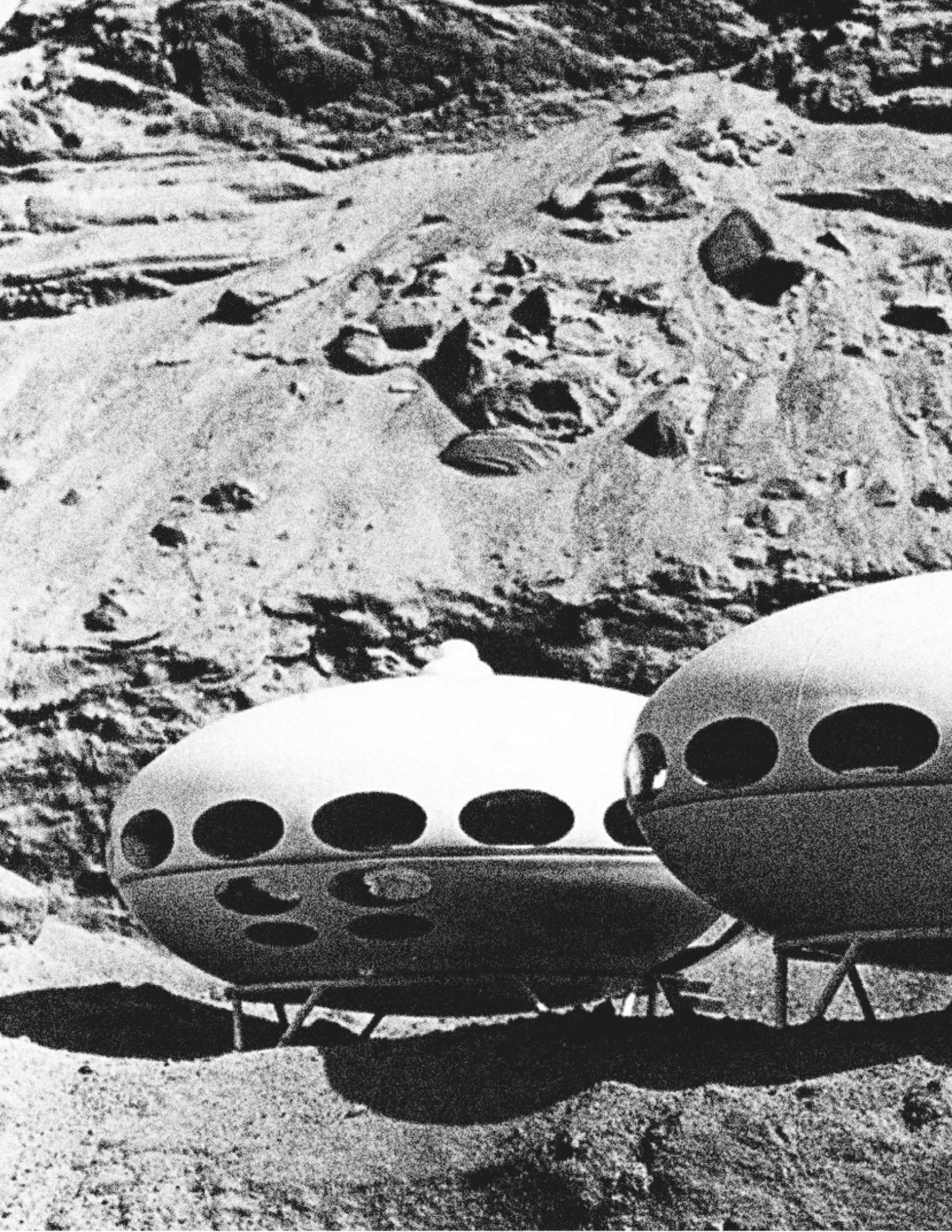




SOLACE

winter 2019
independent study
ashley hanson



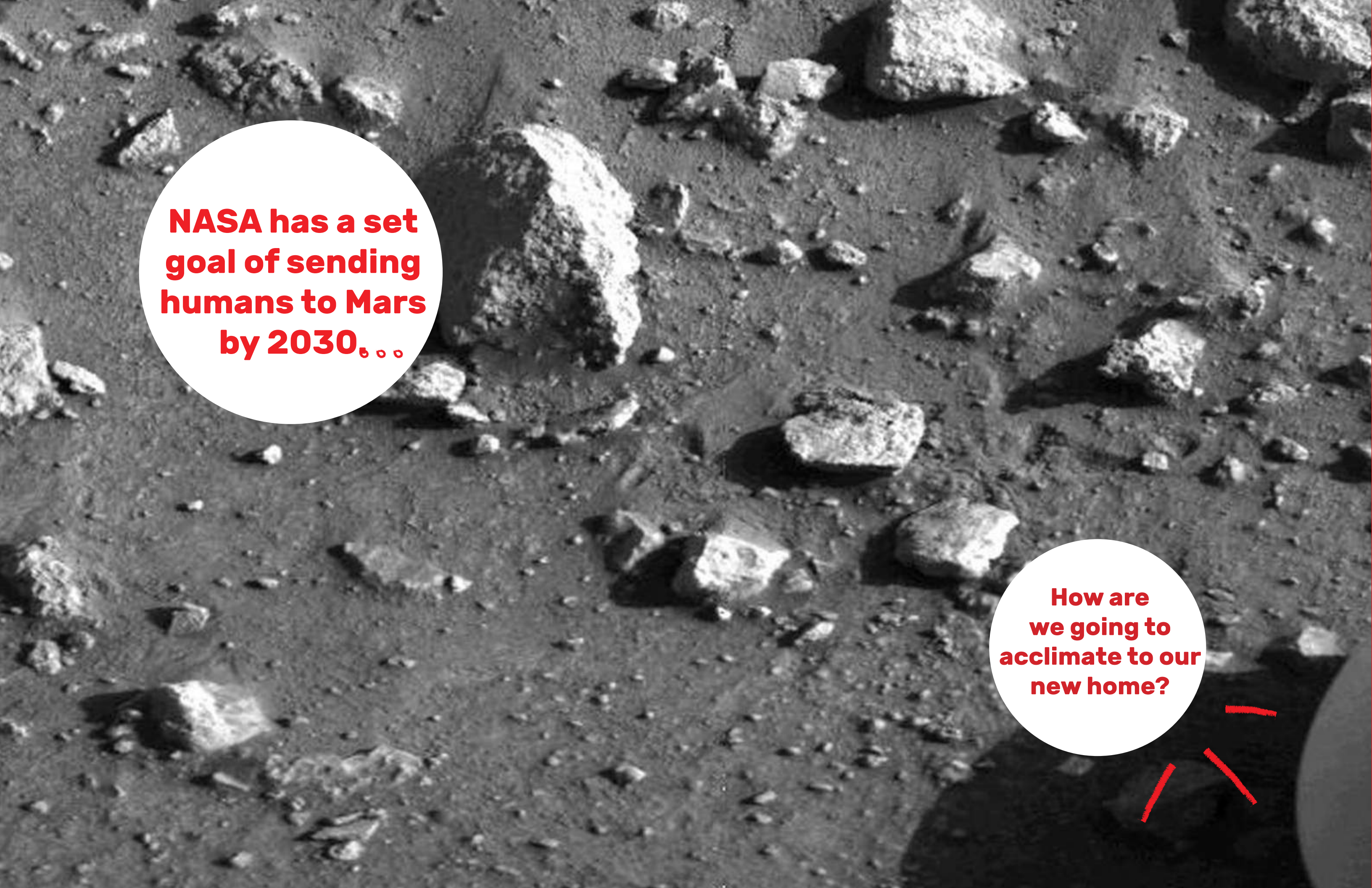
The Solar ~~System~~

ce

so • lace

noun

1. comfort or
consolation in a
time of distress or
sadness.



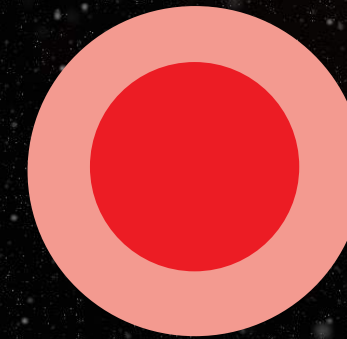
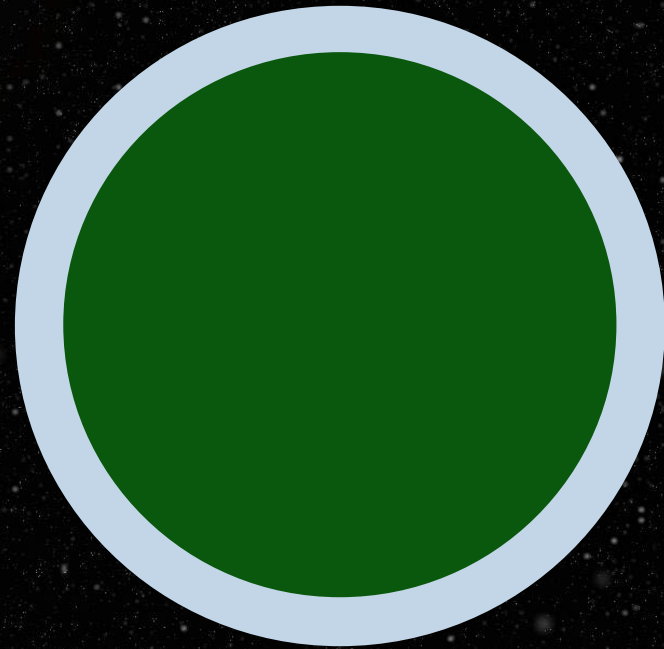
NASA has a set goal of sending humans to Mars by 2030...

How are we going to acclimate to our new home?



Solace is a community center based in the year 2200 on Mars that provides ease of comfort during the harsh realities of space exploration. The space connects astronauts with their loved ones on their home planet, and bridges the gap between imagination and realism by responding to the physical and emotional well-being of the community that will find itself there.

SOLACE



Average Distance from Sun
Average Speed in Orbiting Sun
Diameter
Tilt of Axis
Length of Year
Length of Day
Gravity
Temperature
Atmosphere
Number of Moons

93 million miles
18.5 miles per second
7,926 miles
23.5 degrees
365.25 Days
23 hours 56 minutes
2.66 times that of Mars
Average 57 degrees F
nitrogen, oxygen, argon, others
1

142 million miles
14.5 miles per second
4,220 miles
25 degrees
687 Earth Days
24 hours 37 minutes
0.375 that of Earth
Average -81 degrees F
mostly carbon dioxide



What's a sunset like on Mars?

It's the complete opposite of Earth - instead of our blue sky, with a vibrant red yellow sunset at night - we have a that red orange tone environment throughout the day with a blue sunset at night.

Dust in the Martian atmosphere has fine particles that permit blue light to penetrate the atmosphere more efficiently than longer-wavelength colors. That causes the blue colors in the mixed light coming from the sun to stay closer to sun's part of the sky, compared to the wider scattering of yellow and red colors. The effect is most pronounced near sunset, when light from the sun passes through a longer path in the atmosphere than it does at mid-day.

NASA's Curiosity Mars rover recorded this sequence of views of the sun setting at the close of the mission's 956th Martian day, or sol (April 15, 2015), from the rover's location in Gale Crater. This was the first sunset observed in color by Curiosity.

Space Parameters

01. SPACE RADIATION

The most dangerous aspect of traveling to Mars is space radiation. On the space station, astronauts receive over ten times the radiation than what's naturally occurring on Earth. Our planet's magnetic field and atmosphere protect us from harsh cosmic radiation, but without that, you are more exposed to the treacherous radiation. Above Earth's protective shielding, radiation exposure may increase your cancer risk. It can damage your central nervous system, with both acute effects and later consequences, manifesting itself as altered cognitive function, reduced motor function, and behavioral changes. Space radiation can also cause radiation sickness that results in nausea, vomiting, anorexia, and fatigue.

Many structures created for Mars must be underground to abide by the extremities of radiation present.

02. HOSTILE / CLOSED ENVIRONMENTS

Your stress hormone levels are elevated and your immune system is altered, which could lead to increased susceptibility to allergies or other illnesses, and disease. Every inch and detail of your living and working quarters must be carefully thought-out and designed. Just like you wouldn't want your house to be too hot, too cold, cramped and crowded, very loud, or not well lit, you wouldn't enjoy working and living in such a dwelling in space either.

03. ISOLATION AND CONFINEMENT

Crews for a Mars mission will undergo even more scrutiny and preparation, since they will travel farther and longer than any previous human, being more isolated and confined than we can imagine. The types of problems you may encounter are a decline in mood, cognition, morale, or interpersonal interaction. You could also develop a sleep disorder because your circadian rhythm might be thrown off due to the 38 extra minutes each day on Mars, or by a small, noisy environment, or the stress of prolonged isolation and confinement. Depression could occur. Fatigue is inevitable given that there will be times with heavy workload and shifting schedules. And then there's the possibility of the third-quarter effect, where morale and motivation decline three-quarters of the way into a mission, regardless of how long the mission lasts. The more confined and

International Space Station Interior



The ISS is the largest human-made body in low Earth orbit and can often be seen with the naked eye from Earth. The ISS consists of pressurised habitation modules, structural trusses, solar arrays radiators, docking ports, ex-

Why do we need a healthcare center?

Well, astronauts are under a tremendous amount of physical and mental pressure.



01.

PHYSICAL CONSEQUENCES

The gravity on Mars is 38% of that on earth. This brings about many physical complications. Your muscles act differently on Mars than they would on Earth. Heavily restricting activity reduces mental abilities over time

02.

MENTAL HEALTH

Nasa consider behavioral and psychiatric conditions to be one of the most significant risks to the integrity of the mission – not least as there is now significant evidence that space travel has mind-altering effects.

03.

ACCLIMATION TO ENVIRONMENT

You are traveling to an entirely new environment that is completely new to you by all means.

Mars has complete **sensory** **deprivation.**

Imagine never being able to go to the woods and camp out in the serene tranquility of nature. Being able to fall asleep at night with the warm air softly blowing into the tent, and you grabbing for your comforter. You wake up to the smell of pine trees and hear the crackle of the fire and fresh coffee.

Imagine never being able to step your toes into the sand of a beach, slowly running away from the tide coming in. The sand between your toes feels squishy and the air whips your hair back and forth.

