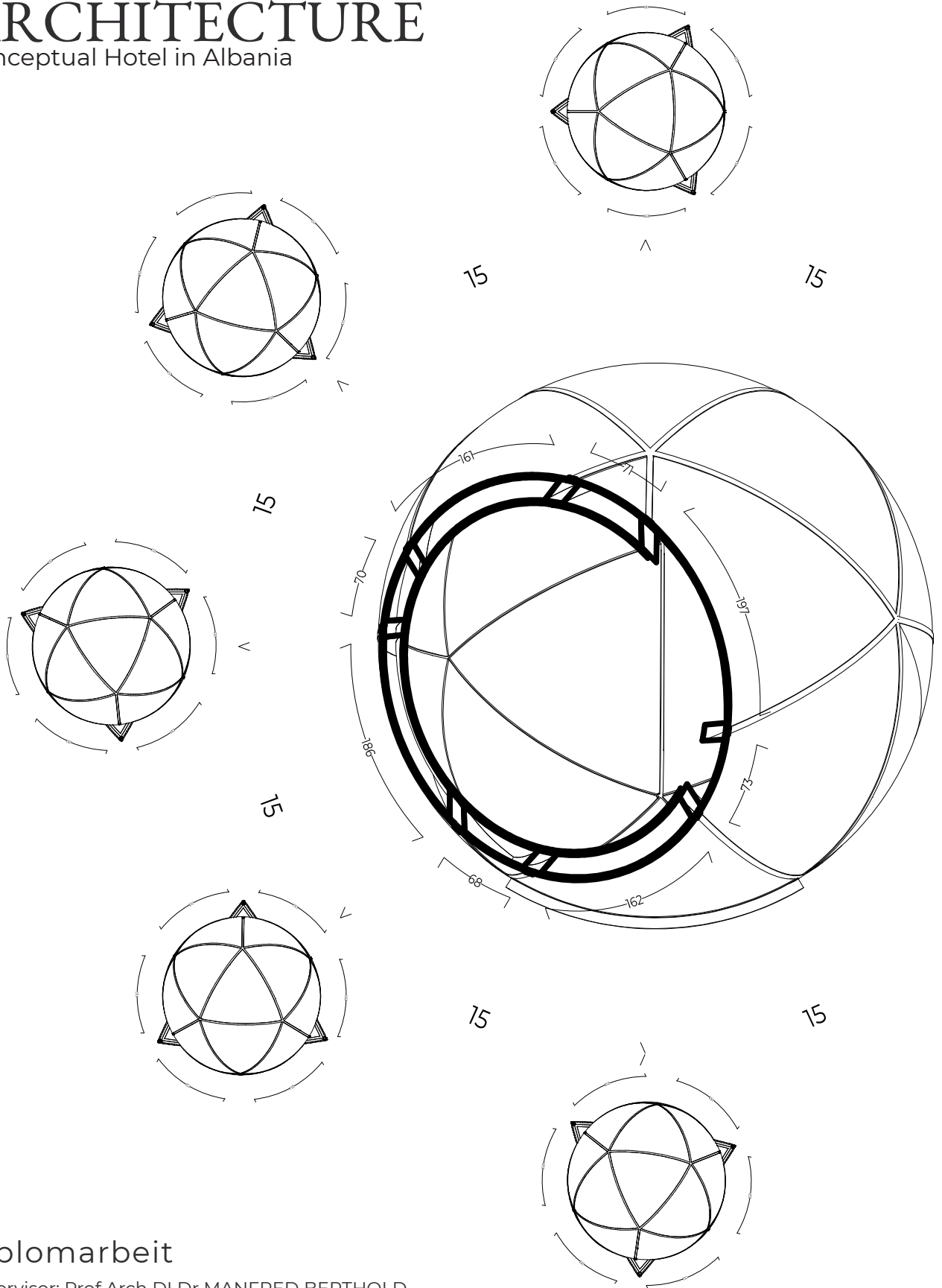


LONELY ARCHITECTURE

Conceptual Hotel in Albania

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Diplomarbeit

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*“Dedikuar babait që më mësoi
imagjinatën, mamasë që më mësoi
të dua dhe motrës që më tregon
rrugën sa herë që e humb.”*



MASTER-/DIPLOMARBEIT

Lonely architecture Einsame Architektur

Conceptual Hotel in Albania

Konzeptionelles Hotel in Albanien

ausgeführt zum Zwecke der Erlangung
des akademischen Grades eines
Diplom-Ingenieurs / Diplom-Ingenieurin
unter der Leitung von

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Abstract

DE

Der Tourismus ist für Albanien eine der vielversprechendsten Wachstumsbranchen.

Durch die langjährige, politisch bedingte Isolation des Landes waren große Gebiete von einer Entwicklung ausgenommen. Gerade aber diese weitläufige und unberührte Natur scheint heute das größte Potential für Albanien zu sein. Auch im Hinblick auf den angestrebten EU-Beitritt denke ich es von entscheidender Bedeutung verträgliche Strategien und Konzepte für Hotelbauten zu entwickeln und anstelle von Quantität auf Qualität zu setzen.

Während die Gesellschaft derzeit versucht seine sozio-politischen Hürden zu überwinden, spielt Architektur weder im öffentlichen Diskurs noch in der Politik eine entscheidende Rolle. Die Qualität der Bauproduktion leidet unter einer sehr schwachen Wirtschaft, unter der geringen Überprüfung bei der Einhaltung von Mindeststandards, zu geringen gesetzlichen Regulatoren und unter dem Fehlen einer institutionellen Raumplanungsstrategie.

Obwohl der Ausbau des Massentourismus für eine kurz- bis mittelfristige Entwicklung der heimischen Wirtschaft von großer Bedeutung war, verfügt Albanien nicht über das Potential langfristig mit den viel größeren Reisezielen konkurrenzfähig zu sein.

Meine Diplomarbeit fokussiert auf ein konzeptionelles Hotel für Albanien, das auf die Besonderheiten des Landes reagiert und deshalb mehr auf innovative Ideen als auf Standardlösungen setzt. Mir ist bewusst, dass dieser Ansatz die derzeitigen finanziellen und technologischen Möglichkeiten des Landes übersteigt. Mein Konzept für ein Hotel sieht aber dennoch als ein Entwurf, der auf die speziellen historischen, kulturellen und baugeschichtlichen Eigenheiten Albaniens referenziert.

EN

With tourism being one of Albania's most promising resources, the development of Hotels as its building cell is crucial. A large amount of Albania's most valuable territory is still virgin. What is considered as the outcome of Europe's most isolated communism, seems to have become its greatest potential. But while the country still struggles to overcome its socio-political barriers, architecture is left for dead. Almost all that is being build stands as the result of extremely poor economy, poor state control over the territory and complete lack of guidance to its development. A bad example of architecture without architects that is struggling to provide both quality and quantity to its tourists. But as the country aims to enter the EU, I believe that Albania must aim quality rather than quantity. Even if attracting mass tourism was the right choice to push the economy in short to midterm, Albania doesn't have the physical capacities to compete with the much larger destinations in the long run.

My thesis will focus on the development of a new Hotel concept in Albania. The potentials that this country has to offer will be identified. I aim to crate a concept looking towards innovative solutions rather than standard ones. An approach that could be beyond the financial and technological capabilities of the country itself, but does anyway have root in its identifying substance.

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Introduction

With the diversity of the architectural concepts, ways of thought, developments as well as future ideas and proposals that I have encountered in the field of architecture, I do not believe that there is a right or a wrong way to do this job. The only way is your way and as in any other forms of art one needs to find himself first to then be able to execute their own ideas.

The difference to other forms of art consist in the fact the one can paint, sing, dance or write without much trouble while building is not that practical. In order for an architect to create and give birth to their idea, a huge number of events needs to take place in the context of the systems that we live in.

There needs to be some place on Earth where someone with the rights to some land and the budget to build in it, decides to contract an architect. Despite the numerous other ways to make the above happen, it always ends up with the architect conceptualizing an idea, planning the solution in cooperation with all the necessary partners, approving it by numerous institutions and building it with the technology in hands to finally experience how it all works out. Only at that

point, a given amount of people will start to make use of this new build environment and judge from the inside out what once was just an idea.

If addressing specific requirements correctly, goes along with selecting the suitable architect to execute the solution, the newly build environment will per consequence perform, look and feel uniquely well.

The huge responsibility associated with the permit to build goes beyond explanation. The confidence required in order to be certain that what you're proposing is right, seems to be completely disproportional with the amount of practice that one can ever get in lifetime of being an architect. Because of that, I firmly believe that practice must regularly occur in limited environments. With technology making it possible to foresee up to the tiniest details of the virtual reality of a given project, there's certainly at least one medium to train yourself by developing concepts and ideas.

Anyways, at a time when the speed of

development is increasing at a fast pace, no one has a clue of what could be achieved in ten, twenty or fifty years from now. We live in times of advanced technological communication while the human race is exchanging amounts of information never seen before. Controlling the information environment has become a modern challenge and being selective on what we consume is vital. Yet, considering all personal limitations and limitless possible choices, architects need to provide some personal perspective of what the future holds for us.

The need to free myself from all the knowledge of the systems I've lived in, has become strong. I believe that the power of limitless imagination needs to be implemented into developed solutions and it needs to happen fast. It needs to be intuitive and precise in order to overcome the barriers of our reality and get a chance to be accomplished.

The skills developed so far, my growing interest in tourism, my personal experience and the information available to analyze Albania will be the starting point of my

project. Going through my childhood and the cultural background that comes with the reality of growing in a third world country transitioning to democracy, inspires a kind of curiosity towards the social changes that have occurred. Almost thirty years after a fifty-year-old communist regime its impact has definitely become one of the most permanent identifying characteristics of Albania. With economy catching up to capitalism while democracy has yet to happen there is a huge number of issues that need to be resolved before any real change can happen but in a time when countries are struggling to identify themselves in a globalized world, there seems to be room to take advantage of what once was a terrible dictatorship.



Das Produkt ist gedrukt und ist als PDF-Datei verfügbar.
The product is printed and is available as a PDF file.

2. Analysis

**Historical background, geographical features
and technological developments**

A collection of methods used to analyse the factors that lead
up to the idea of “The flying room“

2.1

Historical background

Communism

Albania is almost like a microcosm of every nation's attempt of statehood. Here systems come on strong and die hard. Some last a year others a generation. In the last century alone this country has seen the rise and fall of colonialism, capitalism, monarchism, fascism, communism and probably democracy. But in this list the most famous is the attempt in communism. In 1944 as Mussolini's fascist colonial

2.1.1 COMMUNISM

government collapsed, Albanian partisans under the leadership of Enver Hoxha filled the void it left behind. The country found itself swinging from one extreme to the other without much time to reflect about it. Hoxha would take over a war torn country at the bottom of the international indexes. The foundations of the national economy were in complete ruin. Farms had been bombed out, cities were rubble, and pre-existing commerce had been crushed by the years of war. Healthcare and food were almost non-existent. To put it simply, at the end of the war there was almost nowhere on this earth worse than Albania. And with so much devastation, there was little reason to imagine things would be better any time soon. Albania was neither large nor stable enough to defend itself from its enemies, regardless of their ideology. Standing up for their independence was as much a danger against their communist allies as it was to their capitalist enemy. Yet it survived and what's more, it thrived. Because communism, totalitarianism, dictatorships, fascism, they all come with positive attributes. If they didn't they'd never make it to power. The question is what's traded in return. It's unfair to only discuss failed societies from a post-collapse perspective. Hoxha's Albania lasted for nearly fifty years. Extremism rises out of disorder. And for those living in anarchy, totalitarianism can be an attractive solution, until the moment

it isn't. By then it's too late.

If you were in Albania during those years, chances would be that you'd see the silver lining. People had been through the worst



FIGURE 01 ENVER HOXHA, MEHMET SHEHU AND RUSTEM MEÇI IN A MILITARY PARADE

of human history, not just as soldiers but as civilians. They'd come into the war with little and left with less. Those that survived had traded everything to do so. The people had simply had nothing left. At the beginning of Hoxha's Albania, it was easy to see the promise of communism. After all communists had won the war. And for people who'd spend a decade protecting themselves from foreign invasions and internal division, the visible enemy was



FIGURE 02 WOMEN ACTIVISM DURING COMMUNISM

chaos. With Stalin at the height of his power, it was easy to imagine a similar home-grown authoritarian might keep them safe too.

For a time, they were proven correct too. One by one Hoxha met his early promises. The nation was stabilized and the new government began providing the basic necessities people needed to live. Industry blossomed. Food, healthcare and shelter were treated as guarantees. A justice system was put in place to stop blood feuding and lower criminality. Women were given resemblance of equality. Education became a universal right. In four years, literacy in Albania went from 15% to 70%. In polls conducted on Hoxha recently nearly half of the country spoke positively of his legacy. Actually, there is no question that in those first few years he breathed life back into a nation left for dead.

