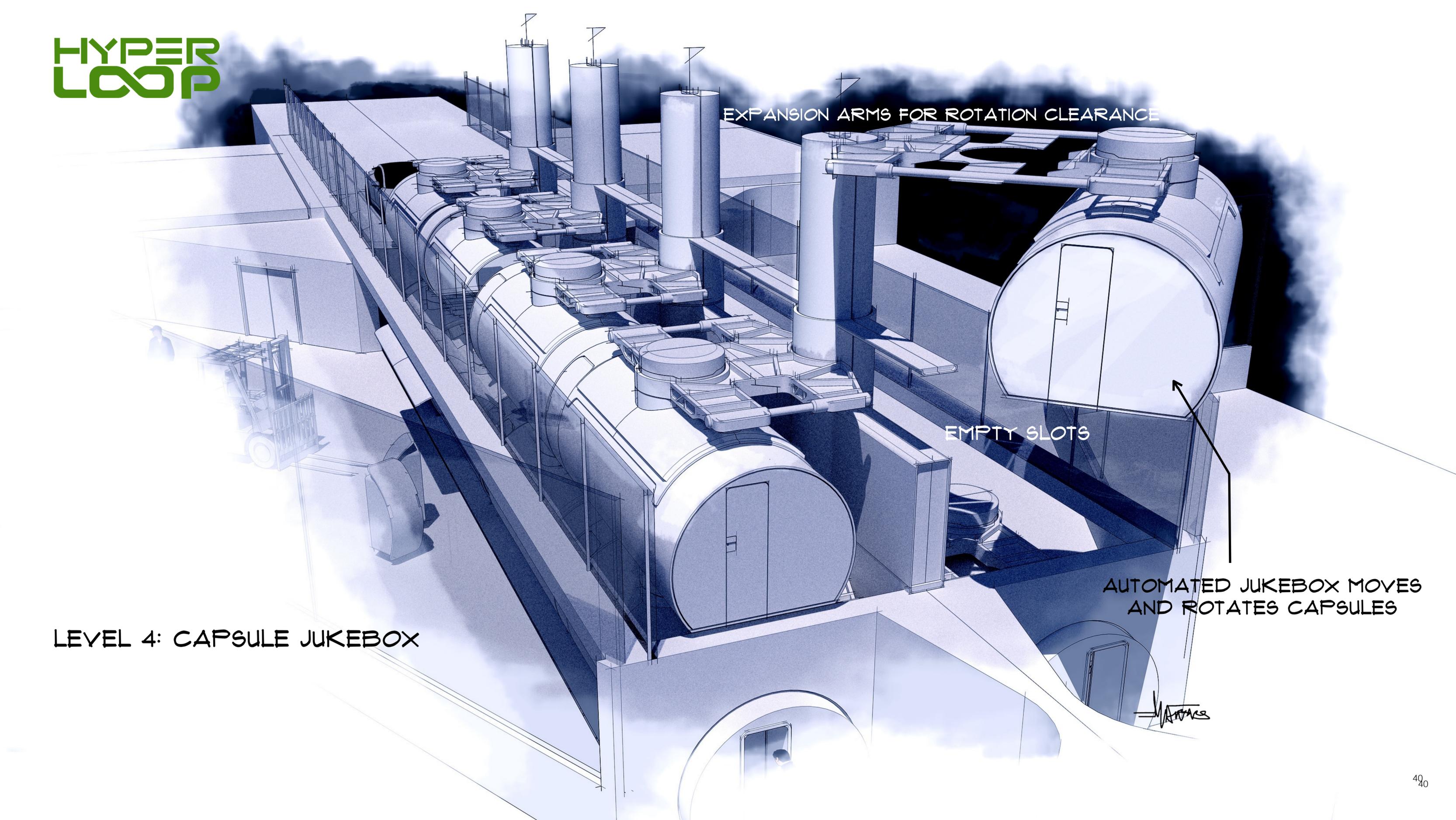
Level Four is used to move or rotate a capsule from one set of tracks to to the other. There is a Capsule Jukebox at the top of each of the Capsule columns.