Imagine never being able to swim in the ocean again. Taking that first step into the water, the water slowly creeping up your fresh legs. Your body starts to float into the depths of the water and you smile.

**ESSENTIALLY,
WE'RE ALL GOING TO LOSE OUR SH*T.**



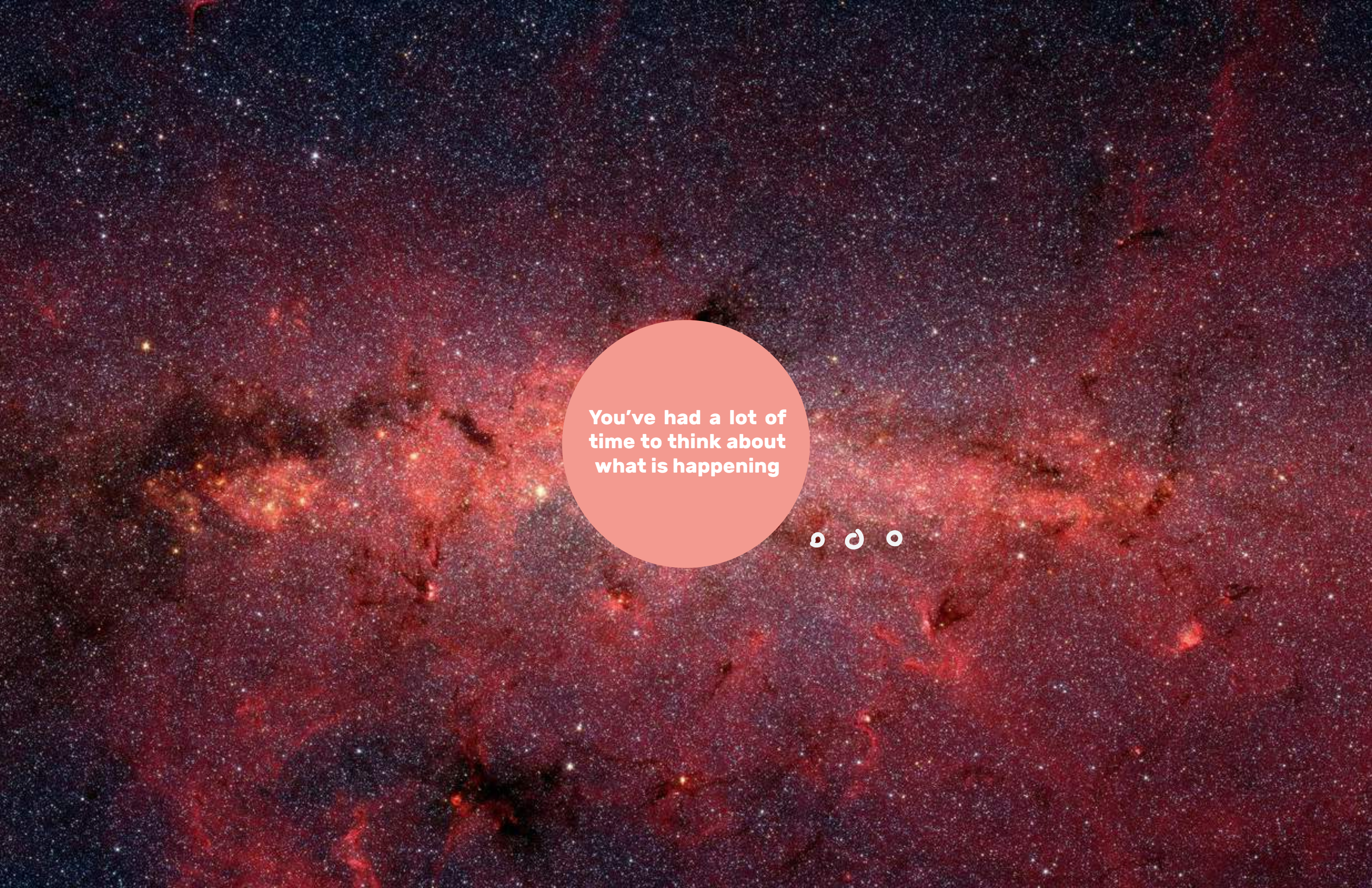
**Color +
Materiality**



**You have been
traveling for
300 days now.**



**You've covered
54.6 million
kilometers.**



**You've had a lot of
time to think about
what is happening**



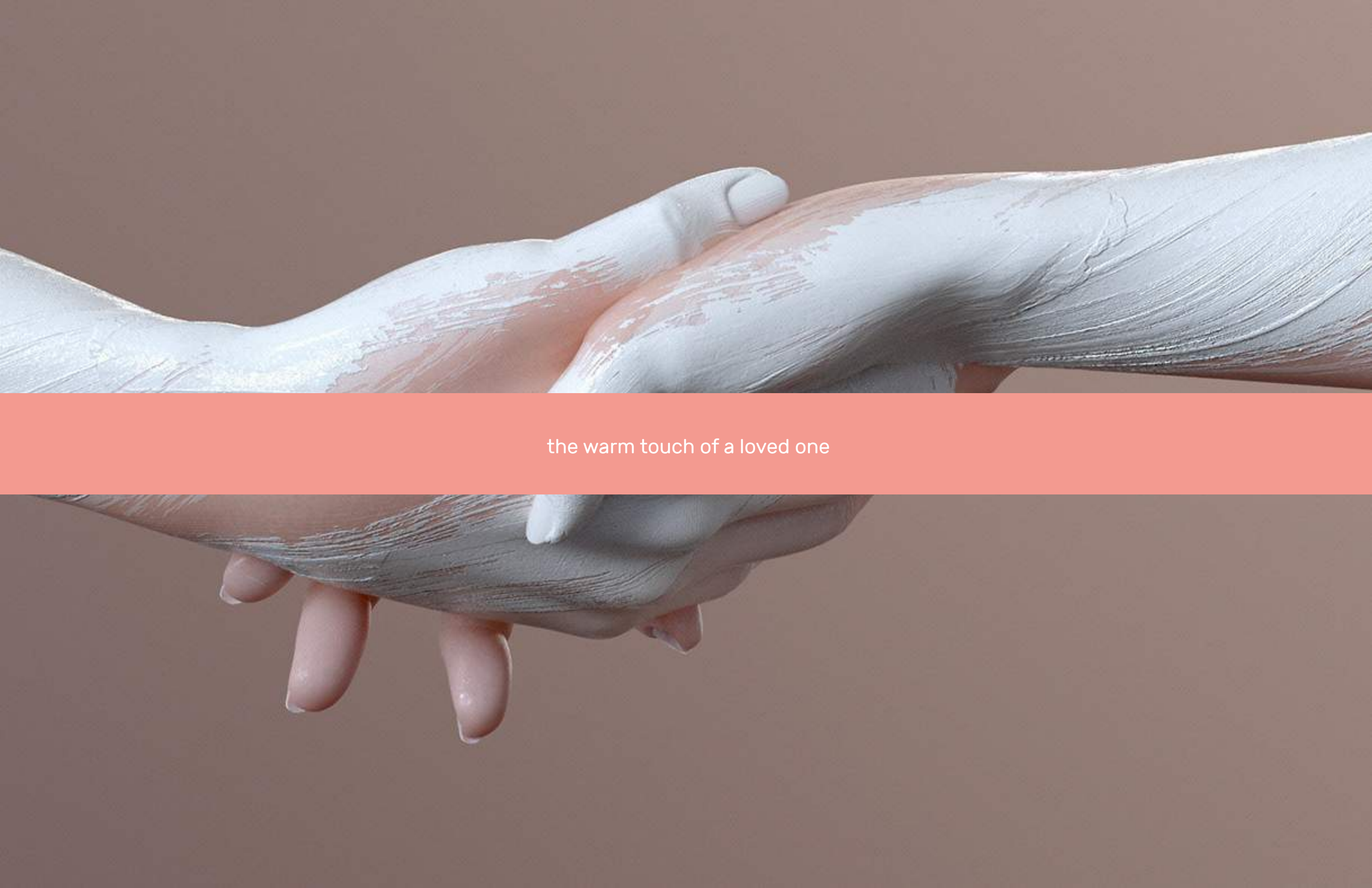
The image features a serene sky with wispy white clouds against a clear blue background. A horizontal light grey band is positioned across the middle of the frame, containing the text "you'd never think you'd miss clouds" in a clean, white, sans-serif font.

you'd never think you'd miss clouds



the tranquility of an unknown forest





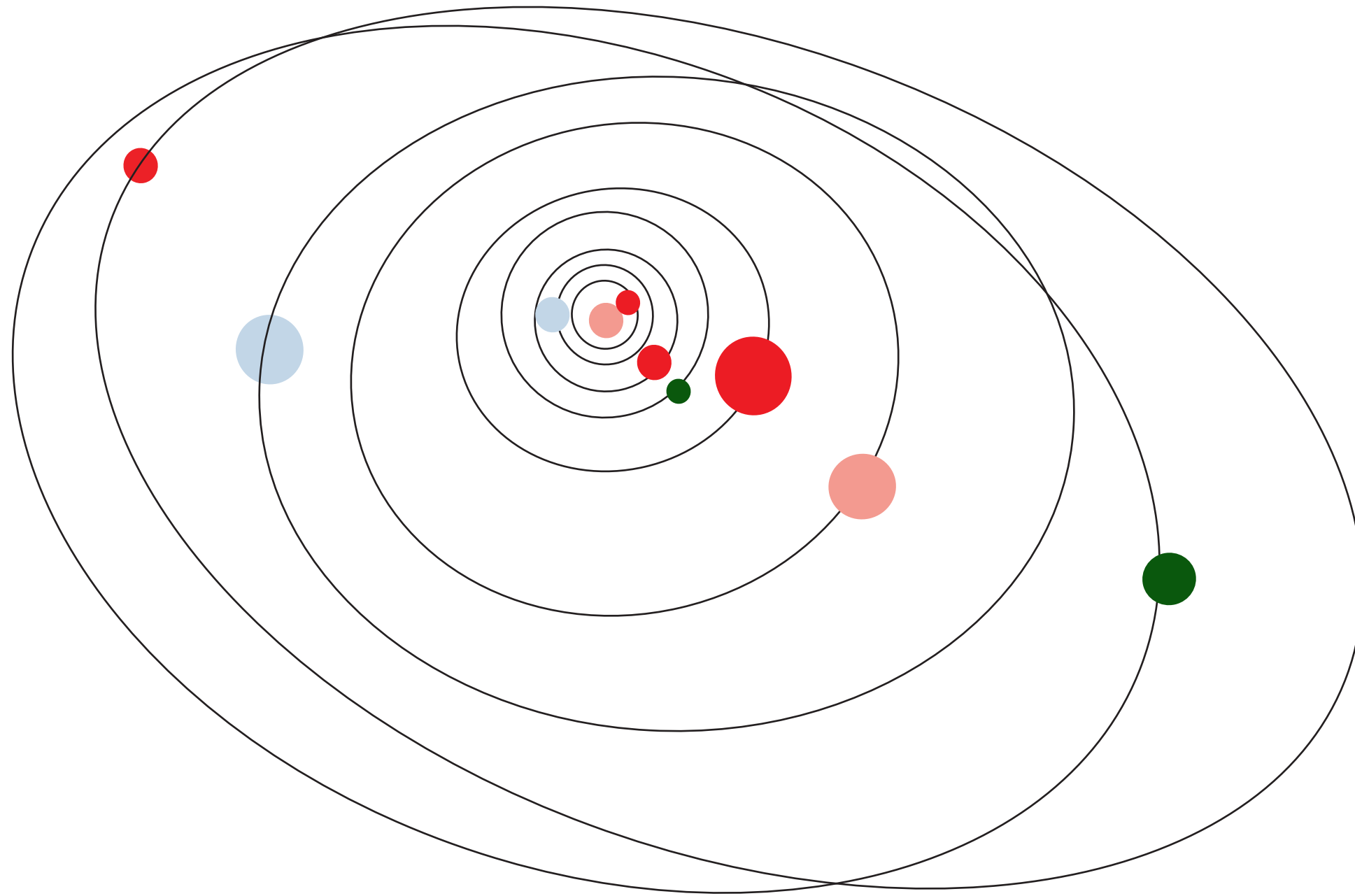
the warm touch of a loved one



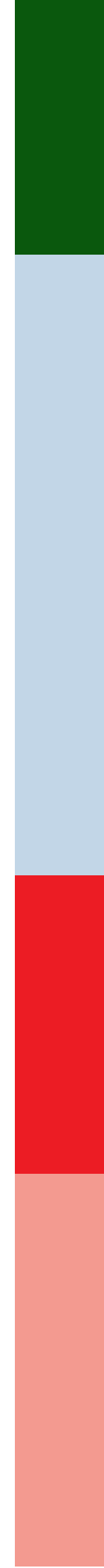
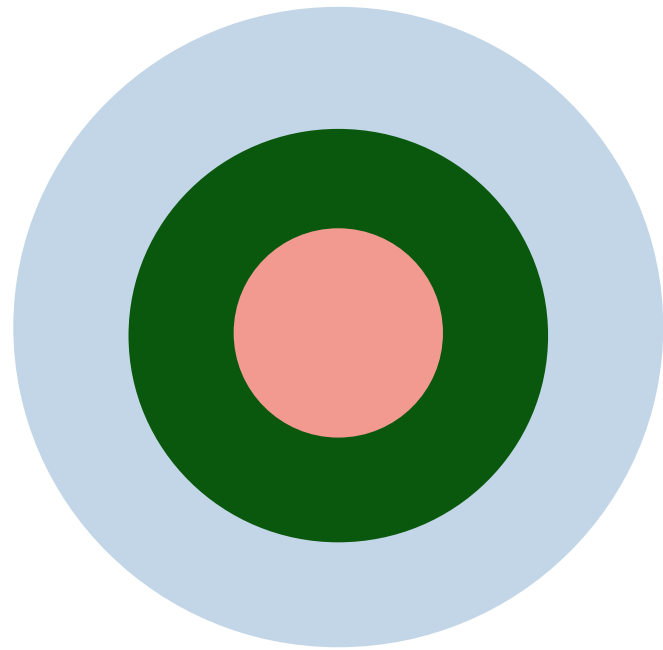
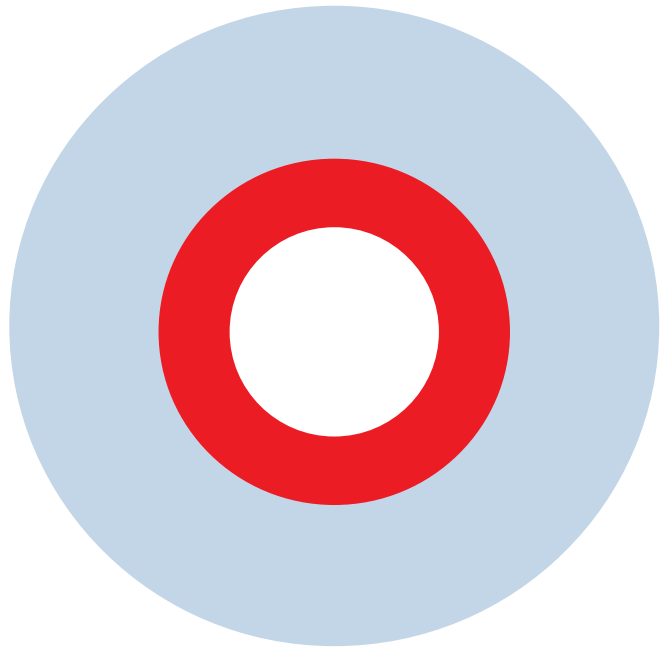
the smell of flowers lingering in your home