But there is more to life than just not being

dead. The basic necessities only take you so far. The four main pillars of the nation foundations are health, shelter, food and security. If all four are taken care of, people tend to put up with any leader, in any system. But eventually something needs to be built on top of foundation and that's where things get complicated. Because the beauty of building a foundation is that everyone is able to imagine a different house on top. Concrete and pillars form a simple structure on their own but they imply a complexity, yet to come. A frame maybe robust but it feels incomplete. And once those walls start going up its quickly apparent if the architect understood reality, because ideology alone can't hold up the roof. But for a while Albania prospered. Building from the ground up, it was able to spend years perfecting its foundations without ever attempting to even build

any further. Nobody would ask why they weren't putting up walls while the base was still under construction. The future they anticipated would never have to become reality so long as the present made it look like it still had the potential to do so. In that bubble of prosperity, it can be easy to overlook what's being traded to make it happen. The long term is often sacrificed for the impulse.

It's easy to trade democracy for a feeling of security. Our environment for a feeling of growth. We humans are more than willing to continue to harm ourselves so long as we can continue believing the house we imagined around that foundation might actually get build. But no matter the system, a society treated as a series of short term solutions is bound to fail. As the nation

reached the natural limits of a centrally planned economy, reality quickly started to take a backseat to ideology. Thus began the era of lies. Massive propaganda campaigns, once glorifying the beauty of the future, turned their gaze towards the present. As the truth died, the Albanian dream died with it.



FIGURE 03 MUSICAL CLASSES IN PRIMARY SCHOOL DURING COMMUNISM



FIGURE 04 BUNKER IN THE EDGE OF LAKE OHRID, 1975-1990

2.1.2 BUNKERS

In 1967, a paranoid dictator was going to war with its own mind. Enver Hoxhas 44 year dictatorial, Stalinesque reign over Albania is commonly the most known piece of Albanias history.

A little over twenty years into his reign and Hoxha had thoroughly isolated the country from virtually every friend Albania had ever had. He looked around and all he could see was enemies. Some real, most not. A paranoia that left Albania without a single remaining ally. A country with a little over 2 million people who had no one left to protect them, except for the masses. The masses would support him. All he had to do was convince

them that they had to defend themselves. If he could get everyone in the country to fight for him then he would be able to stay in power.

The most obvious physical structures that Albania inherited from communism, are the bunkers built all over the country. For over 20 years the regime, aimed to build around 750.000 concrete bunkers across the country. In reality "only" 161.878 were actually built but they are still everywhere.



FIGURE 05 MILITARY BUNKER BY THE IONIAN SEASHORE, GJIPE BAY, ALBANIA

Not just close to the borders or in strategic locations. They are in the city streets, farmer's fields, tourist beaches and in the back alleys of small towns. No matter where you go they're a part of daily life. For two decades they build a bunker for every fourth citizens. Twenty four per square kilometer. But the structures didn't come cheap. Hundreds of thousands of pill boxes full of steel and concrete took a toll on the

already depressed economy and Albania had no friends to help. No foreign relations, no aid, nothing but a poor nation spending its last pennies to fulfill the delusion of its own dictator.

It is estimated that over 20% of the country's total economic output of the nation was spent on bunker production. It left Albania with an extreme housing shortage, unpaved



FIGURE 06 BUNKER IN THE ALPS, VALBONE, ALBANIA

roads, a weak military and a collapsed economy. Nobody benefited. It was a terrible idea. But it wasn't only an economically bad idea, it was a militarily bad idea as well.

Even though every citizen was trained to shoot from the age of twelve and were all considered reservists in the army, how long can one bunker filled with four civilian sliders really hold out? How do they get their bullets? How do they get their food? Who organizes their activity to make sure they work in unison? Nobody.

In building these bunkers, Hoxha was both imagining and virtually guaranteeing that any invasion would have to be fought off in 1930's guerilla style warfare. Given that that's how he got to power, it isn't all too surprising that in times of fear, he fell back on what he knew. But the world had moved on and under the new circumstances, Albanians would be crushed. Static, non-moving civilian targets waiting in a hole to be killed. If only anyone ever cared to invade.

The lasting effect of these bunkers had

little to do with war and far more to do with psychology. By putting them virtually everywhere on the country, he'd convinced the people to be paranoid. Just like their dictator. For a country with no friends and a lot of imagined enemies, having a physical reminder of that isolation only helped to stoke their fears and increase Hoxha's control. The further the bad idea was followed, the more it made sense. After all, if they weren't under threat, why were there so many bunkers? But as every bad idea this also had to come to an end and two years after Hoxha's death, his bunkerization policy died with him. As the USSR came to an end, so did communist Albania. It was time for capitalism to have a go. However, even though Hoxha's plans were dust, the bunkers weren't. There are still hundreds of thousands just randomly strewn about the country..



FIGURE 07 FEW BUNKERS HIDDEN IN THE HILLS

They reminded people of the dictatorship and as the country slowly opened to the outside world, they've changed alongside with it. Their fates are strangely symbolic of the fates of their own people.

Where thousands were destroyed as an act of revolutionary defiance and thousands more were dug up and scrapped for their steel, many of the remaining bunkers found themselves as part of the new economy.

They have been turned into restaurants, museums, hostels, art installations, beach huts, souvenirs for tourists, photo galleries, Kosovar refugee camps and even mushroom farms. Possibly, every way to turn a small dark space into a profitable venture has been tried.

While they're no longer as ubiquitous as they once were, and no longer hold the imagination of the people in their dark hearts, there's no denying that they have become a visible part of the modern economy. They have become a poignant

introduction to foreigners into those fifty years of this nation's history. And while certainly no tourists are coming to Albania to see the bunkers alone, they are among the first things to mention when expressing their impression about the country. They pass it around if that's a secret. As if they're the first to come across this hidden oddity. Because once you discount the history that put them here, the bunkers bring a playful perspective.

They're unique. Special, even. As more tourists come to create the standard image of how this newly opened country will be pitched to future travelers, the bunkers have become a defining feature. Something you can only find here. And as the world has changed and Albania looks for something to set itself apart, new life has been breathed into these crumbling shells. Maybe this is a way to turn a bad idea into a good one..

2.1.3 TYPOLOGICAL ANALYSIS OF BUNKERS

As the bunkers gained the attention of many architects after the end of communism, they have so far only been treated in terms of revitalization. I do not know of any case where this typology is architecturally analyzed or developed any further. The very easily identifiable shape alone makes up for valid reason to look for visual, structural or even functional qualities in it.

- Technically speaking the shape is as basic as a semi sphere. A very uncommon shape in the build environment of the world we live in.
- From the scale of the most common bunkers, it reminds one of the igloos build by the Eskimos out of snow just that in this case they are build out of thick reinforced concrete aiming to protect civilians from ground and air attack instead of providing shelter for domestic use.

- Meanwhile the semi sphere itself in other scales is very common and can be found everywhere that there's at least one cathedral with a dome in it. The semi sphere often comes as an answer to creating huge indoor spaces with breathtaking effects.
- The technology and materials used to build them are in fact an early use of concrete for what does best. Building them in some of the roughest terrains possible must have had its own difficulties but because of the complete totalitarian nature of Enver Hoxha, very little information about bunkers has ever become public.
- Functionally speaking there are basic characteristics that can still be considered. Bunkers had to serve to at least four civilians providing them shelter. Larger ones served to more and

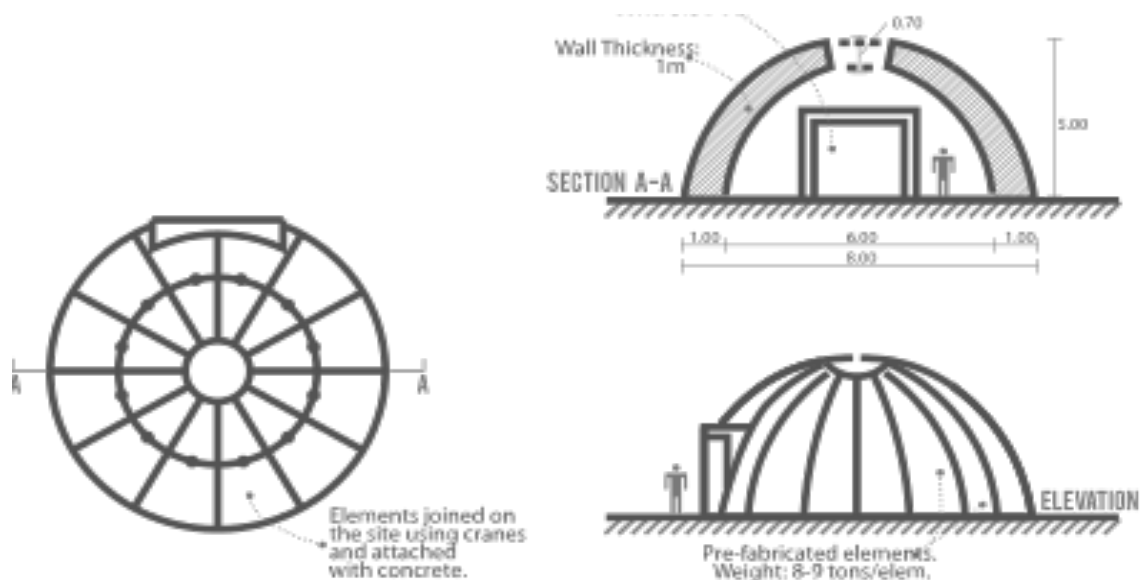


FIGURE 08 "QENDER ZJARRI" BUNKER TYPE DIAGRAM 1

they always had a temporary function. They sometimes had underground tunnels connecting more of them together, providing larger groups of people the possibility to communicate even in case of war.

- The space that it offers in the inside is completely unique. Partially from the intense contrast between the small bright holes and the dark surrounding

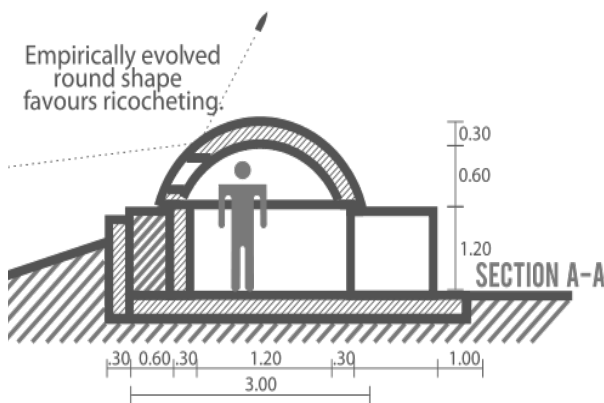
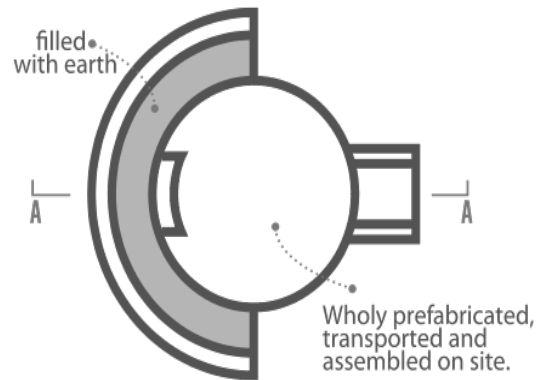


FIGURE 09 "QENDER ZJARRI" BUNKER TYPE DIAGRAM 2

perfectly well contained situation, they can have a very self-centered effect. This effect can be related to the isolation concept of their purpose but can also be seen as a quality for a completely different context.

- The urban context is probably the most complicated to analyze. With no definable pattern on where and why are these structures are located, it is difficult to come up with any logical explanation. Anyway one can quickly start to appreciate the beauty of the randomness that characterizes them. The diversity of unique locations that

as well as from the uncommon shape where walls become the roof. The symmetry is so strong that makes you feel like the center of the attention. This dark space feels very cold. The high humidity makes any surface almost wet in winter but could provide with some shadow comfort in the warm summer days. With the low air circulation and the amount of garbage in them, bunkers usually stink unimaginably bad but in



they can be found is extraordinary. They are just everywhere and this alone is probably the most interesting perspective when considering this idea in the context of tourism of the 21st century. What they terribly lack though is infrastructure. There is no known way to make use of them as a unity but the idea of being able to develop a concept that could somehow provide with the opportunity to spend time in so many, so drastically different locations, is fascinating and will be the focus of design for my thesis.

2.2

Geographical

Geoposition of Albania

Albania is located in southeastern Europe, central Balkan and Mediterranean area and is defined in an area of 28.748 km². Geographically speaking, Albania's serves as a favorable transition point between Europe and Asia as well as Europe and Africa. Albania's broad Riviera including the Ionian and Adriatic Sea both part of the Mediterranean Sea,

2.2.1 ALBANIAN GEOGRAPHICAL POSITION



FIGURE 10 GEOPOSITION OF ALBANIA

The Albanian Riviera represents the country's most important territories because of its geographical position, natural resources and biodiversity. Both seas are part of the Mediterranean Sea, which includes 27 countries that unites Europe, Africa and Asia. Some of the most important rivers in the history of mankind, like Nile, Ebro, Po, Rone and Vjosa flow into the Mediterranean Sea adding in into its importance and making it one of the most visited areas worldwide with over 500.000.000 tourists.

Climate in Albania is also typical Mediterranean (Subtropical). It is defined by a dry spring and summer whereas autumn and winter are partly rainy. Rainfall averages from 400-700mm a year. Winter in Albania is soft while summer is hot and dry.