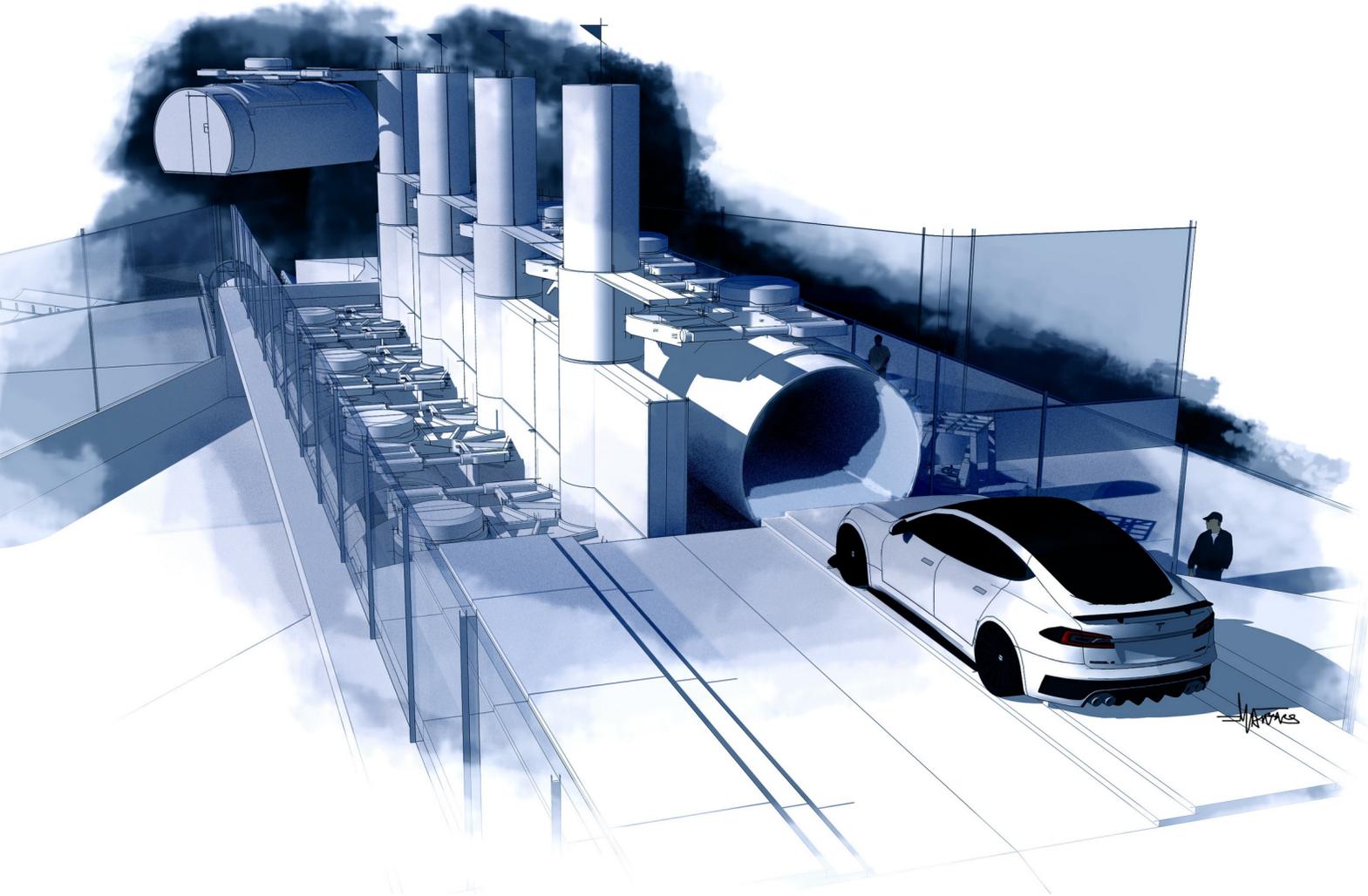
EXPANSION ARMS FOR ROTATION CLEARANCE

EMPTY SLOTS

AUTOMATED JUKEBOX MOVES AND ROTATES CAPSULES

LEVEL 4: CAPSULE JUKEBOX





Concluding Remarks

We would like to clarify that these concepts are not fully engineered solutions, but rather an exploration of what it might be like to visit a Hyperloop terminal and travel inside one. These designs are an exercise for our team to contribute to the Hyperloop project, and we hope it stimulates discussion and thought on future design directions.

HYPER LOOP



altuitdesign

Handwritten signature or mark.