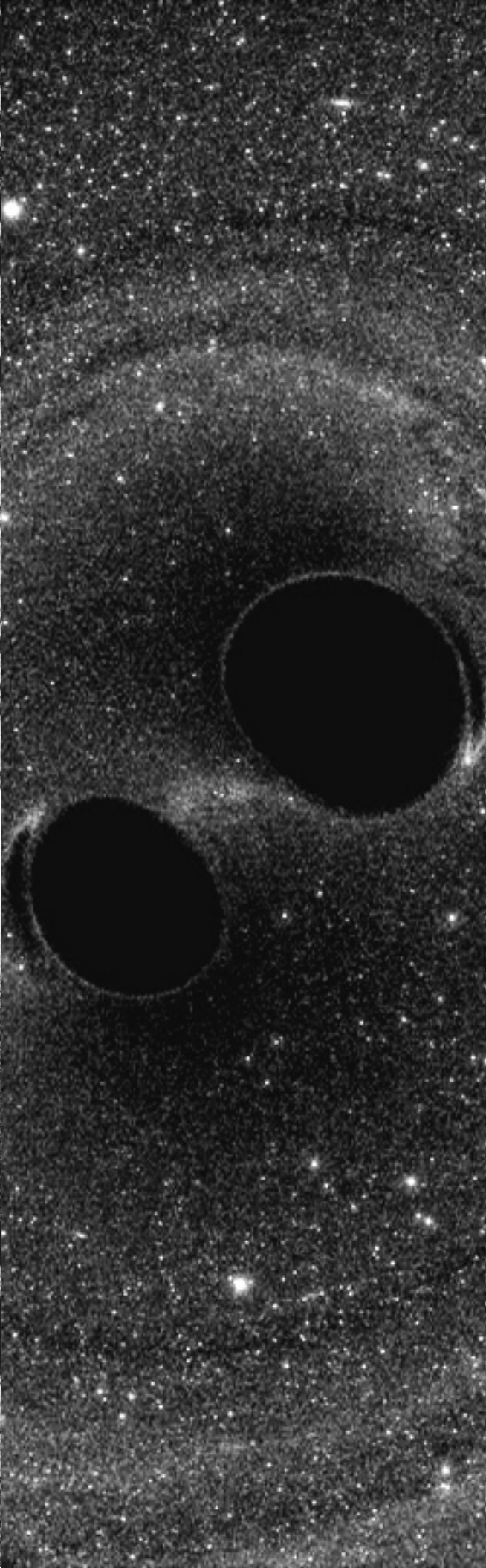
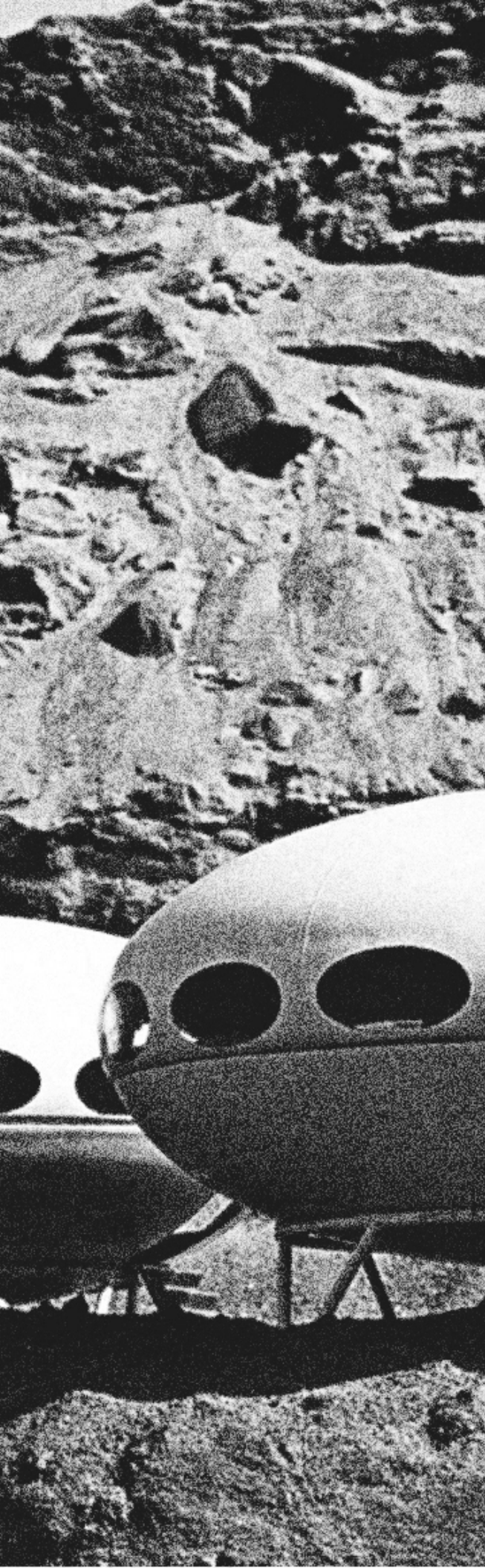
color



theory



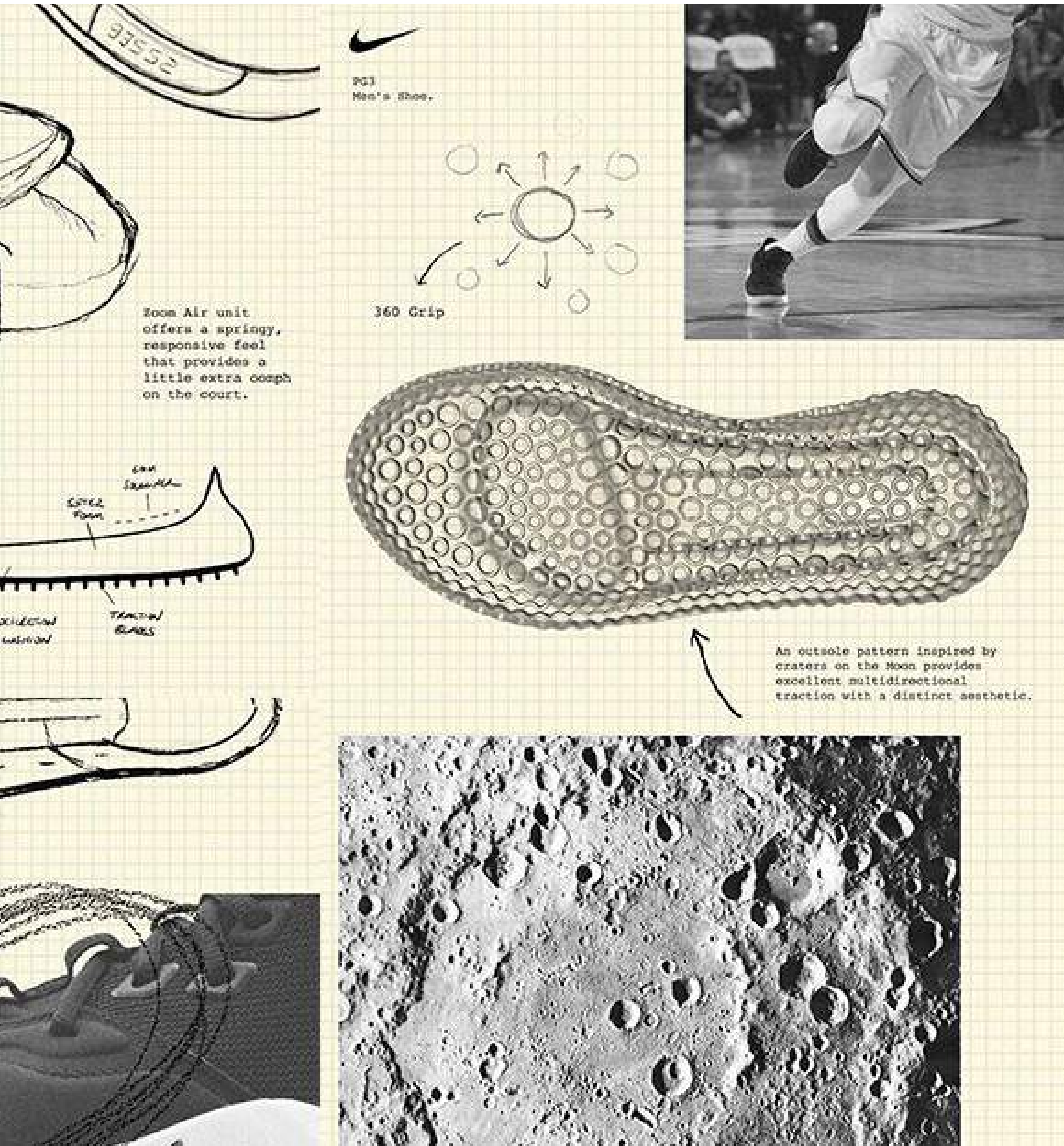




Nike PG 3's x NASA

Paul George's off-court interests are well-known, from his love of video games to fishing. Often, PG sums up his vision for the future with a single quote: "Don't tell me the sky's the limit when there are footprints on the moon," he says. This sentence wraps around the heels of his new signature shoe, the Nike PG 3. The PG 3's intergalactic inspiration comes from an official footwear and jumpsuit collaboration with NASA, using patches, NASA colors, and other references that unite basketball and space flight. "I grew up in Palmdale, California, which has a big NASA base that not a lot of people know about," says Paul George of the collaboration, which has the city's zip code, 93552, on the shoe. "This shoe is for the kids who want to fly, whether as professional athletes or astronauts."






PG3
Men's Shoe

Zoom Air unit offers a springy, responsive feel that provides a little extra oomph on the court.

360 Grip

An outsole pattern inspired by craters on the Moon provides excellent multidirectional traction with a distinct aesthetic.



DON'T TELL ME THE SKY'S THE LIMIT WHEN THERE

ARE FOOTPRINTS ON THE MOON

Dava Newman: Mars Space



A thousand feet of ribbing is held in place with over 140,000 stitches.

For a mission to Mars to succeed, off-world explorers desperately need a new wardrobe to deal with the planet's unique challenges. In humanity's entire spacefaring existence, there have been 514 extravehicular space walks, but a single, multi-year mission to Mars will require over 1,000.

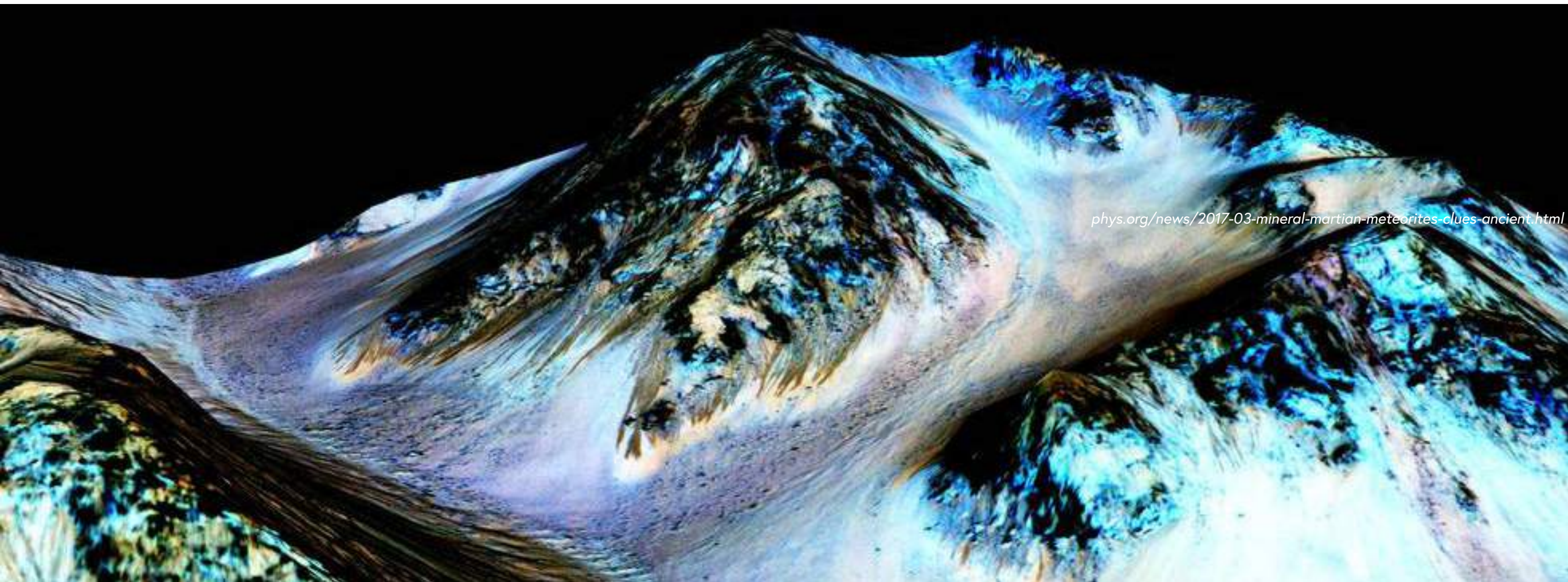
Even if the flight plan for Mars is delayed indefinitely, all of Newman's R&D will have down to Earth applications. Already, some of the innovations are being applied to treatments for children with cerebral palsy and seniors with severe balance impediments. Ultimately, Newman hopes we can design our way towards a world devoid of disability.