2.2.2 GEOGRAPHIC FEATURES

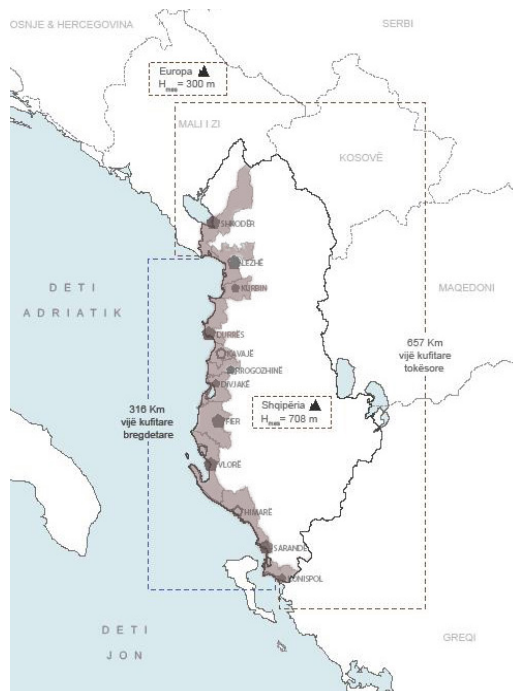


FIGURE 11 GEOGRAPHIC FEATURES OF ALBANIA

The Republic of Albania borders with Montenegro in the North, Kosovo in the Northwest, Macedonia in the West and Greece in the South. The length of its borders is 1094km where 657km are land borders, 316km coastline, 49km river and 73km of lake borders. The average altitude above sea level is 708m being twice higher than Europe's average altitude. Albania's physical configuration is very complex. The highland is part of the Dinaric Alps with their highest peak of 2694m North of Albania. Limestone Mountain ridges from North to South and West to East compose the highlands with peaks that often surpass 2000m of altitude. Geology of the coastline can be categorized in two main forms, the accumulative filled relief starting north of the coastline and the rocky relief ending south of it.

2.2.3 ALBANIAN COASTLINE THROUGHOUT THE HISTORY

In the Illyrian times, the Albanian territory played a strategic role as the shortest connection between the Western and Eastern Europe or the Roman and Byzantine Empire. Until the Ottoman Empire invasion Durres was one the most important ports in the Adriatic Sea. The Ottoman Empire weakened its strategic role in Europe. The Second World War and the communist regime that followed contributed to that decline as well.



FIGURE 12 ILLYRIAN EXPANSION, 300BC

2.2.4 DEMOGRAPHY

Migration in Albania has had the tendency to go from East to the West as the coastline offers better opportunities for people, has a low relief and better infrastructure. During the last two decades there has been an increase in the urban population manifested in a general growth of construction. This means that a high concentration of the population is located in the coastal area with around one million inhabitants. Regardless of that the major part of the coastline remains rural.

The Albanian coastline lies in twelve local governmental units including Shkodra, Durres, Vlora and Saranda as some of the largest cities in Albania. The average density in these twelve units is 142.6 inhabitants/km² with Durres as the densest unit with 496.99 inhabitants/km² and Shkodra with the lowest density of 55.9 inhabitants/km².

Sex ratio is amounted to 49.9% males and 50.1 females of the total population whereas 67.7% of the population is from 15-67 years old.

2.2.5 COASTLINE ANALYSIS

Considering the geographical and cultural factors as well as infrastructure, the Albanian coastline can be divided into four sections.

■ FIRST SECTION

The first section is characterized by urban and infrastructural developments in the so-called sea-sun area. It includes coastal cities such as Velipoja, Durrës, Vlora and Saranda. All the coastal tourism related developments as hotels, hostels, bars, restaurants, houses and clubs are located in this section. This is the first line of contact with the seaside and its urban developments have been fast due to the high demand. The fast pace has led to numerous issues that are to be seen in the chaos of some of the newly build areas.

■ SECOND SECTION

The second section can be identified by agriculture. These territories, mostly fields and soft hills, are represented by cities that are not in direct contact with the coastline like Shkodra, Tirana, Kavaja, Lushnja, Fieri. Some of them have a direct connection to at least one of the cities in the first section, serving as supply for many products. The other cities function as independent units and because of the limited connectivity to the coastline they focus on farming or sheep breeding in the hills. All of the above add up to the diversity of the Albanian coastal tourism.



FIGURE 13 FIRST SECTION IDENTIFYING SUN AND SEA AREAS

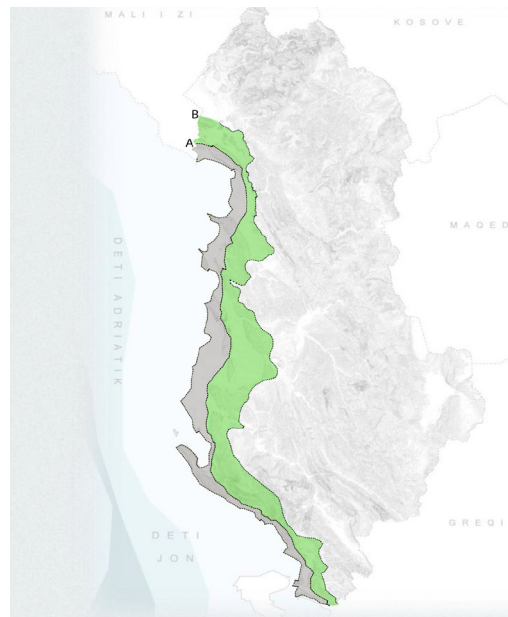


FIGURE 14 SECOND SECTION IDENTIFYING AGRICULTURAL AREAS

■ THIRD SECTION

The third section includes cities in the depth of the territory which inherit important values for the cultural, folklore, music and art heritage of Albania. Because of the steep terrain between the second and the third section, this section is almost completely isolated from the coastline (which is main tourist attraction at the moment).

Cities in this section include Kruja, Berat and Gjirokaster, some of the most monumental and important cities in the history of Albania. They offer great opportunity for cultural tourism. It includes a total of 959 monuments of cultural heritage.

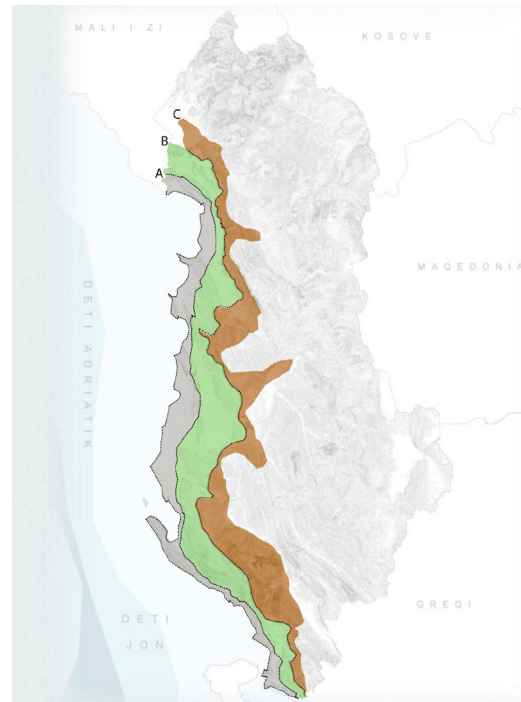


FIGURE 15 THIRD SECTION IDENTIFYING CULTURAL AND HISTORICAL AREAS

■ FOURTH SECTION

The fourth section is the Albanian marine area including its rich flora and fauna, water resources, the underwater surface, the coastline, beaches, ports, lagoons, river mouths etc.

The Albanian coastline is 470km and is rich in form and biodiversity.

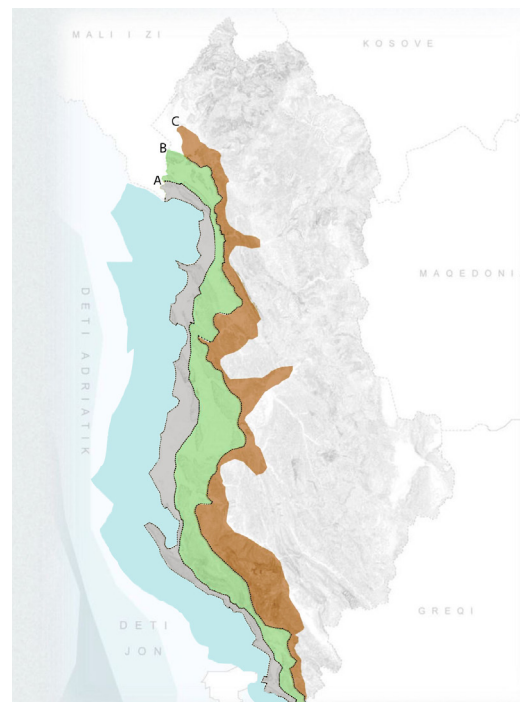


FIGURE 16 FOURTH SECTION IDENTIFYING ALBANIAN MARINE AREAS

2.2.6 INFRASTRUCTURE

The main arteries of infrastructure are located alongside the Coastline of Albania connecting Montenegro and Greece.

The so-called Blue Corridor is a priority for the future of the highways and railways. With just one existing airport in Tirana and highways still disconnected from one another, the flow of people throughout the country is still very limited and slow.

Adding up to the underdevelopment of the ground transport,

Albania is still failing to take advantage of its marine area for transportation.

The third map shows the future and diversity of transportation methods in Albania.

Plans for a new airport in the South (Vlora or Saranda) have been announced as well as routes of marine transport.

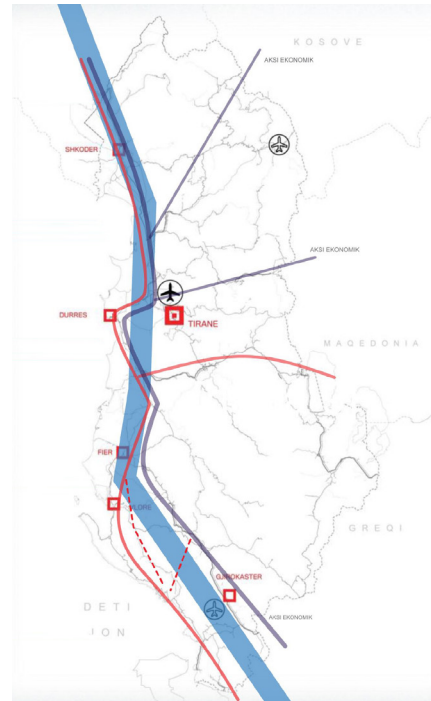


FIGURE 17 BLUE CORRIDOR AS A MAIN ARTERIA OF ALBANIAN INFRASTRUCTURE

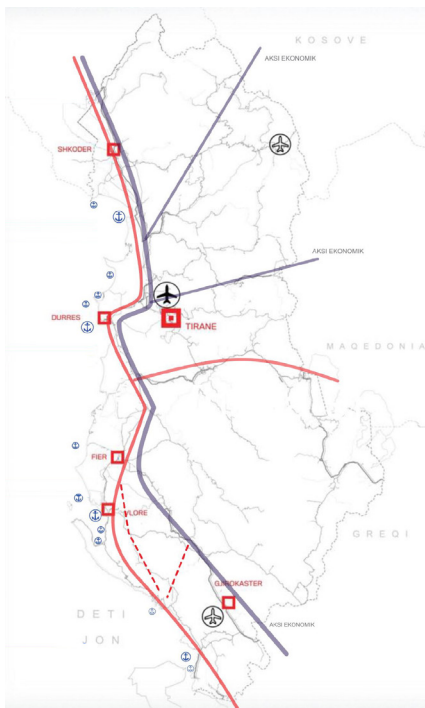


FIGURE 18 THE FUTURE OF HIGHWAYS AND RAILWAYS IN ALBANIA



FIGURE 19 THE FUTURE OF DIVERSE TRANSPORTATION METHODS IN ALBANIA

2.3

Drones technology

Unmanned Aerial Vehicles (UAV) or drones are aircrafts that can be navigated without a human pilot on board the aerial vehicle. Thanks to the GPS tracking system they contain, drones can be controlled from the ground.

2.3.1 DRONES DEFINITION



FIGURE 20 - BOEING'S SELF-PILOTED PASSENGER DRONE DRONE C DRONE COMPLETES FIRST TEST FLIGHT. (JAN 2019)

Very important points of drones are the maximum altitude and payload (sensors), flight duration and flight range. They are all influenced by the major factors: The model, energy source and weight.



FIGURE 21 VOLOCOPTER 2X ELECTRIC AIR TAXI

As drones were invented to fulfill different demands, they accordingly vary on size and technicalities. They can be small or large depending on their transportation purpose and flights.

2.3.2 THE AUTONOMY OF DRONES



FIGURE 22 BELL NEXUS, THE FUTURE OF URBAN TRANSPORTATION

A major development is the further increasing autonomy of drones.

Drones are often seen as remote control aircraft, but there are technologies that enable autonomous operations, in which the remote control by a human operator is partially or completely excluded.

Most drones that are commercially available are remotely controlled, but at the same time they already contain elements of autonomy, mostly software for flight stabilization. More professional drones offer

the possibility to pre-program flights. In the near future, more autonomy is expected with regard to determining flight routes, sense and avoid systems⁷⁶ for performing evasive maneuvers (e.g., birds, airplanes), adapting to changing weather conditions etc.