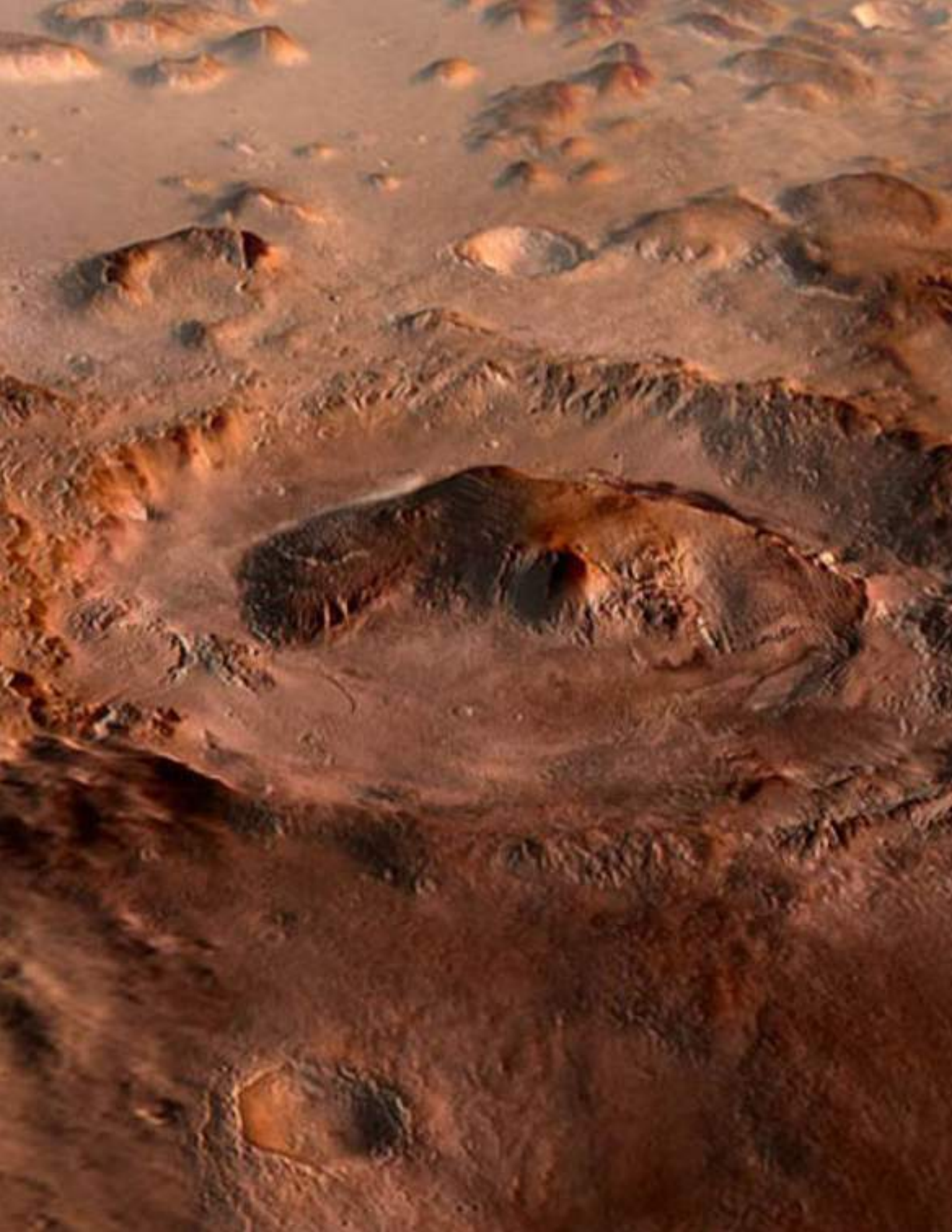


Solace

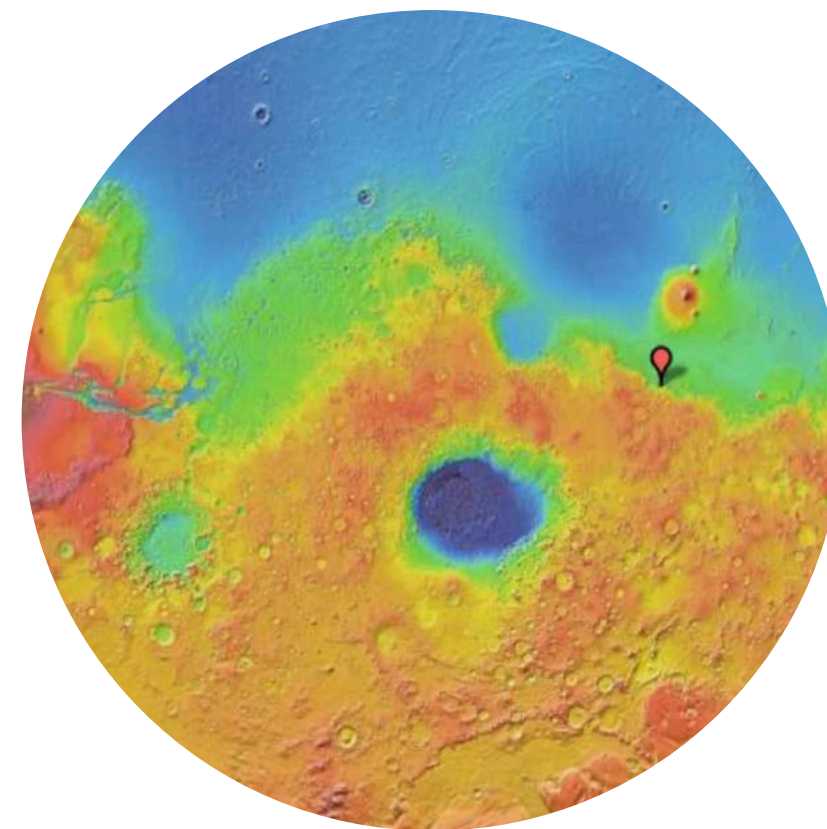
Water Conditions

Almost all water on Mars today exists as ice, though it also exists in small quantities as vapor in the atmosphere, and occasionally as low-volume liquid brines in shallow Martian soil. The only place where water ice is visible at the surface is at the north polar ice cap.





The Site



Location: 5.4S, 137.7E

Size: 155km / 96mi

Named in: 1991

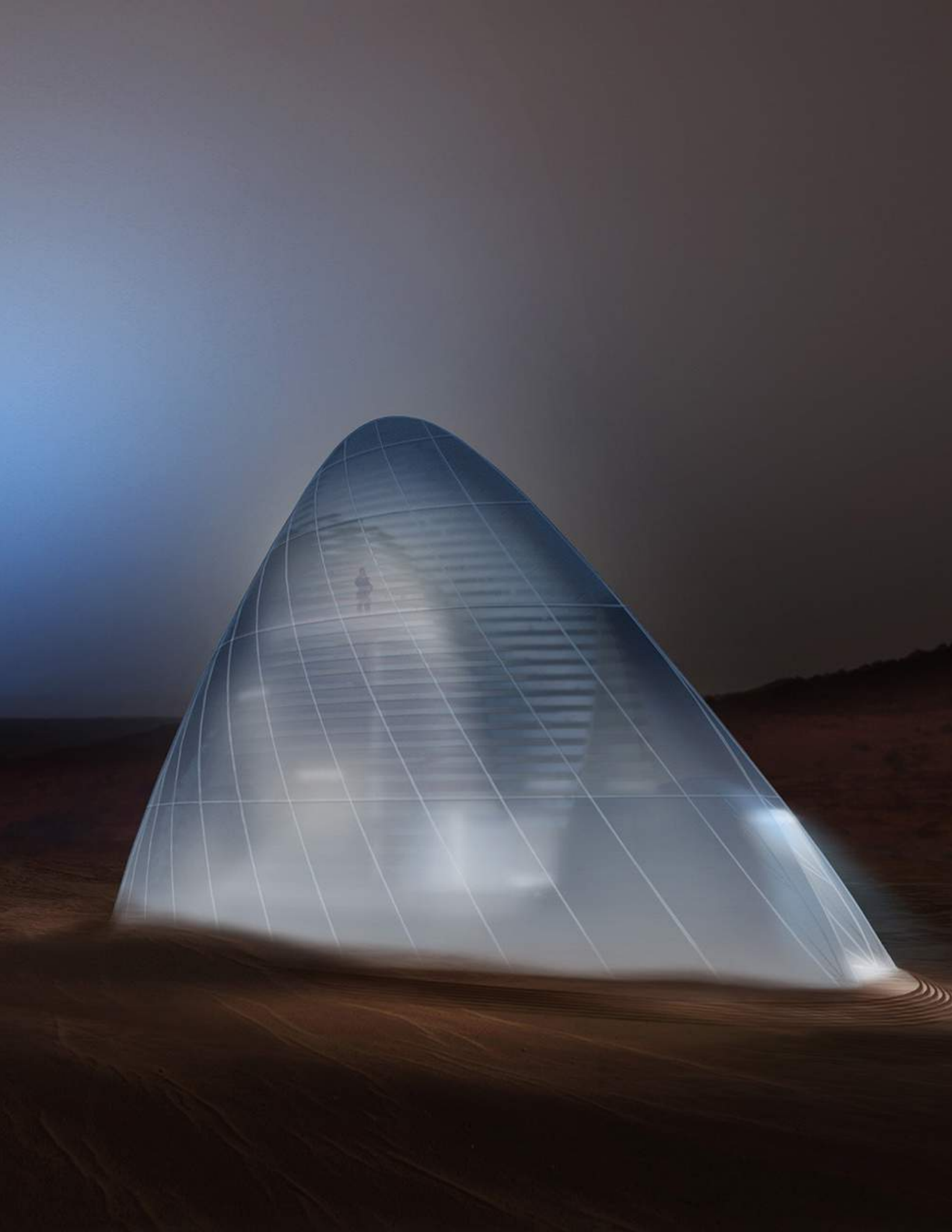
Named for: Australian astronomer
Walter F. Gale (1865-1945)

NASA's Centennial Challenge: 3D Printed Habitat



- 1** Team AI. SpaceFactory of New York is the second-place winner in NASA's 3D-Printed Habitat Challenge, Phase 3: Level 1 competition.
- 2** Team Kahn-Yates of Jackson, Mississippi, is the third-place winner in NASA's 3D-Printed Habitat Challenge, Phase 3: Level 1 competition.
- 3** Team SEArch+/Apis Cor of New York is the fourth-place winner in NASA's 3D-Printed Habitat Challenge, Phase 3: Level 1 competition.

NASA and its partners are holding a \$3.15 million competition to build a 3D printed habitat for deep space exploration, including the agency's journey to Mars. The multi-phase challenge is designed to advance the construction technology needed to create sustainable housing solutions for Earth and beyond.



On September 27, the architects and designers from Team Space Exploration Architecture (SEArch) and Clouds Architecture Office (Clouds AO) were crowned the winners of NASA's 3D-Printed Habitat Challenge.

Their design, Ice House, relies on the power of water, which we now know exists on the red planet, to create a pressurized and habitable shell where human and plant life can thrive. It features a hydroponic greenhouse, "hollowed-out" ice rooms to give the illusion of space, and a safe area where astronauts can hang out without their suits. The ice shell protects against radiation and won't melt, since Mars is about 67 degrees below zero.

"Ice House is born from the imperative to bring light and a connection to the outdoors into the vocabulary of Martian architecture," the designers explain in a project statement.

One of NASA's ongoing goals, says the team, is to adopt a method of exploration in which it "follows the water." Ice House was designed as an extension of that goal.



3D PRINTING WITH ICE

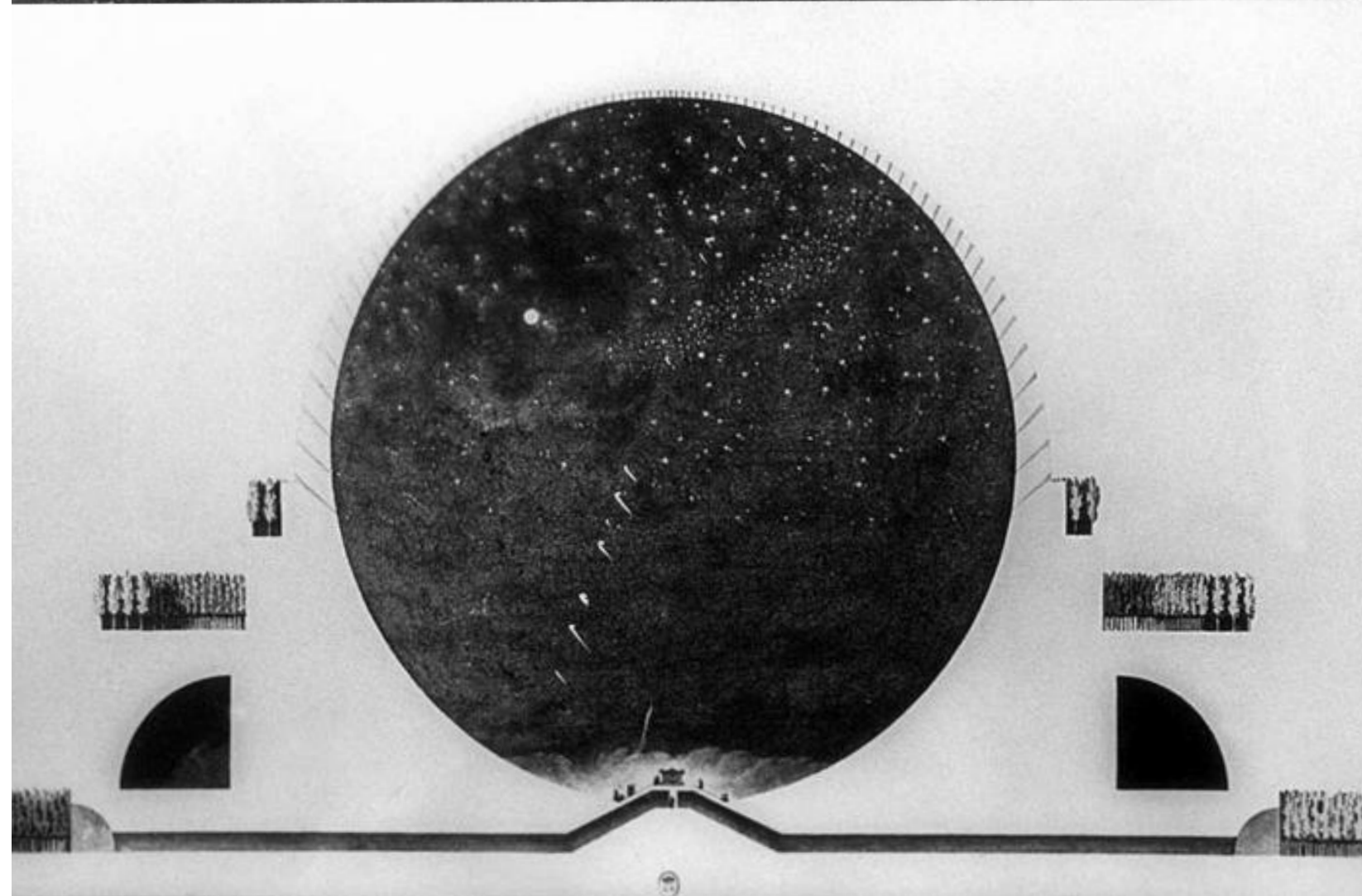
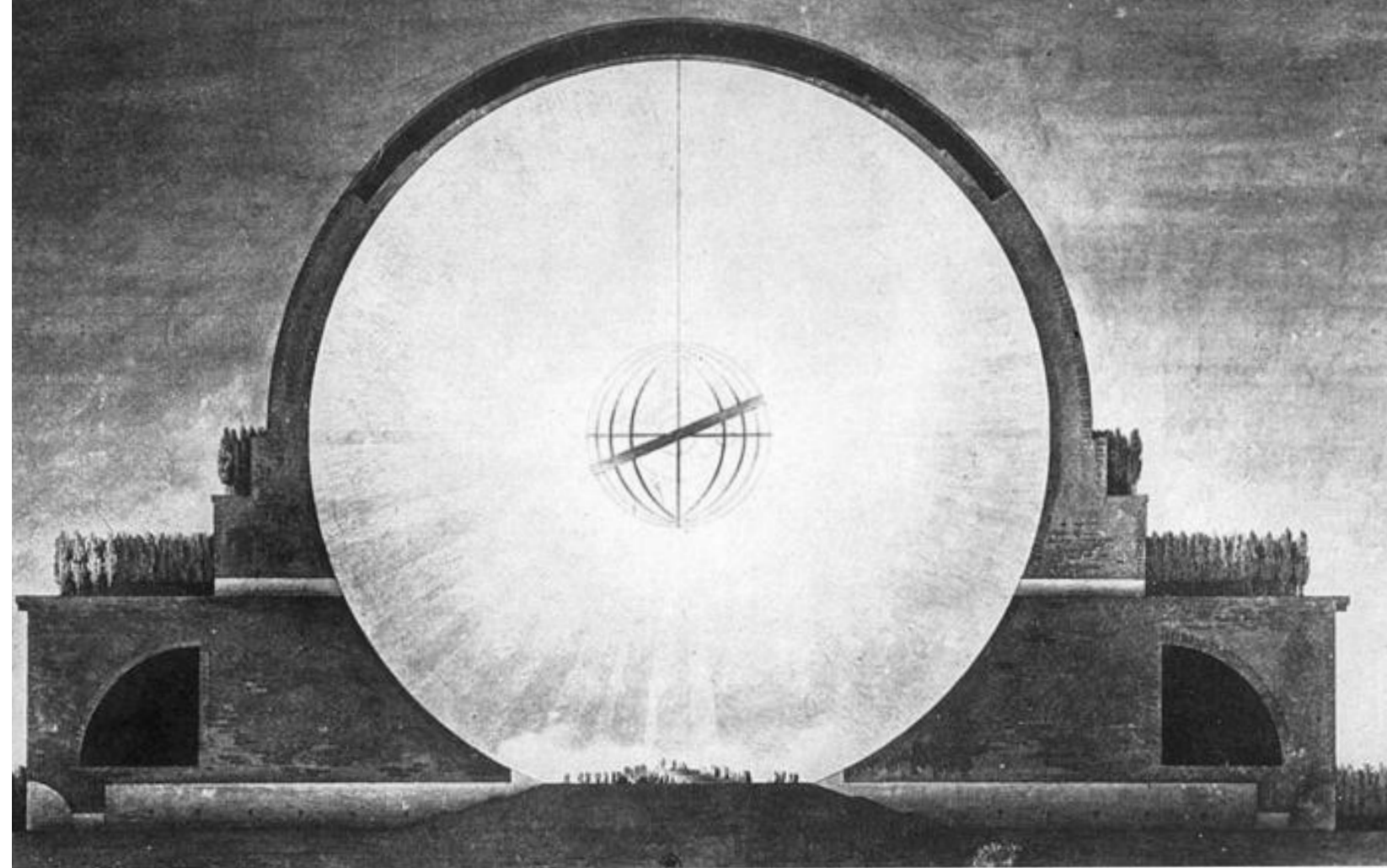
Ice habitats on Earth and 3D Printing with ice are not without precedent.

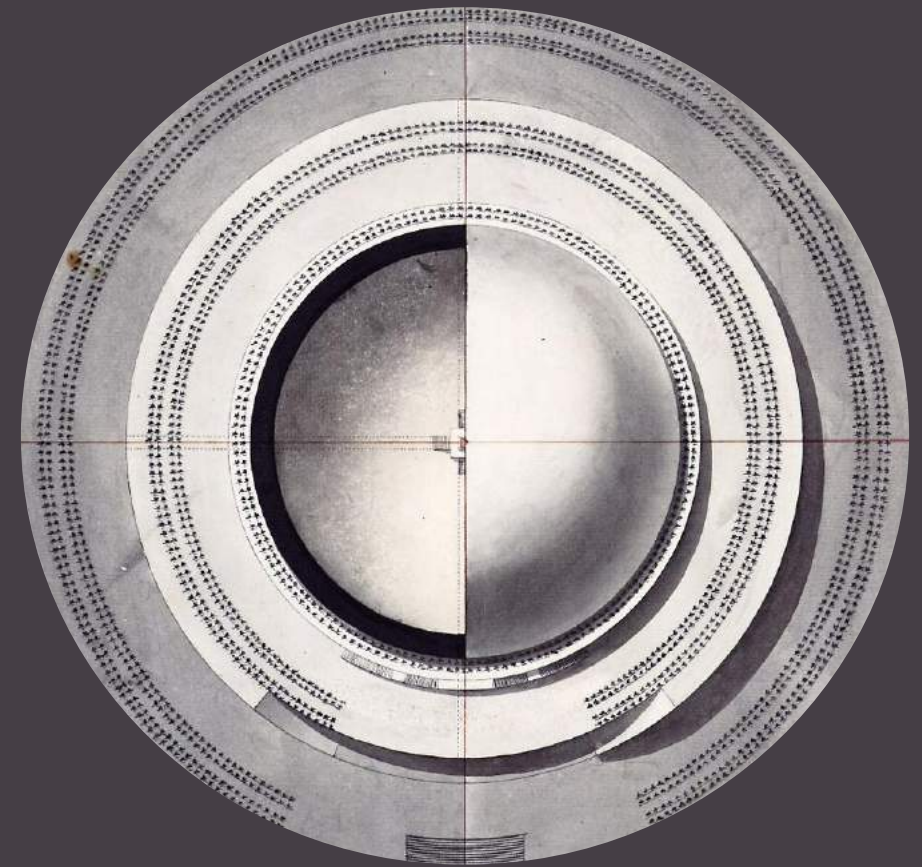
“Through an understanding of the physics of phase change and the temperature and pressure conditions of the Martian environment, as well as an understanding of the physical deposition techniques required we’ve designed a process to turn subsurface ice into water vapor, vapor used to deposit liquid water, in an environment cold enough to print a form in solid ice.”

Étienne-Louis Boullée

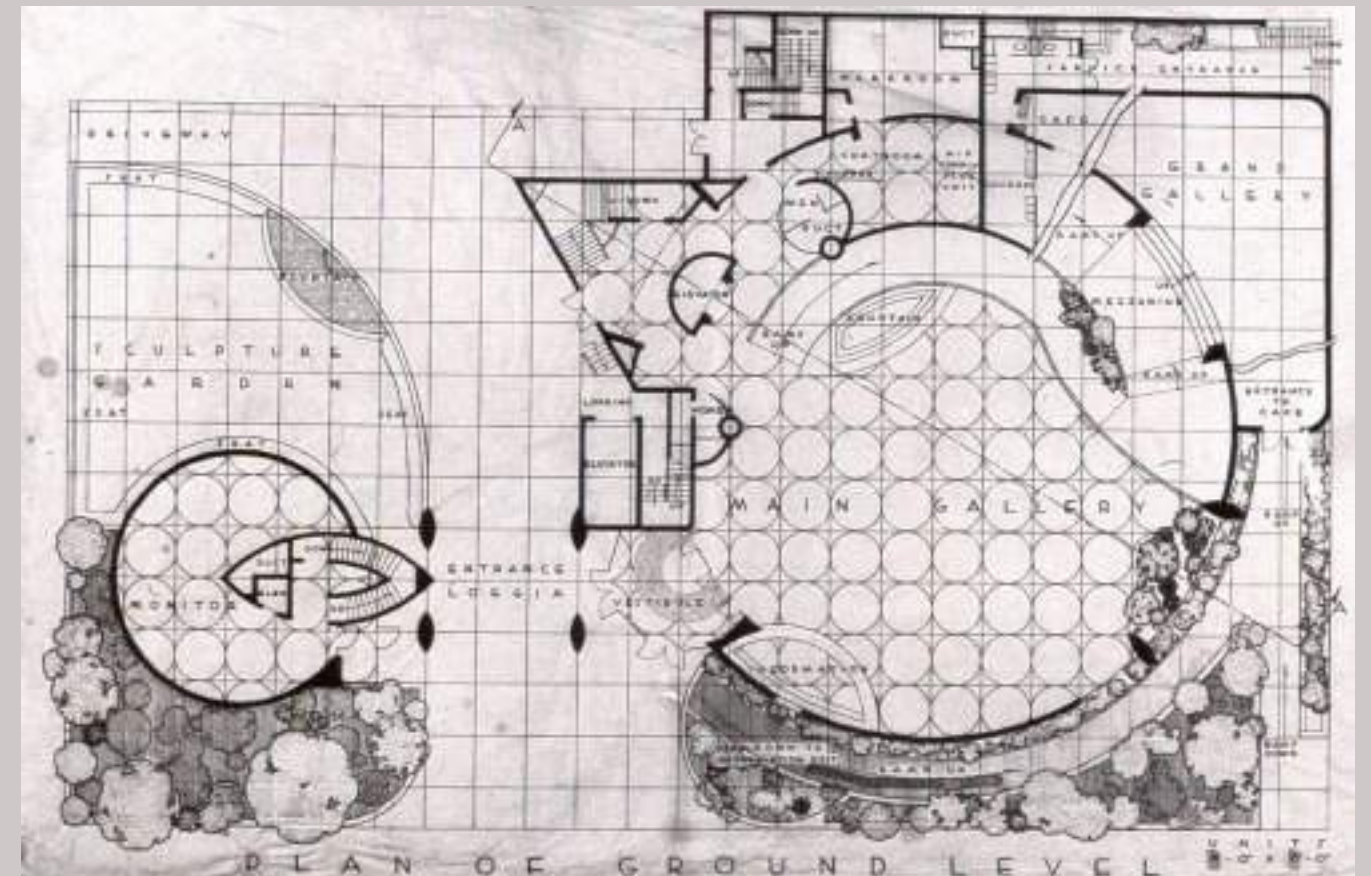
For Boullée the sphere represented perfection and majesty, creating soft gradations of light across its curved surface and having an “immeasurable hold over our senses” (3). For Newton’s cenotaph a 500 ft diameter sphere is embedded within a three-tiered cylindrical base, giving the impression of a buried volume. Boullée smartly completes the figure of the sphere with a flanking pair of curved ramps.

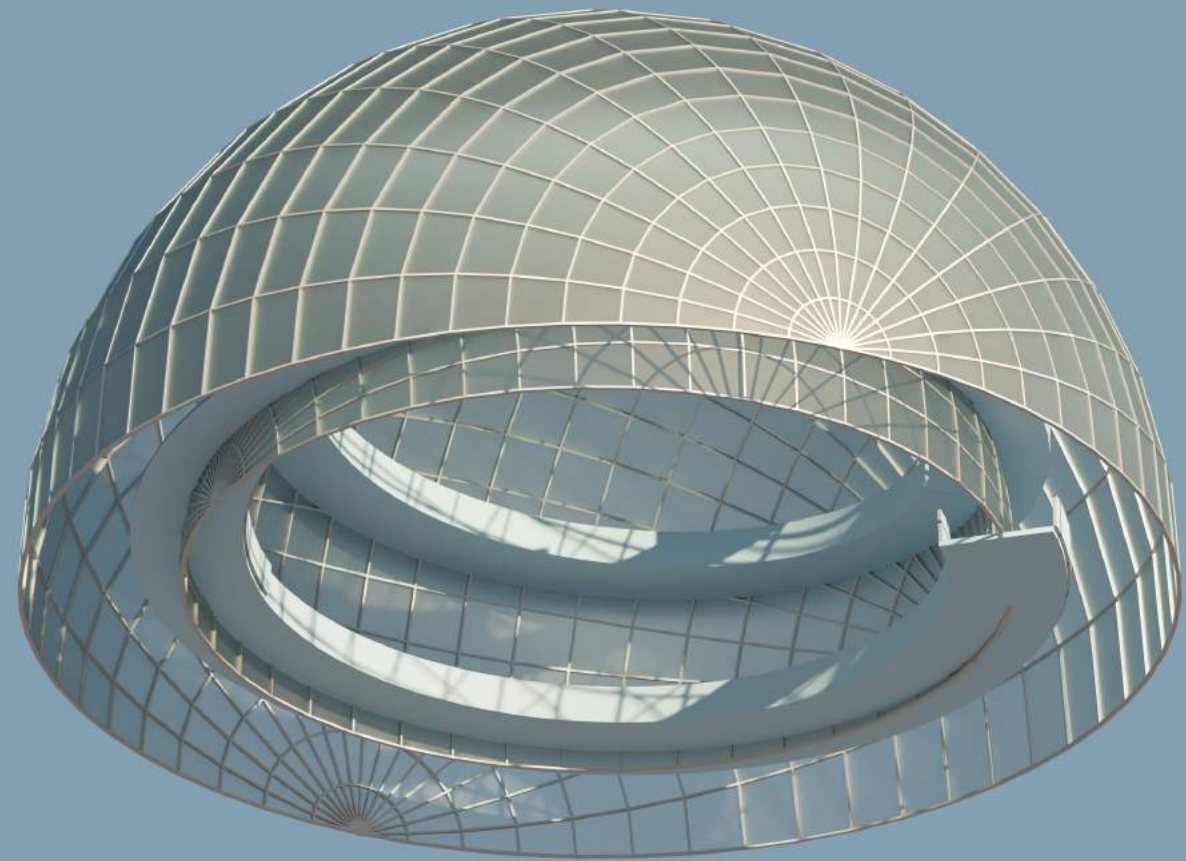
The drawings privilege impact and atmosphere over legibility of the layout, for example showing a small exterior door on the second level above a band of crenelation yet illustrating no means of access. Narrow flanking stairs provide an exterior connection between the second and uppermost terrace. Closely spaced cypress trees, associated with mourning in Greek and Roman cultures, circumscribe each level. The spherical entry portal at the lower level gives way to a dark, long tunnel that runs below the central volume. Rising up as it approaches the center, a final run of stairs brings visitors into a cavernous void.