2.3.3 ATHLETIC DRONES

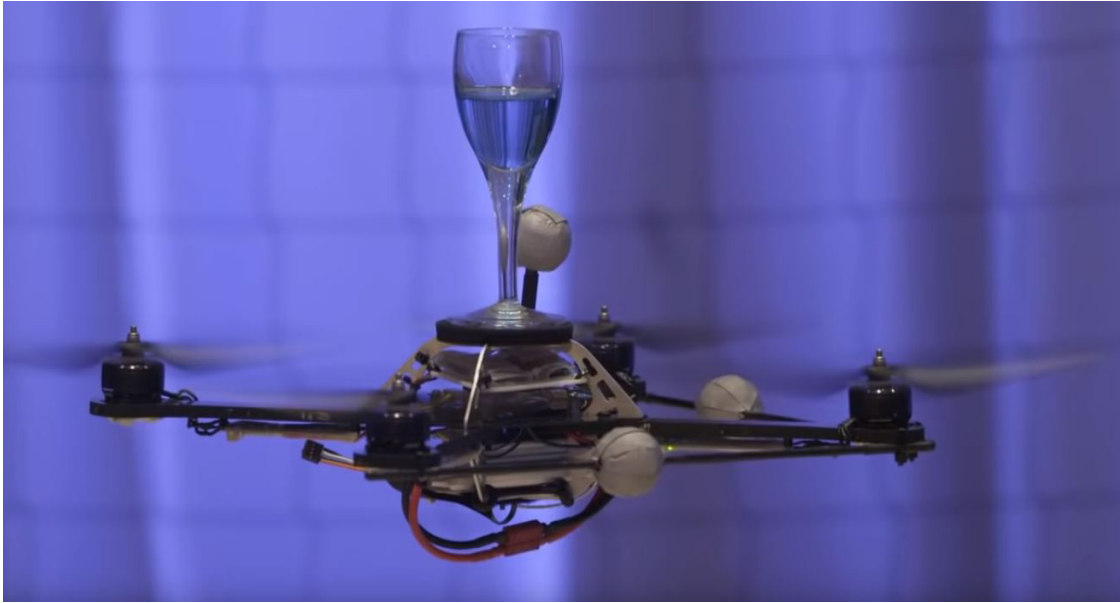


FIGURE 23 QUADCOPTERS BY RAFFAELLO D'ANDREA, TEDGLOBAL, 2013

What makes the flying quadcopters unique is their athletic behaviour. These smart robots can detect and solve, in no time at all, the physical problems with algorithms that help them learn. As shown in the figures 21-24, these drones can play catch and balance, making decisions together.



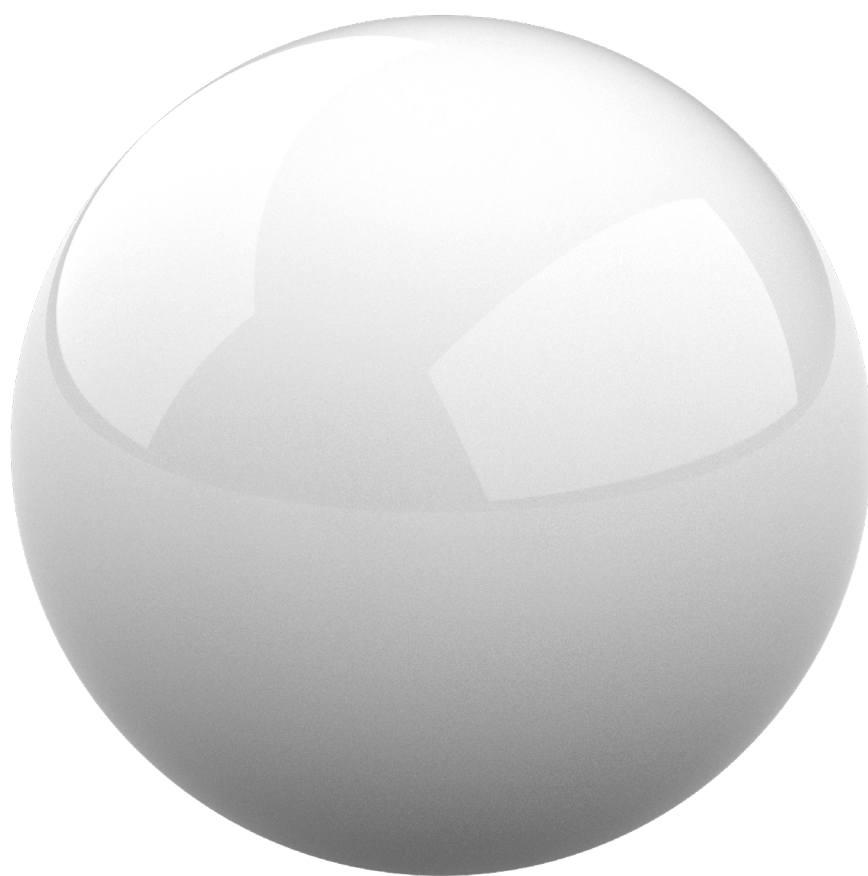
FIGURE 24 QUADCOPTER PLAYING CATCH, TED CONFERENCE, 2013



FIGURE 25 QUADCOPTER NAVIGATION, TED CONFERENCE, 2013



FIGURE 26 QUADCOPTER'S ATHLETIC POWER, TED CONFERENCE, 2013



When something needs to be as small as possible but still have a large volume, it takes the shape of a sphere.

2.4

The Sphere

The basics of spherical geometry

A sphere is a geometrical figure that is perfectly round,
3-dimensional and circular - like a ball.

2.4.1 SIMPLE AND COMPLEX

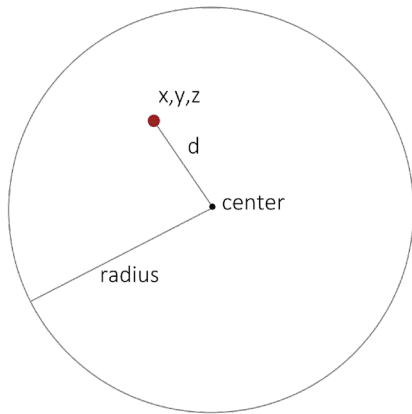


FIGURE 27 BASIC ELEMENTS OF THE SPHERE

Geometrically, a sphere is defined as the set of all points equidistant from a single point in space. The distance from an outer point to the center of the sphere is the radius(r) and the maximum straight distance from one side of the sphere to another is the diameter (d).

If you were to split a sphere down the middle, half of the sphere would be called a hemisphere.

The circle that has the same radius and center as the sphere itself, it is called a great circle.

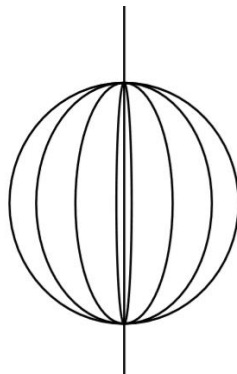


FIGURE 28 THE MERIDIANS OF LONGITUDE ARE EXAMPLES OF GREAT CIRCLES

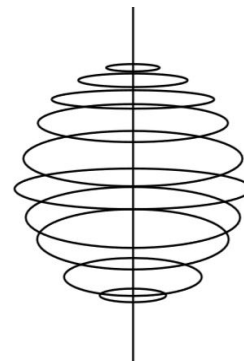


FIGURE 29 THE PARALLELS OF LATITUDE ARE EXAMPLES OF SMALL CIRCLES

When something needs to be as small as possible but still have a large volume, it takes the shape of a sphere.

That is why a balloon is round when you blow it up. It wants to hold as much air as possible with the smallest amount of surface. This occurs quite often in nature - common examples include bubbles and water drops.

2.4.2 THE PERFECT SPHERES OF NATURE



FIGURE 30 PLANETS AS THE PERFECT SPHERES OF THE SOLAR SYSTEM

Nature has a beautiful and amazing way of using math. A basic formation found in it is the perfect sphere.

A perfect sphere is defined as being completely symmetrical around its center, with all points on the surface lying the same distance from the center point.

It can be seen in examples such as bubbles, water drops, planets, and atoms.

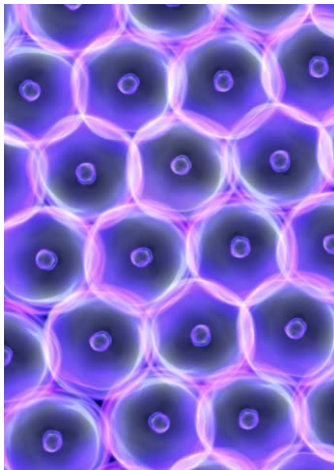


FIGURE 31 CELLS, THE BASIC ORGANISM



FIGURE 32 BUBBLES



FIGURE 33 WATER DROP

Why are these perfect spheres so important to nature and our existence?

If spheres are not balanced with one another, the world would not function as we know it. Life on our earth depends on the balance and nature has found its own special ways to keep them that way.



FIGURE 34 GEODESIC DOME DELIVERY, BUCKMINSTER FULLER, RALEIGH, NC 1954

This invention is considered a great example of how to get the maximum from a minimum material by making the most intelligent use of the resources available on earth.

1967, MONTREAL

2.5

Geodesic Dome

Buckminster Fuller (1895-1983)

"We are called to be architects of the future, not its victims."

2.5.1 THE PHILOSOPHY THAT BROUGHT FULLER TO THE DYMAXION TOWER HOUSE

According to Fuller, man was designed to be a success. His characteristics are just magnificent; how the metaphysical man as man could become the master of the physical. So the strategy of finding out how to use the worlds resources that would take care of everybody, would come back then to how to take care of his living equipment.

DYMAXION HOUSE (dynamic+maximum)

The general concept of this house (designed to shelter an airplane maintenance crew), light but strong as an engineering structure is to be flyable economically, to have the ability to be installed in remote places in the arctic and fly easily to Europe.

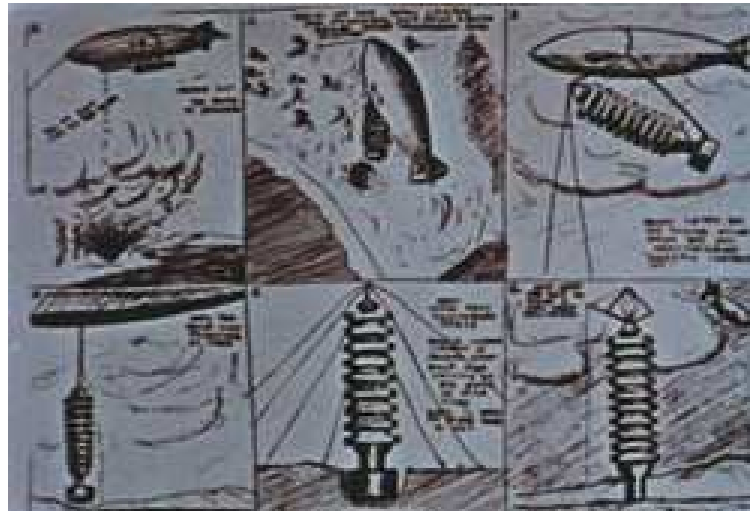


FIGURE 35 SKETCHES OF DYMAXION HOUSE BY B.FULLER

Then, on 1945 from this collective building, Fuller's next step was a single house for a single family. 'The first Dymaxion house', where the edge of it was a ventilation system for the whole house, was very close to the air space technology.



FIGURE 36 UNITED STATES PAVILION AT EXPO '67, B.FULLER

During 1933, Fuller designed the "Dymaxion car", which ended up to be a very efficient vehicle that could also round from 90 degrees angle of a normal car, to 35 degrees angle that could also fly, land and drive in the future.