Guggenheim Floor Plan

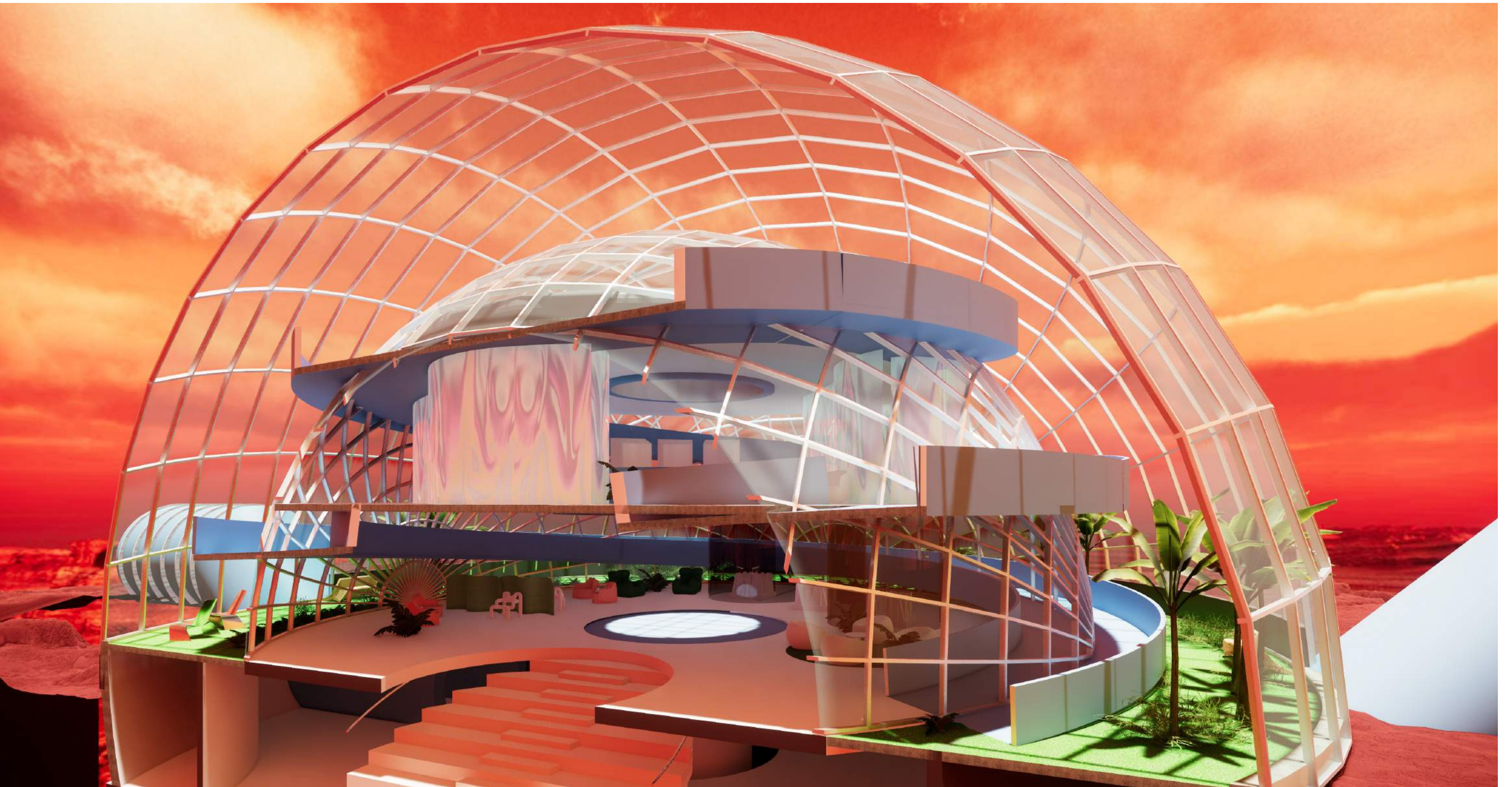




Ribbon Ramp

The ribbon ramp emulates a journey throughout the space to the top of the structure. Emphasis was placed solely on a radial design to make the user feel like the space was larger and endless to relieve the mental stress of when astronauts are space traveling.

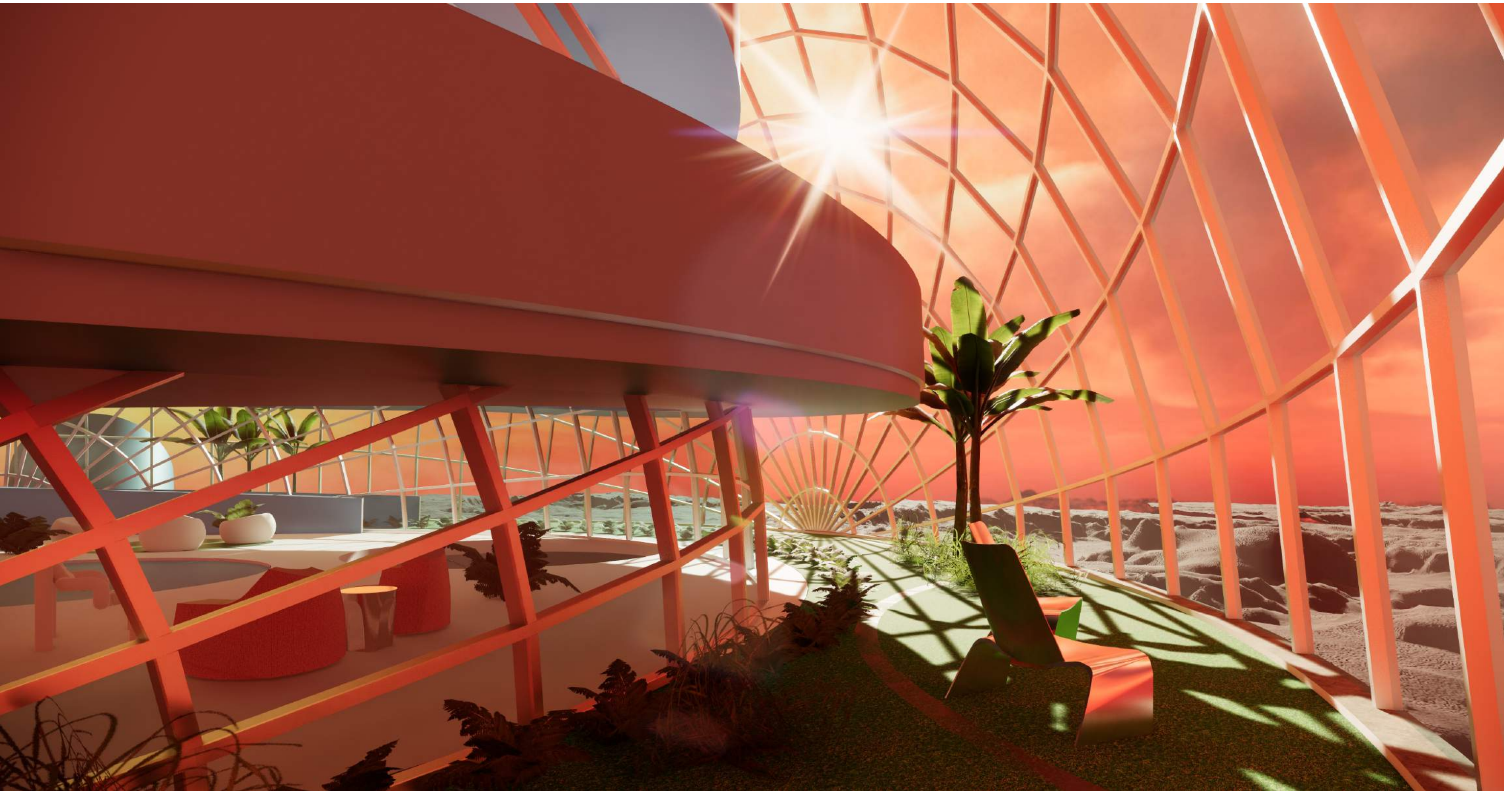
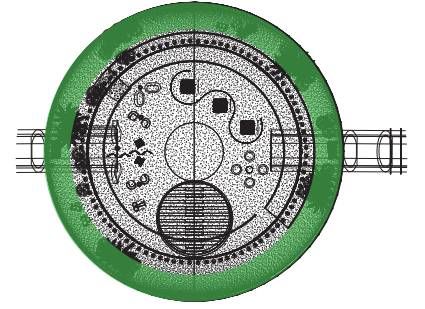
The Structure



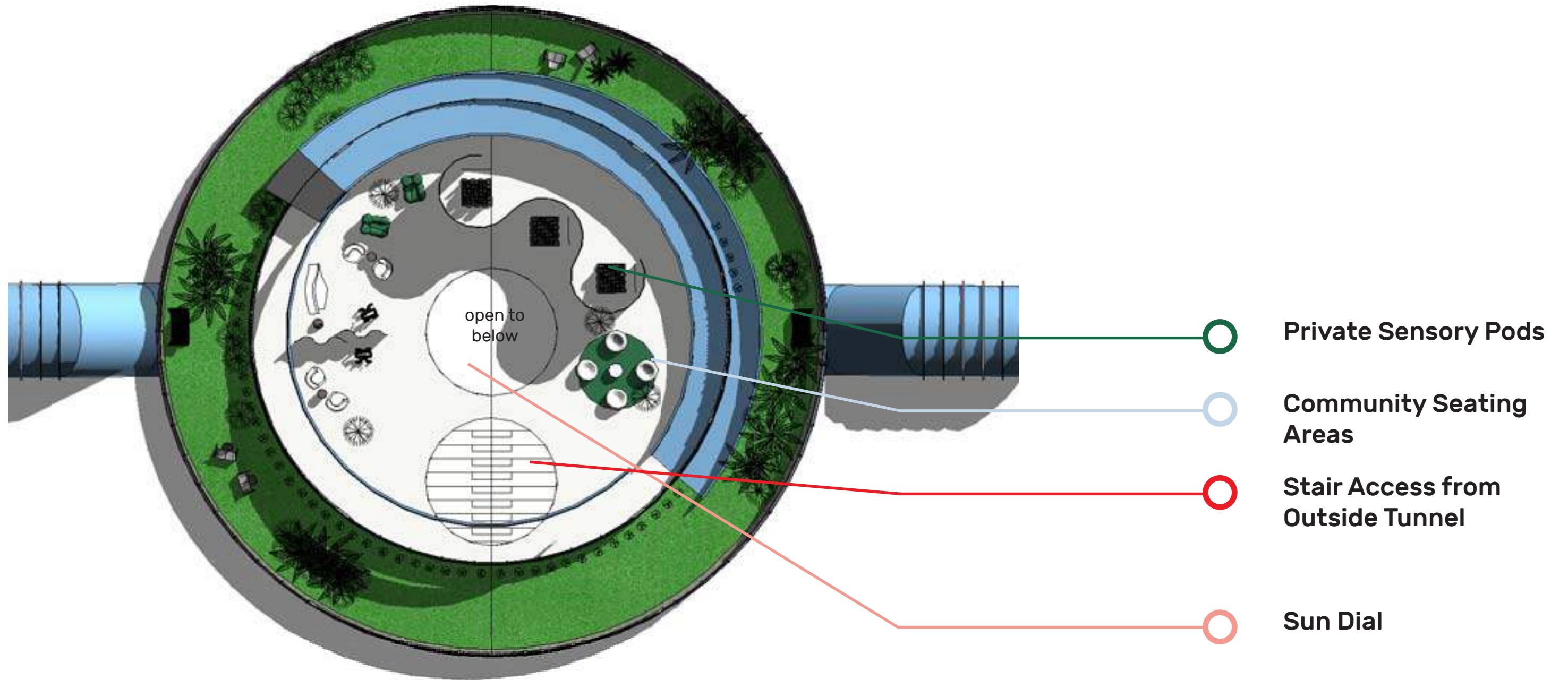
Connection to Earth



The dual sphere structure provides a front lawn for the community where they can roam freely without their astronaut suits and have the same mobility similar to earth.



First Level Floor Plan: Engage



01.

FEELING OF ISOLATION

Exercise that focuses on breathing is integral to the well-being of the community on earth. Twisting and movement of ones body helps to release toxins and strengthen one's core. Yoga comprises a balance of strengthening the mind and body.

02.

CLAUSTROPHOBIA

Time under tension, also known as TUT, Working out with elastics and cardio vascular training is essential to helping astronauts to keep their bones strong.

03.