2.5.2 CALCULATIONS OF THE DOME CONCEPT

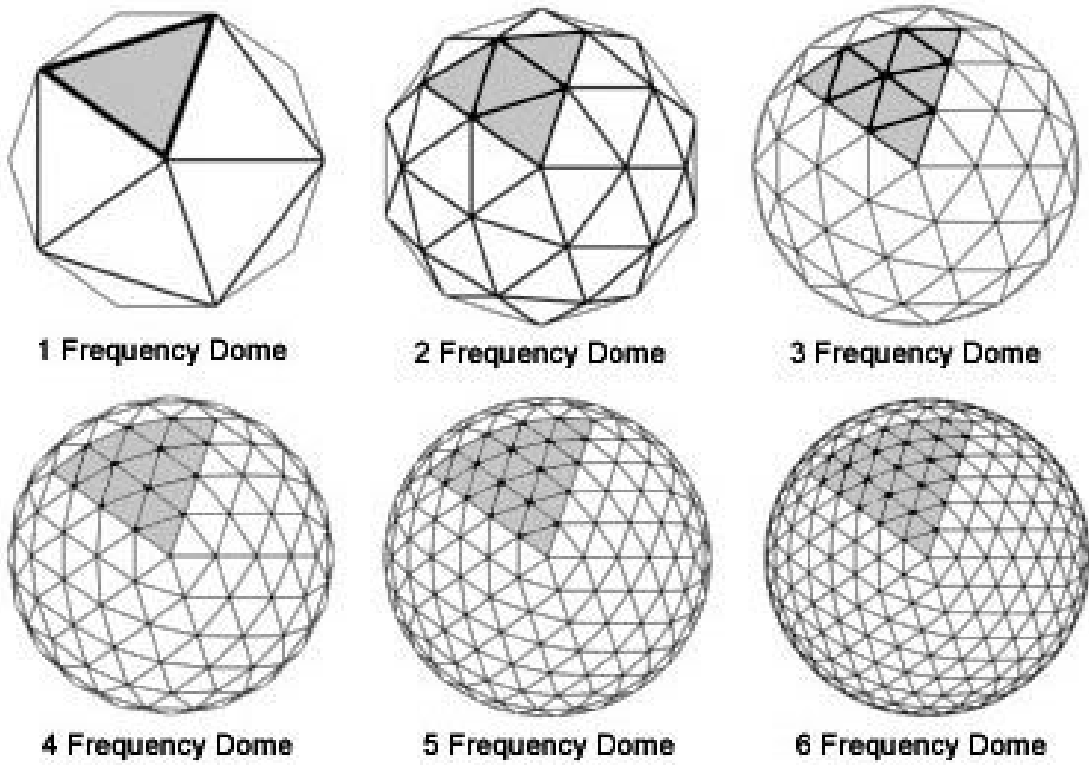


FIGURE 37 DOME FREQUENCIES

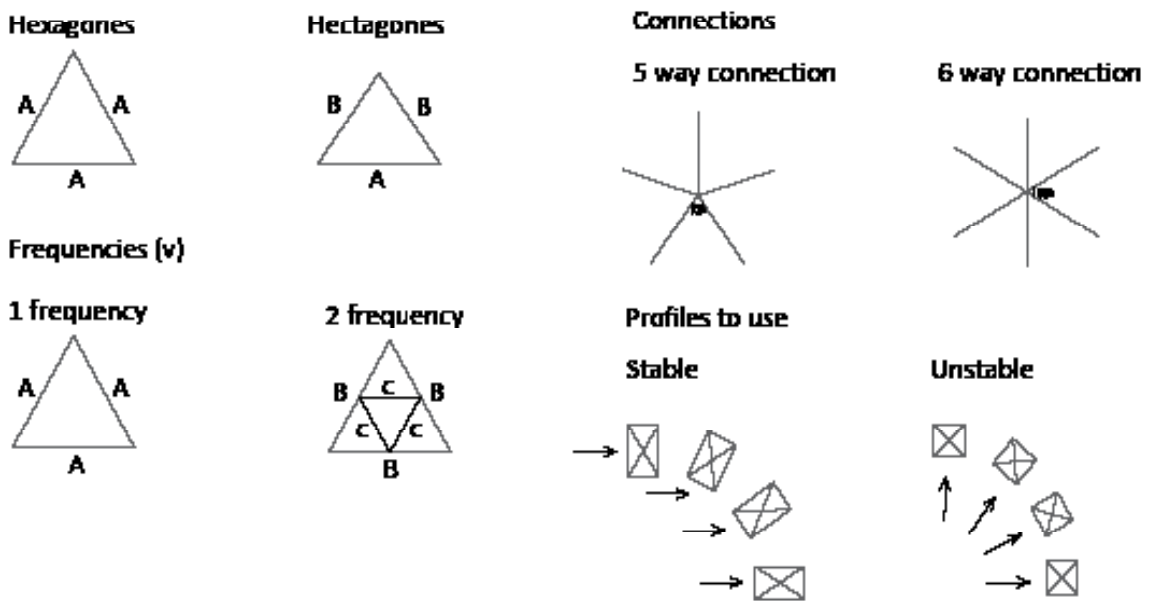


FIGURE 38 BASIC STRUCTURE OF THE DOME'S FORMATION



FIGURE 39 TRIANGLE AS A STABLE SHAPE

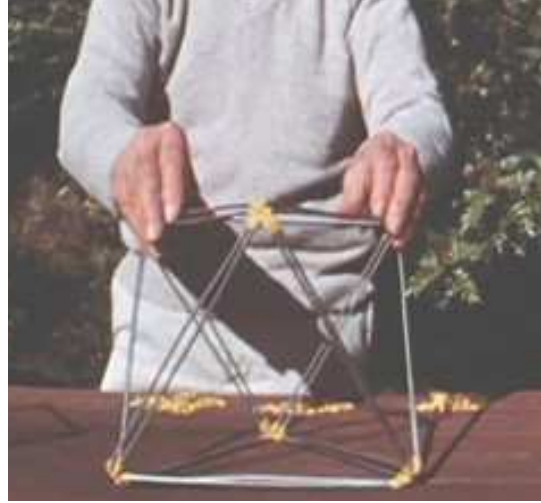


FIGURE 40 FROM TRIANGLE TO X HEDRONS



FIGURE 41 ENDING UP TO A STABLE STRUCTURE AGAIN



FIGURE 42 THE DYMAXON MAP BY FULLER

The only geometrical shape that puts us a limit condition, where angles cannot change anymore and create a stable shape (Structure) is the triangle (vectors of the basic energy: Action – reaction – result.)

We get the most valued with the least quantum with the X hydron : 20 units of

value for 5 units quantum invested – Basic structure used for geodesic dome. Complete transformation of vector hidden through X hydron through octahedron down to tetrahedron – 3 Basic structure systems in the universe.

Four hexagons inside; In this volume we can imagine a centered sphere and 12 spheres around it = atomic packing.

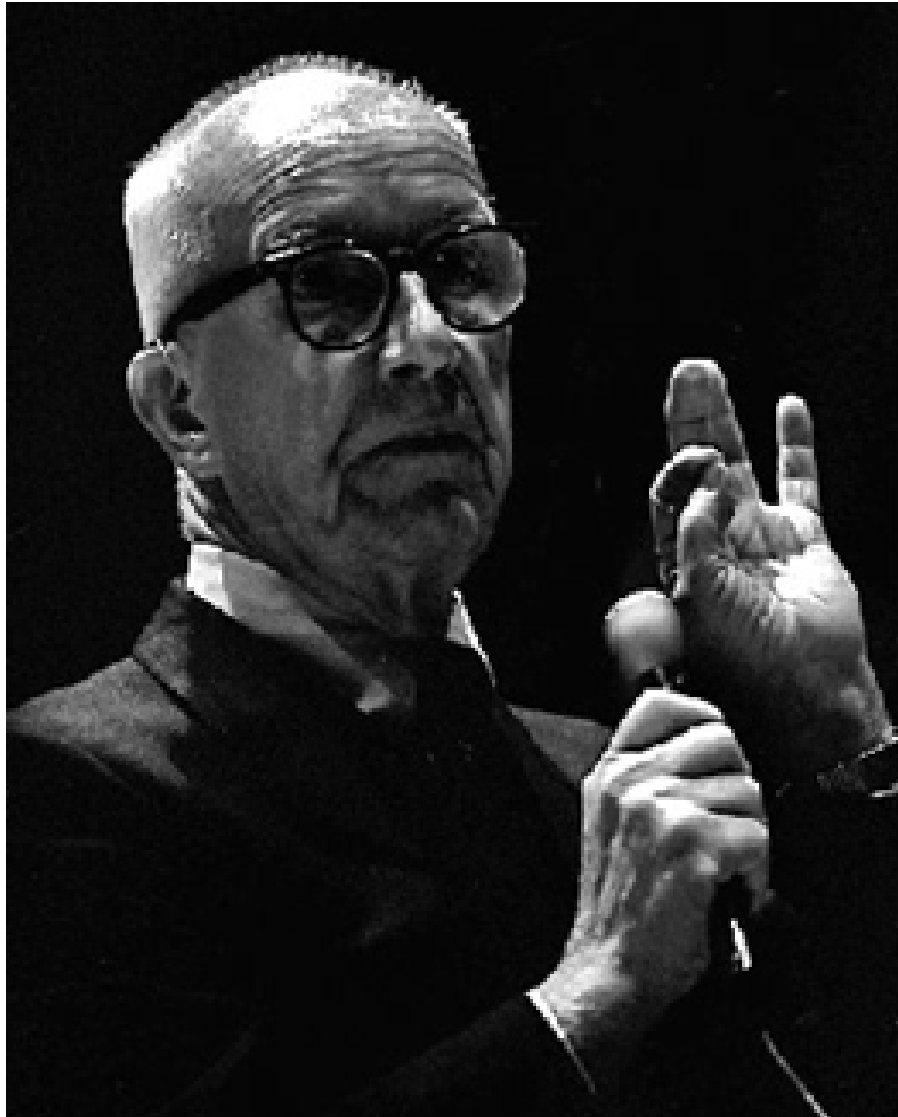


FIGURE 43 BUCKMINSTER FULLER, UC SANTA BARBARA, 1972-1973

BUCKMINSTER FULLER

"You need to find out what needs to be done. How will you organize yourself to accommodate from 1% humanity to 99% humanity and to double, triple their life spans. Will you give them a chance to enjoy the earth? That is the design responsibility... You don't ever have to worry about the beauty of the building because if you really understand the problem and solve it correctly, life really goes on. This is regeneration of life and you do it so economically and it is realizable, it always comes out beautiful." B. FULLER

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3. Goals

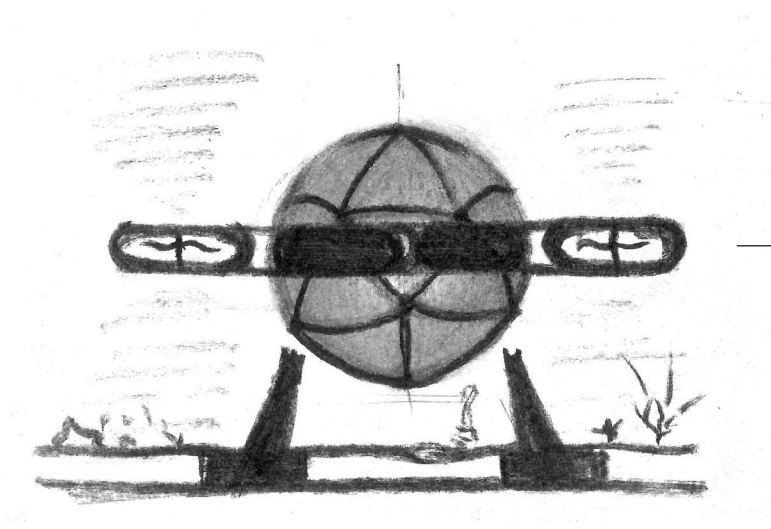
Lonely Architecture

What is the project aiming to achieve?
What is expected by the final design.

3.1 Concept

Lonely Architecture

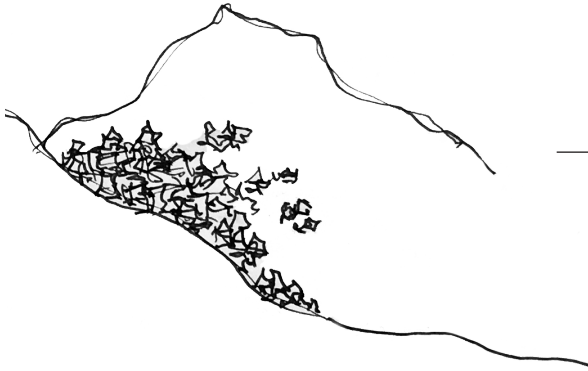
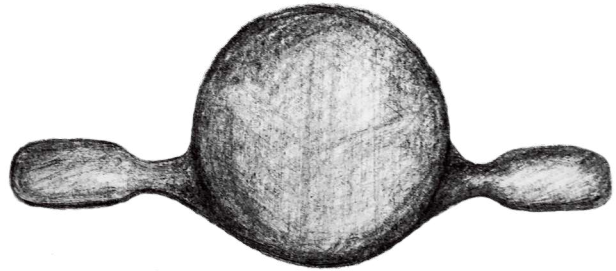
The concept of "Lonely Architecture" aims to create a module that mimics the traditional Hotel room. This module, refereed as capsule throughout my thesis, should be able to provide with enough resources for two people who would live in it during their holidays in Albania.



DEVELOPE A
MODULE THAT CAN
BE TRANSPORTED BY
AIR

EXPLORE

Take advantage of air mobility to explore territories that are not accessible by car

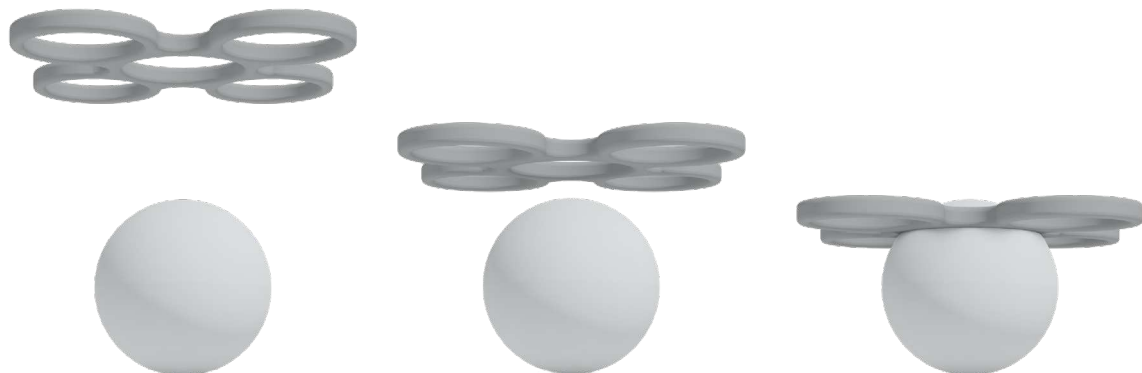


PERSONALIZED HOLIDAYS

Visit different sites with unique character during short holidays trips.