DISCOMFORT + ABANDONMENT

Cardio vascular training is essential for the community on Mars. Walking for exercise benefits those physical as well as mentally to relieve stress. There is a sense of community while running and walking outside together as well that is naturally established.

**MENTAL
HEALTH**

F O C U S E S

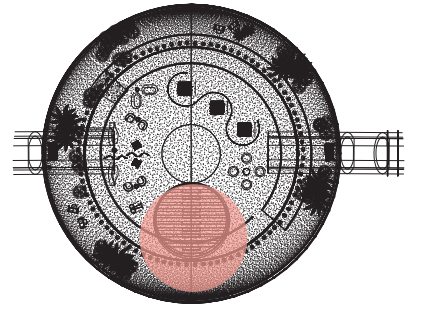
You're not Alone



The space is a celebration of the sun. Stairs lead you up into the space so that you have the experience of walking into a boundless space.



Different conversational settings let users engage with others in the community in a relaxing and inviting way. Plush materials help heighten senses.



Furniture Language



Sensory Pod Inspiration
Custom Modeled Furniture

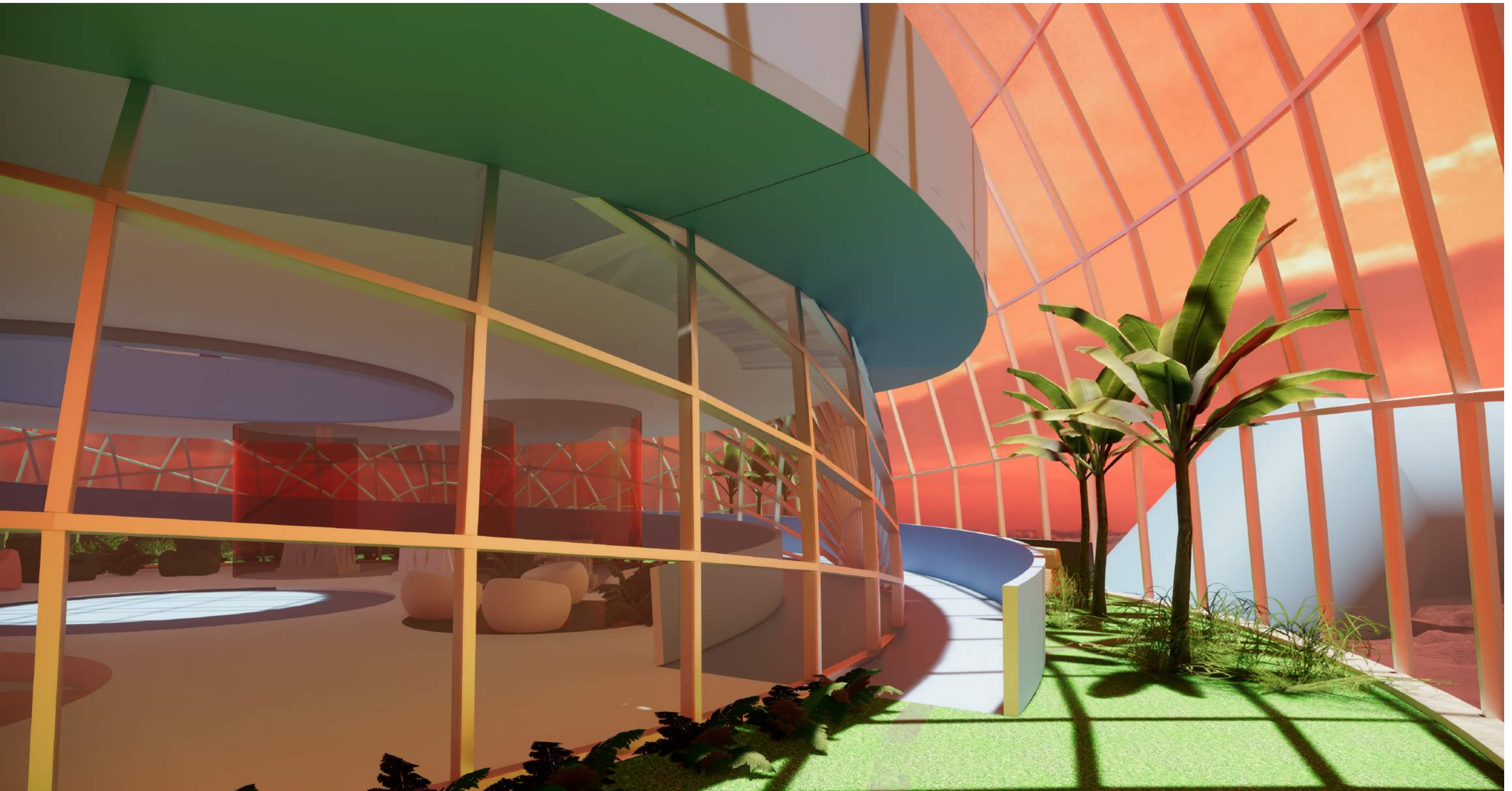
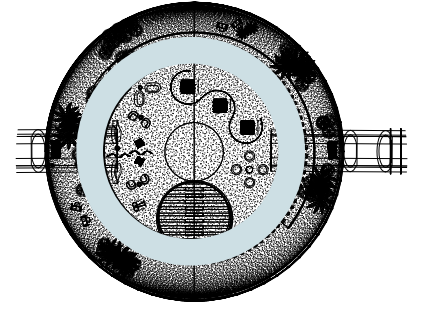


La Mamma UP5 and UP6 Chair

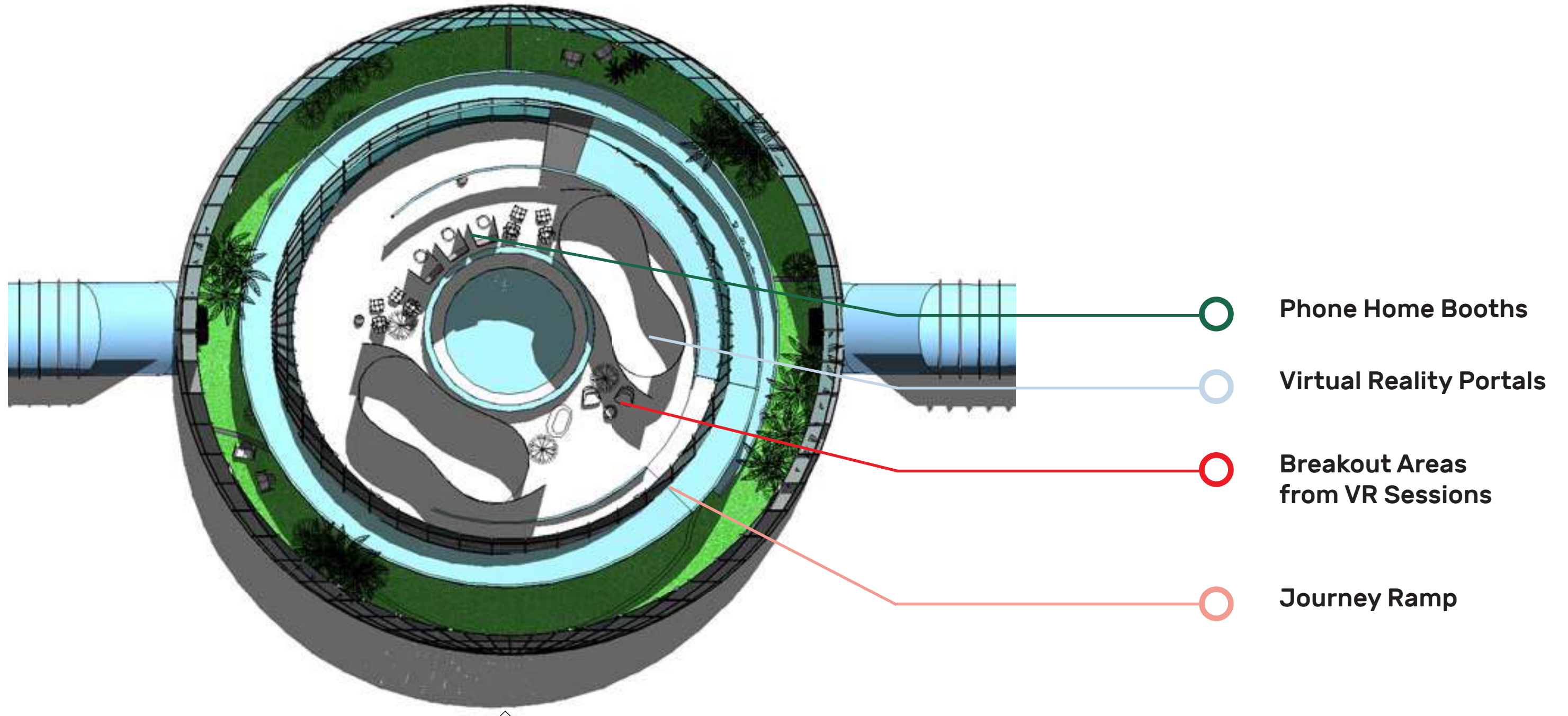
The Journey



Accessing the top of the structure is a spiritual journey. A ramp propels you around the circumference of the structure on the interior, and you can exit on the exterior all the way back down.



Second Level Floor Plan: Remember



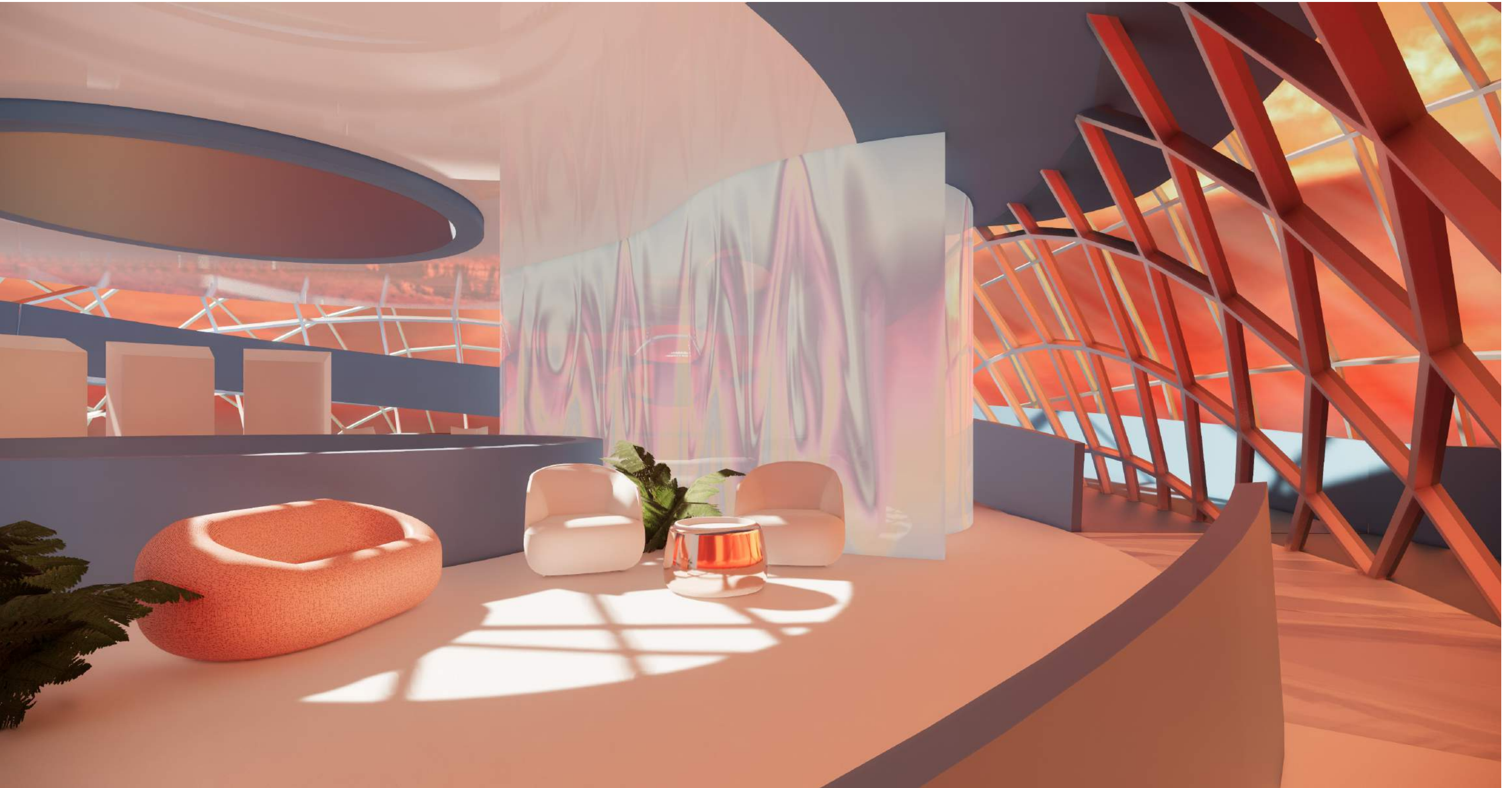
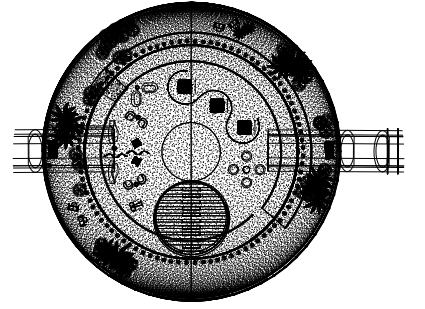
Comfort



Journey upstairs to experience a more intimate setting. Private phone booths and relaxing textural changes await.

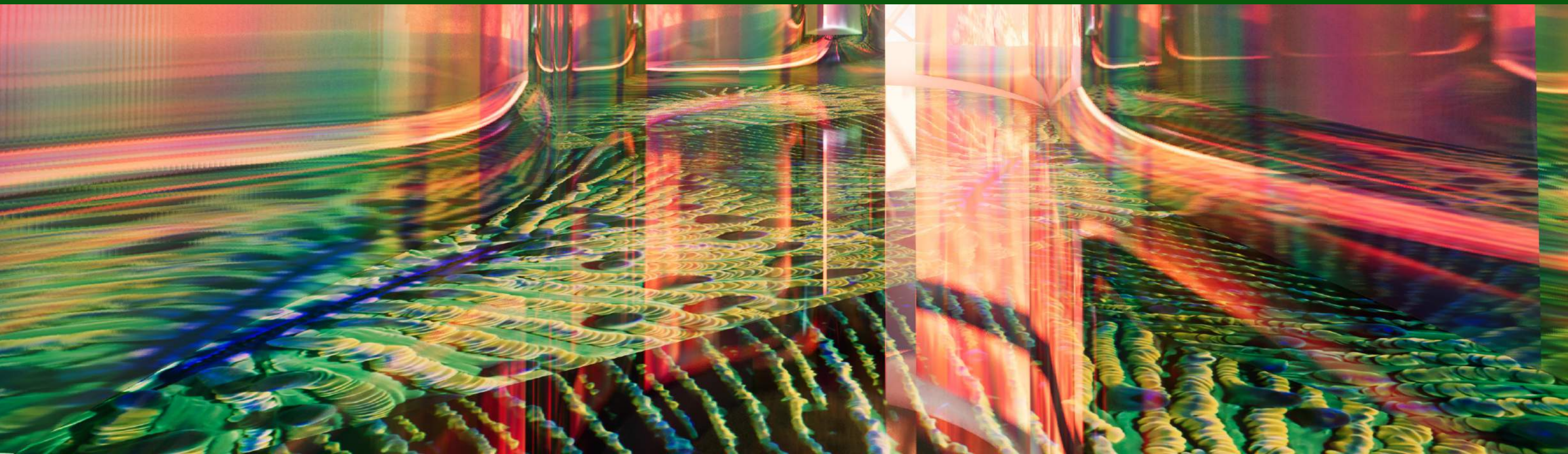


The second floor houses virtual reality rooms that let you escape to the environment that you are longing most.





you can go back to the tranquility of that forest







you can feel at ease with the clouds moving overhead







you can smell that garden again

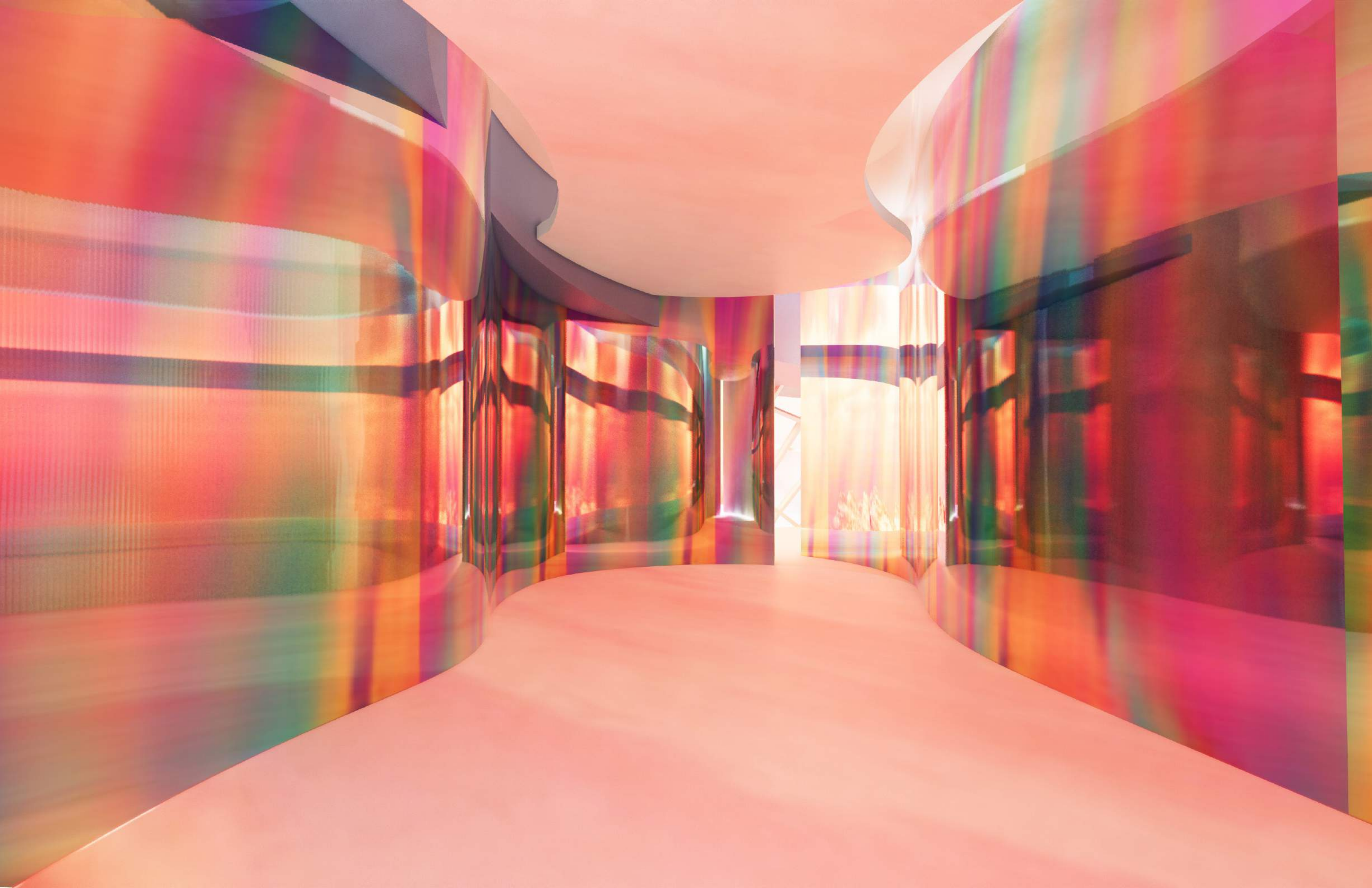






finally connect with a far away loved one





Phone Home



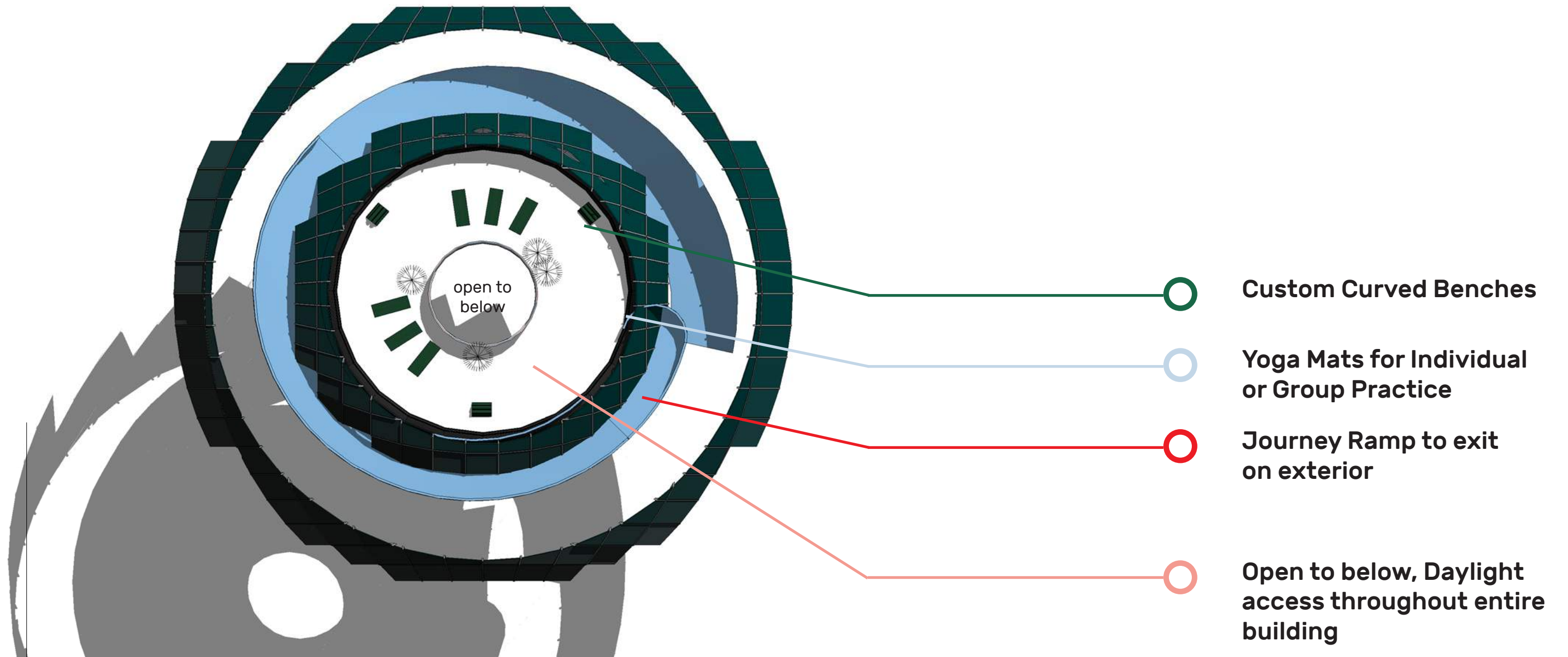
Phone booths allow you to have a conversation and video chat with a loved one at home. These acoustical sound spaces offer privacy for sound.



Break away areas from the Virtual Reality Rooms let you have a time and space to decompress with another.



Third Level Floor Plan: Decompress



Exercise

F O C U S E S

01.

YOGA

Exercise that focuses on breathing is integral to the well-being of the community on earth. Twisting and movement of one's body helps to release toxins and strengthen one's core. Yoga comprises a balance of strengthening the mind and body.

02.

RESISTANCE BASED TRAINING

Time under tension, also known as TUT, Working out with elastics and cardio vascular training is essential to helping astronauts to keep their bones strong. Working out boosts your mood and memory.

03.

CARDIO

Cardio vascular training is essential for the community on Mars. Walking for exercise benefits those physical as well as mentally to relieve stress. Our blood supply has evolved to work best when we experience ground-level gravity, meaning space travel could affect how efficiently oxygen is supplied to the brain.

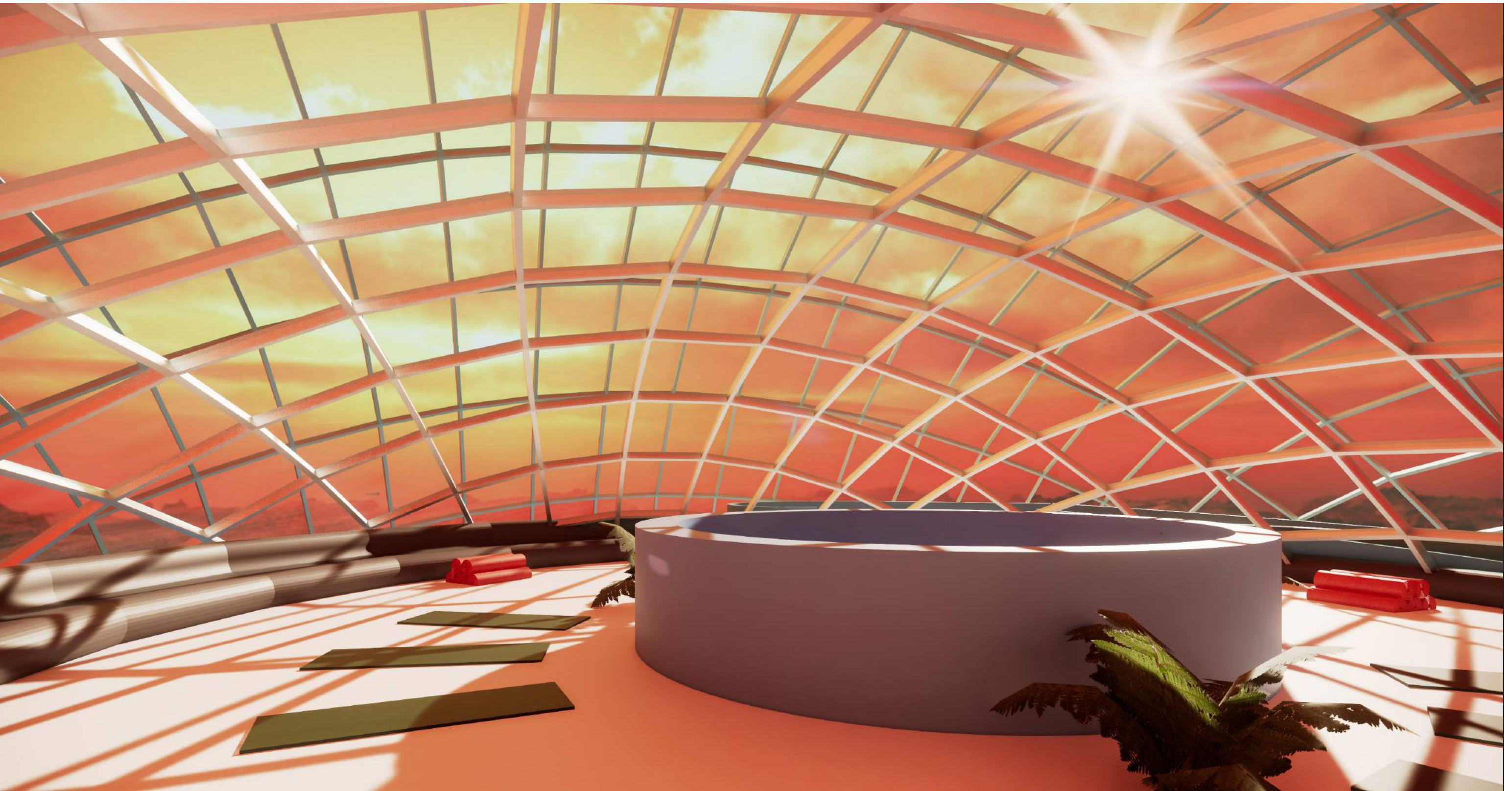
Decompress



The yoga studio ends the journey up the ramp. It is at the top of the structure with the most sunlight.



This is a multi functional space that can be for events, groups or private sessions. Relaxing soft textures put your body at ease from a harsh day.



**I hope this project
can help to start a
conversation about the
long term well-being of
our future community
on Mars.**

Science often overlooks the comforts of human life during long-term space exploration. In order to successfully colonize the Red Planet, we need to be emotionally equipped to do so. *Solace* helps to start to bridge the gap of imagination and realism with responding to the physical and emotional well-being of the community that will find itself on the Red Planet, so that we will not only want to go there - but we will want to stay.



let's take care of home first