3.1.1 THE CAPSULE

- On its own the capsule should be a simple self-sustainable module.
- The goal is to create a capsule that will be structurally stable to be placed in the ground as well as to be grabbed by the wings while it's being transported.
- It needs to be as light as possible but it should also provide with enough space to accommodate two people.
- The capsule should provide with enough electricity, food and drinkable water as well as waste storage and sewage storage possibilities for it to serve its purpose in accommodating its guests during their holidays.
- The capsules main function is to create shelter for different weather conditions.
- It should create the possibility to perform basic tasks such as cook simple meals, sleep, take a shower or go to the toilette.
- The idea behind "The flying room" is to be transported in different locations so that the guests can enjoy them. Therefore the capsule aims to provide a panoramic view of the surrounding environment.
- The capsule itself does not involve any high tech equipment. It actually aims to be as simple as it can be.
- Ideally the capsule shouldn't be very expensive to be build.
- Maintenance should also be simple and fast.



3.1.2 THE WINGS

- The wings should be able to autonomously rise, fly and land in predefined spots according to the schedule.
- Because of the complicated mechanical and technological systems necessary to develop the wings, they will not be in the focus of my thesis.
- The wings of "The flying room" are its most technologically advanced part and as a consequence the most expensive.. For that reason they are thought to be built separately from the capsule itself.
- While capsules could stay for days at the same location, the wings are always on the move. The moment they release one of the capsules in the desired location they leave to transport the other capsules or go to maintenance and recharge.
- One set of wings should be enough to transport thirty capsules in a time span of ten days



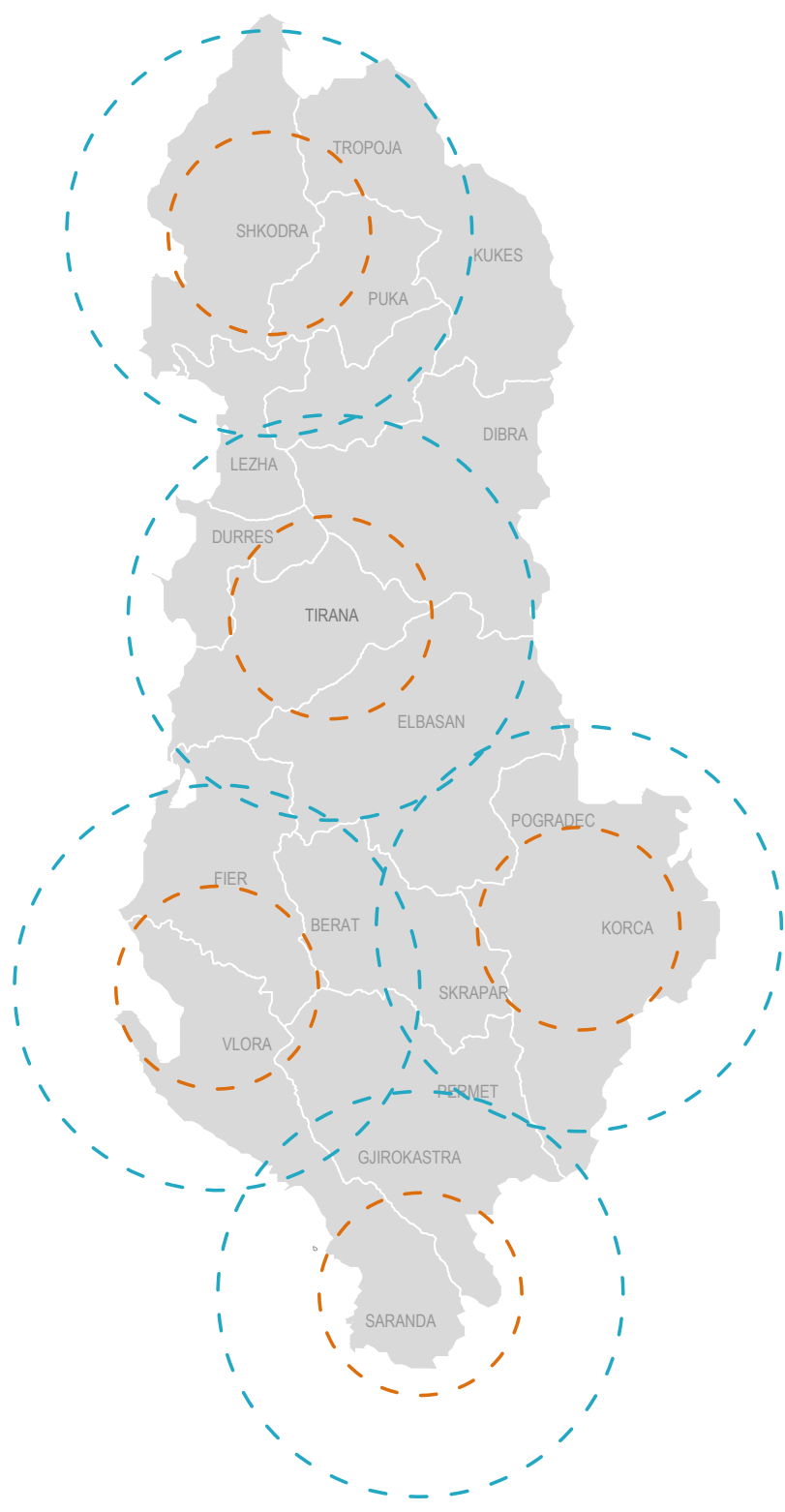
3.2 Urban Concept

The flying room

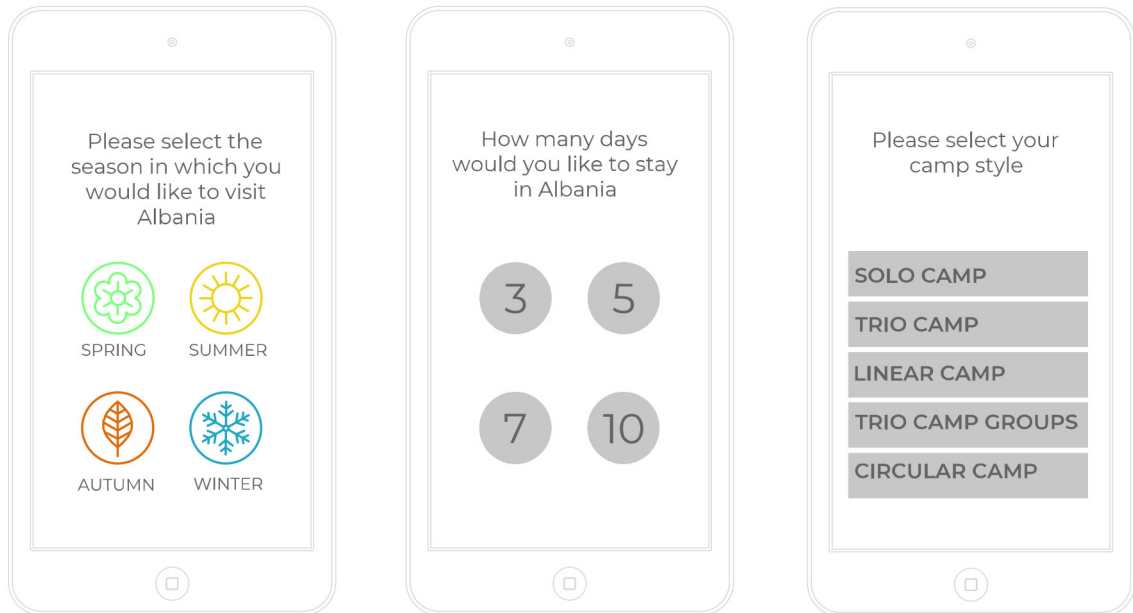
The urban concept aims to provide with different scenarios of how holidays with "The flying room" could look like. The usage of the capsules can be categorized by location, duration, camp style, holiday interests etc...

Because of the numerous combinations of all the factors, no trip would look the same and each selected route would be unique and personalized to the people using it.

3.2.1 AIR DISTANCES r=25km r=50km



3.2.2 BOOK YOUR TRIP



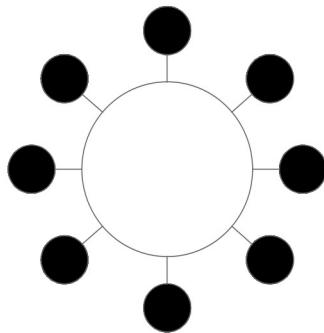
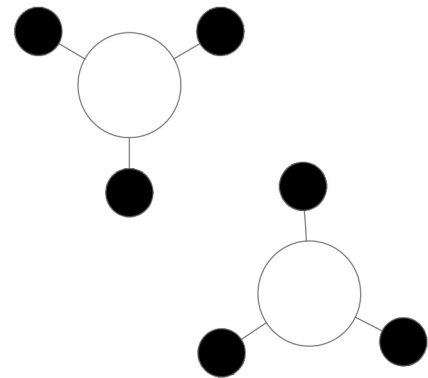
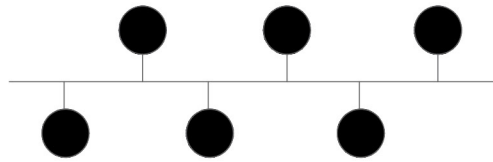
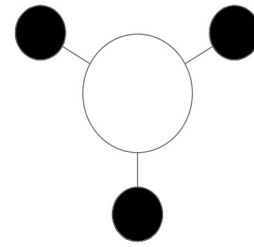
The urban concept of “Lonely Architecture” is the most unique aspect of the project. There is no traditional way of imagining how this hotel could work. Being able to fly the rooms to every possible territory leads to a new kind of tourism. The idea is inspired from the bunkers build during the communism as you can find them anywhere in Albania. The only difference is that “Lonely Architecture” is actually mobile and it can be transported everywhere.

This kind of an urban concept makes it possible to limitlessly increase the number of tourists visiting every corner of the country without the need to invest in infrastructure. The advantages that come with that are many but the most important one is that Albania would be able to preserve its territory and keep it virgin.

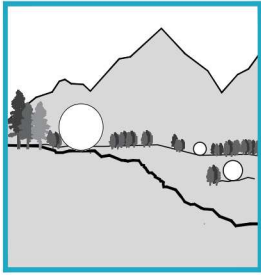
With absolutely zero impact on the build environment this conceptual hotel aims to bring tourists to the wildest places in Albania where they will spend a few day. During these days they will impact the local communities and their micro economy. While most of the cities and villages in Albania are very isolated because of the reasons mentioned in the analysis, this concept would boost their development.

Anyway I believe that the spread of the rooms throughout the territory needs to be controlled into areas deliberately developed for the flying room. Tourism comes with many disadvantages such as pollution and vandalism that need to be contained into camps.

3.2.3 CAPSULES CAMPS



TRIO GROUPS



INTO THE WILD

Uninhabited territories, national parks and places that remain untouched by human development. These places will be accessed by a very limited amount of capsules.



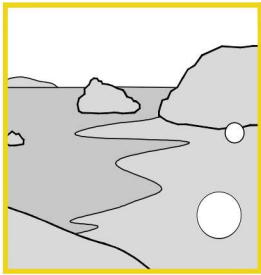
CULTURAL

Areas that include one or many culturally important sites for Albania. They could be historical cities, ruins, or castles.



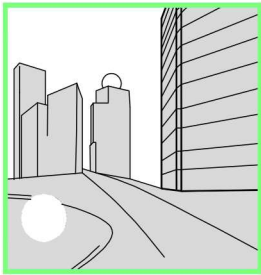
AGRICULTURAL

Rural areas with cultivated ways of growing and cooking food. Traditional cuisine as well as the experience of Albanian villages.



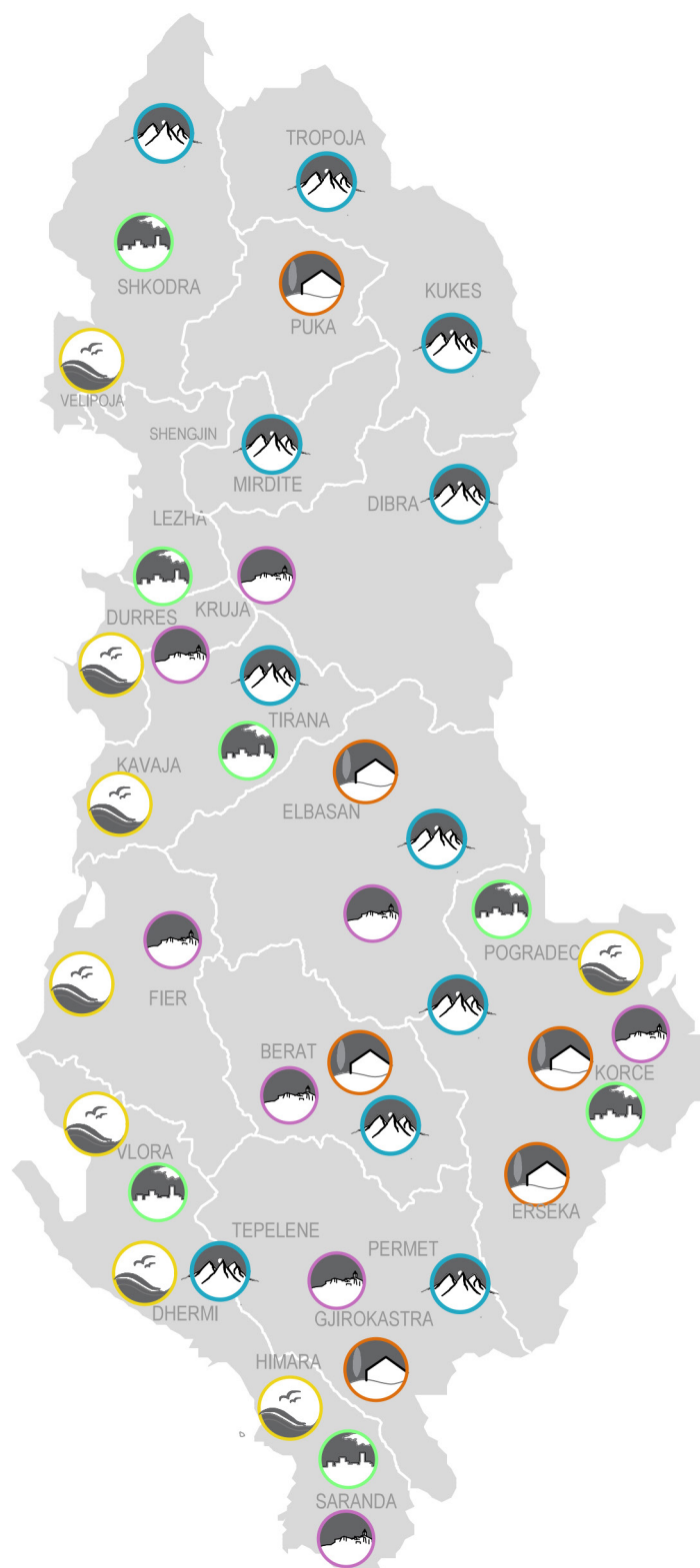
BEACH VIBES

The seaside experience in some of the most picturesque beaches in Albania. This can be both urban and rural experiences.



CITY LIFE

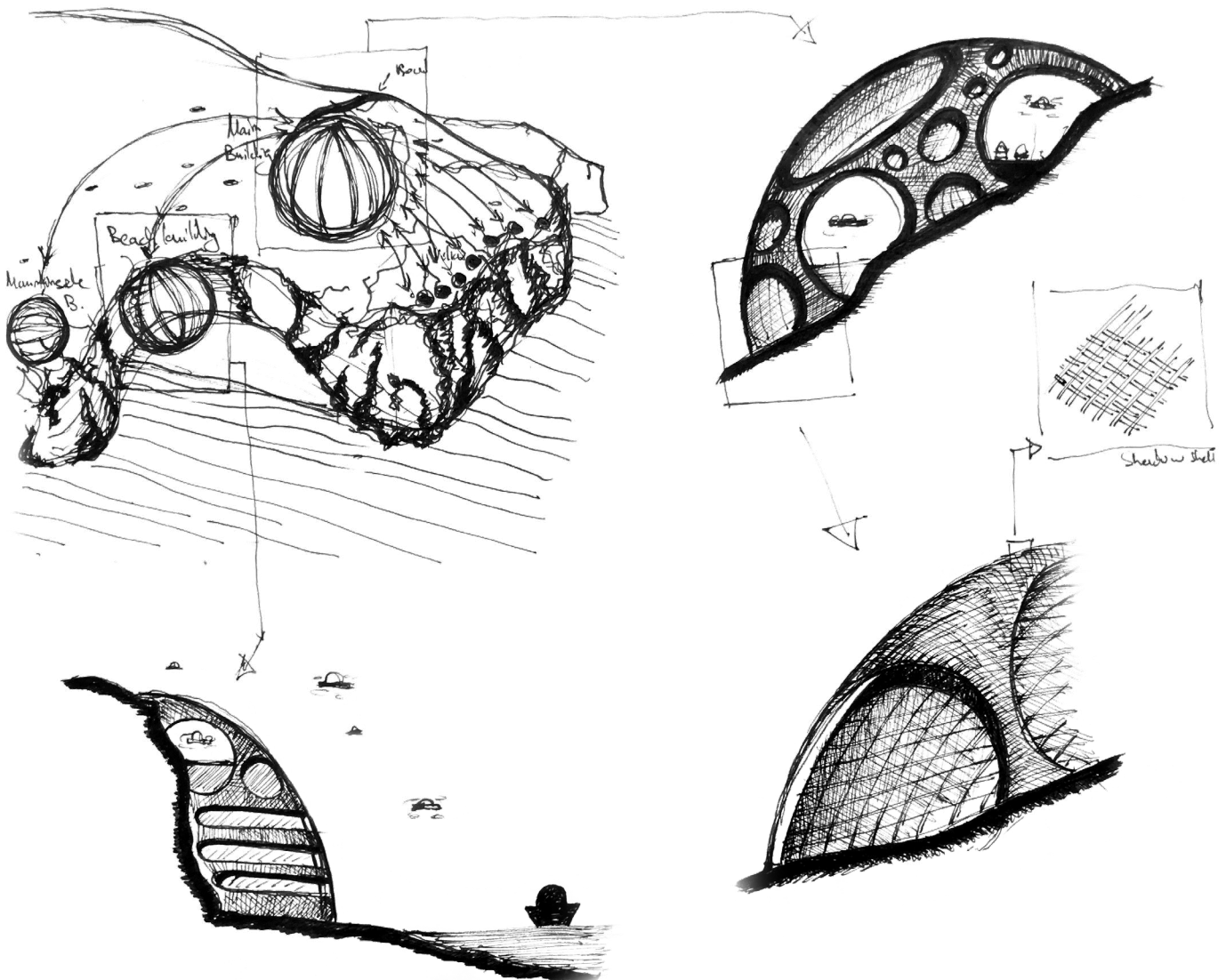
Cities in Albania diverge a lot from one another. They offer unexpected experiences only possible in dense areas. Seaside, lakeside or mountainside cities showcase unique microcultural developments.

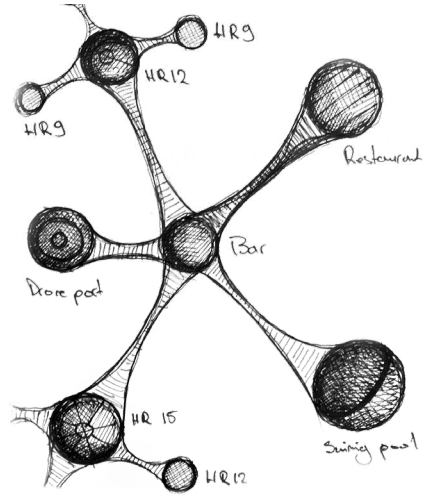
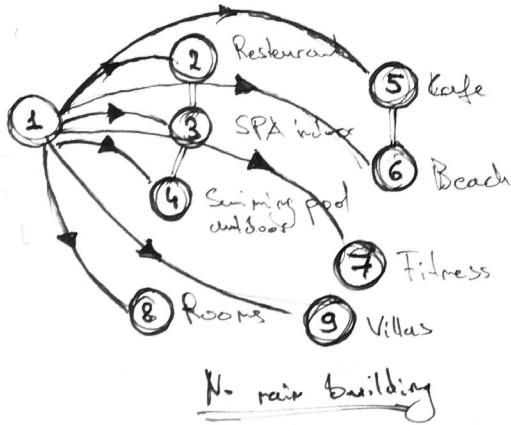


3.2.5 THE FULL EXTENT OF MOBILE ARCHITECTURE AND FUTURE SCENARIOS

By getting rid of the static character of architecture as we know it, a universe of new possibilities opens up. In my opinion, that kind of a change would require for architects and urban planners to redefine everything from the accessibility of buildings to how future cities will be organised. Mobile architecture requires a new way of thinking that messes up with foundational concepts of human society such as private and public property.

In the following sketches I have conceptualised ways that this kind of mobility can affect architecture. In the first group of sketches one can see how air mobility affects architecture. A building can be divided into separate functions that only require limited infrastructure in order to serve their functions.

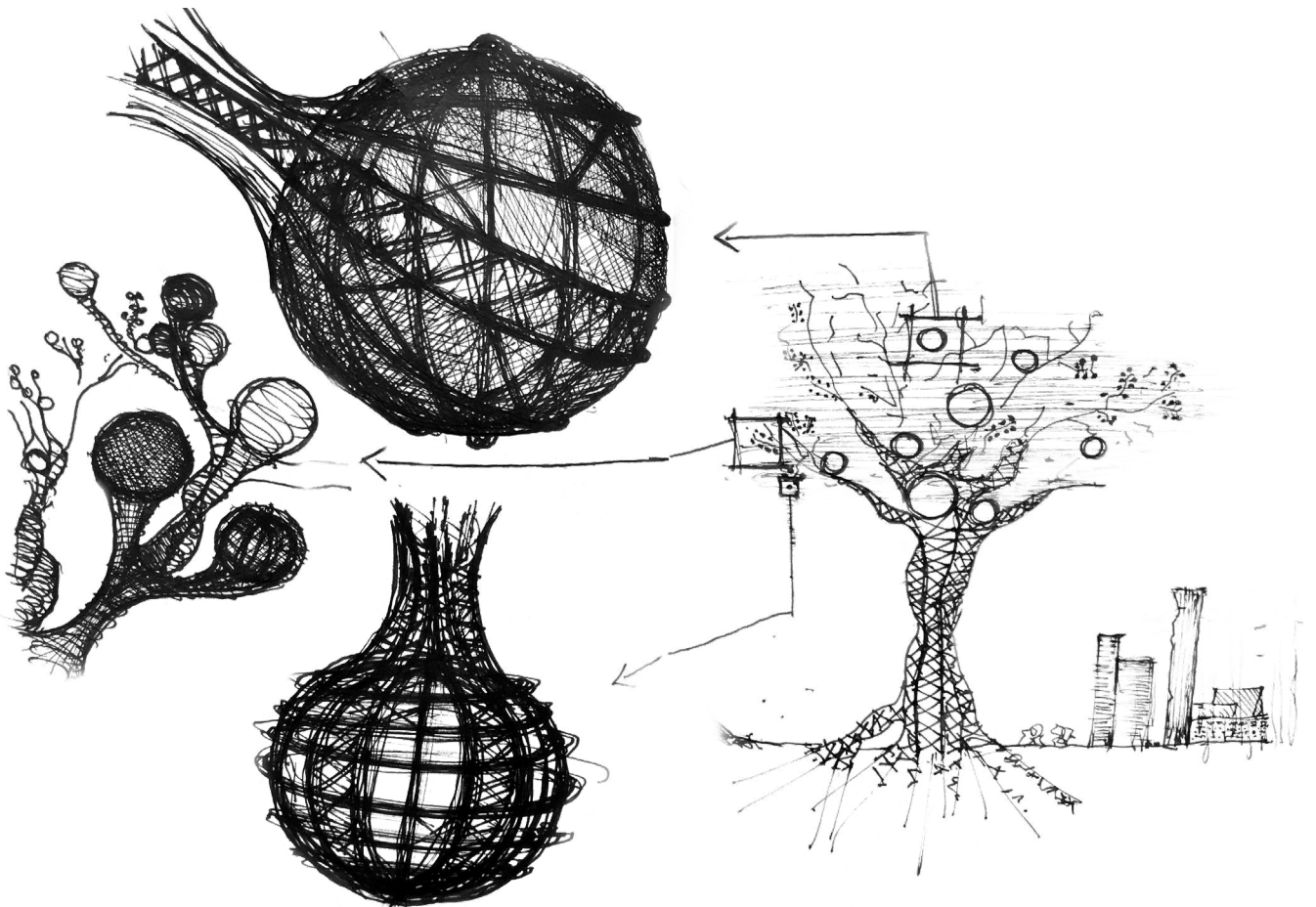




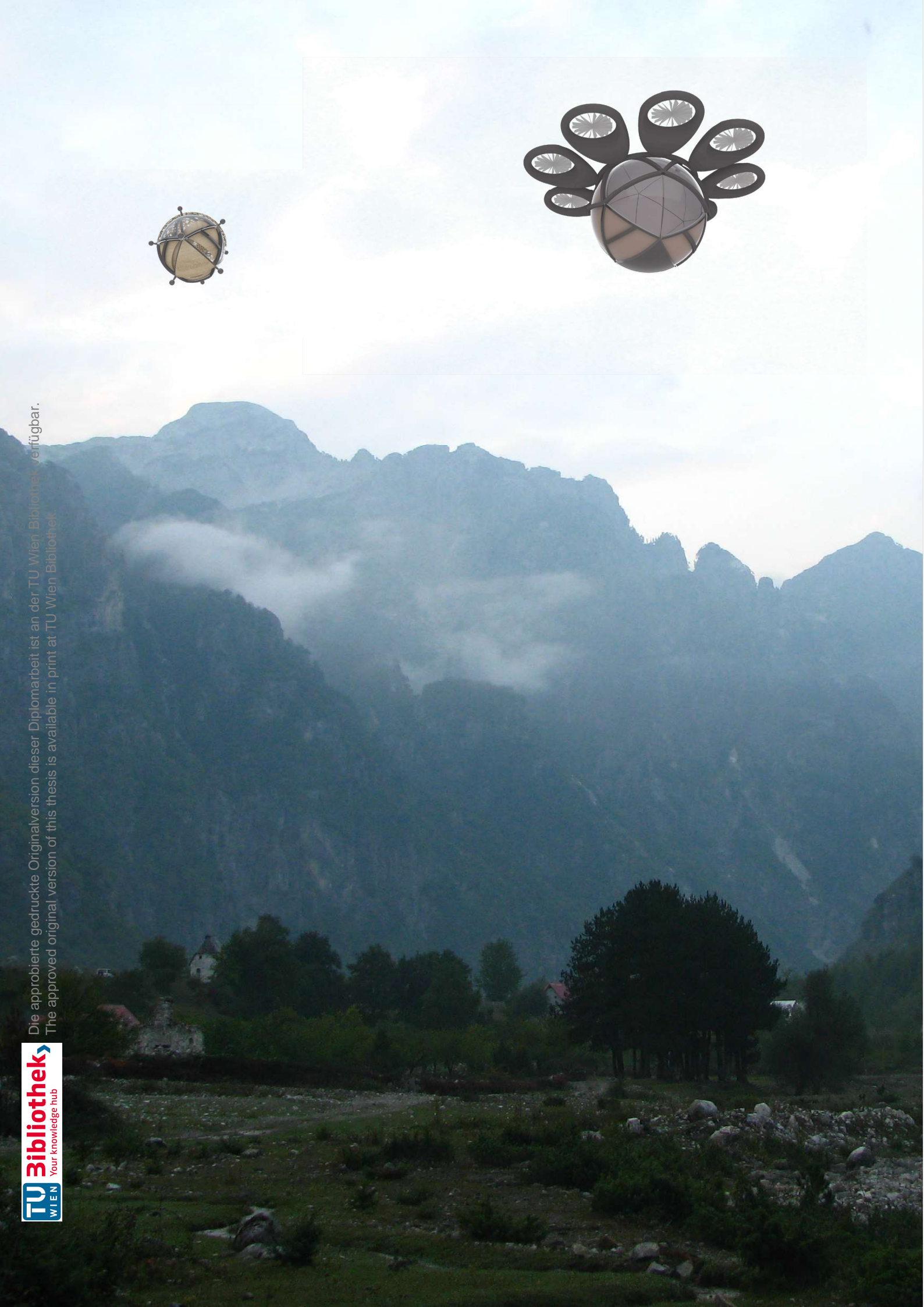
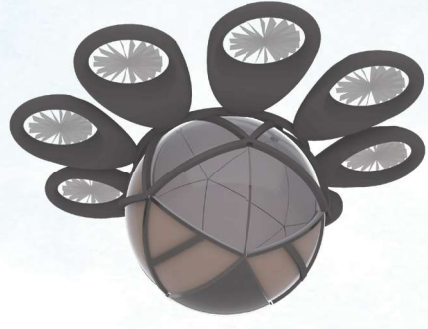
In the next sketches I started imagining how functions could be distributed into different locations and reassembled into different ways in different territories. This would imply that there is no need to build any permanent or static structures but only structures that when transported to their destination serve their purpose as part of

an whole assembly of structures

While the last sketches show a utopian city that separates itself from the land through some kind of a structure inspired from the olive tree and rises up to the limitless sky where buildings hang into their positions away from the pollution.



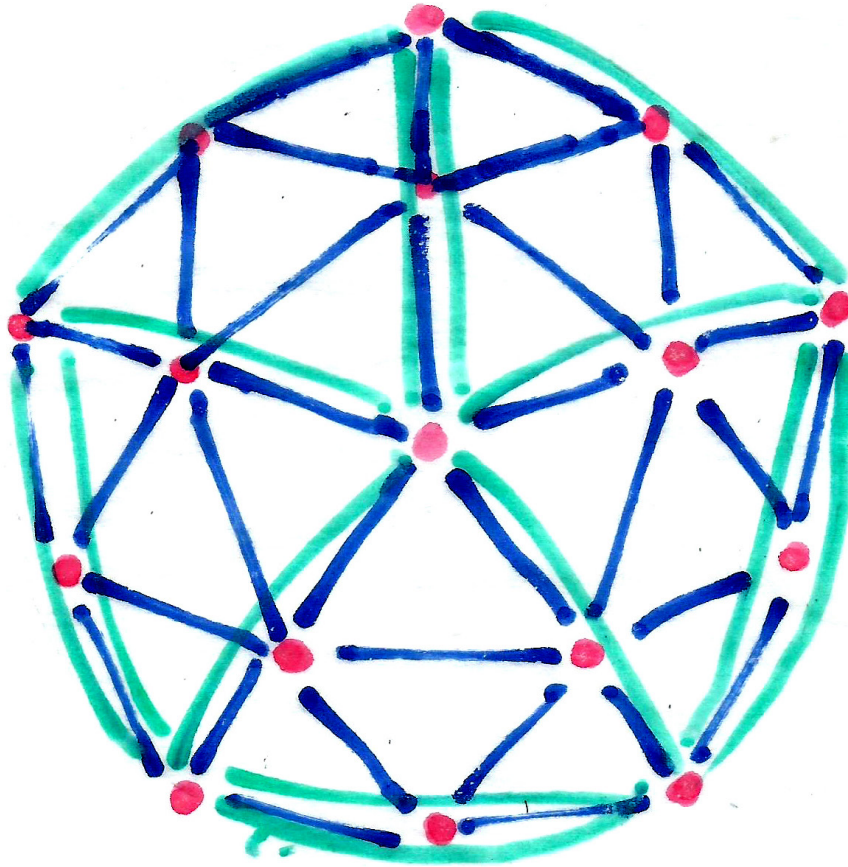
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4. Methodology

The flying room

What is the project aiming to achieve?
What is expected by the final design.



The final structure of the capsule is a derivation of the geodesic dome.

4.1 Structure

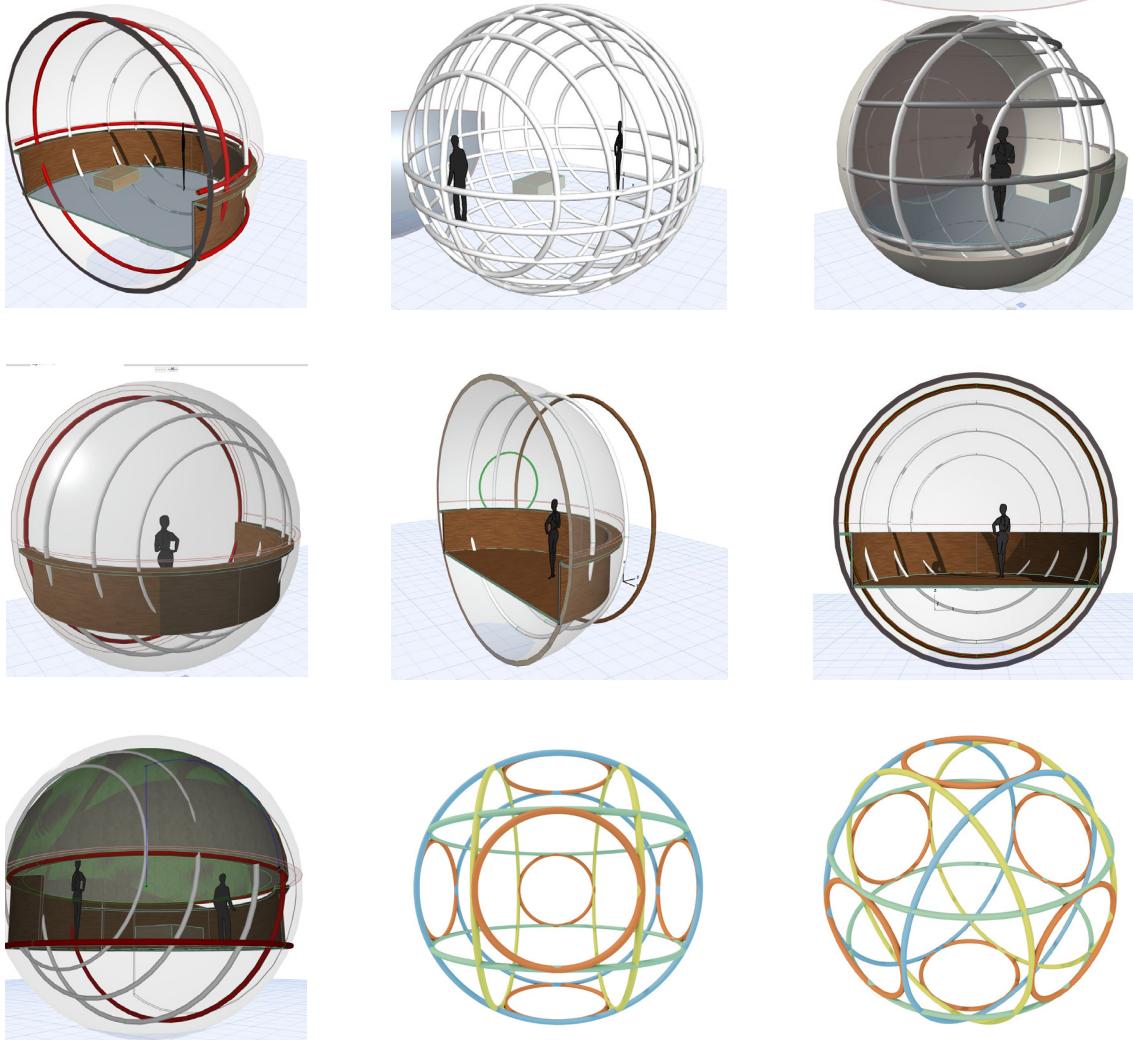
Experimenting with spherical structures

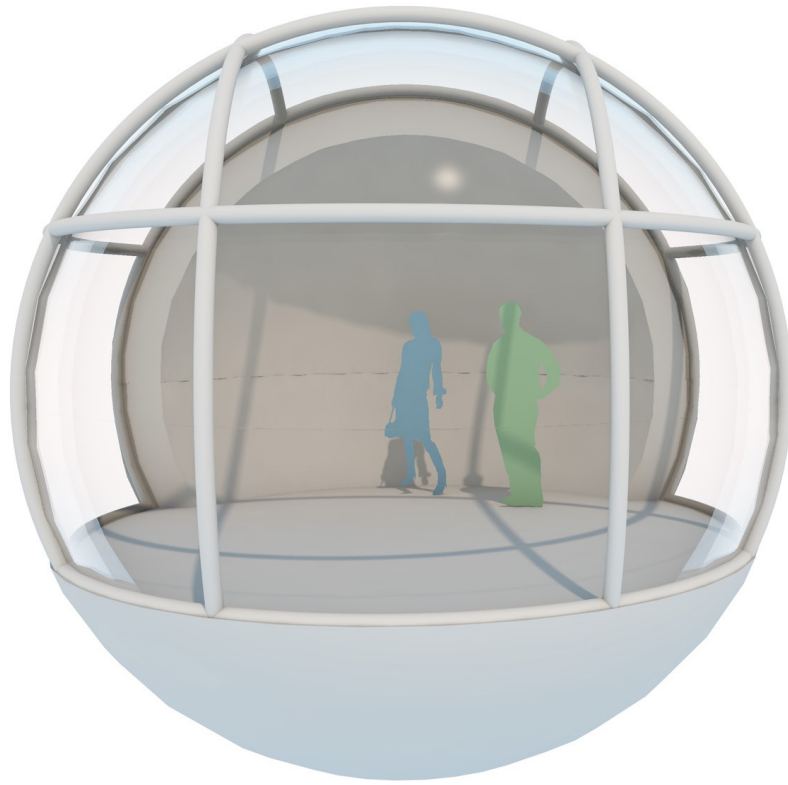
As a perfectly symmetrical shape, the sphere makes it possible to create structures that are closed to itself like a closed ecosystem. This kind of geometry imposes independence from the ground in a similar way to planets and solar systems.

4.1.1 ATTEMPTS TO CREATE A STRUCTURE USING ARCHICAD 22

My first attempts to create a structure that could carry the weight of the object started with tubes. I realised that the structure of the capsule requires three very important characteristics to fulfil its function. It needs to be light, economical but most importantly all forces applied on it should work in two different states: Being carried

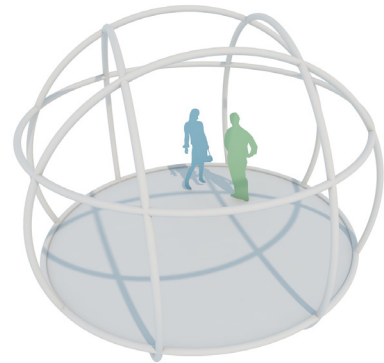
from the wings and placed on the ground. This is in fact one of the most important factors why structurally speaking, the sphere makes perfect sense. In the most natural way the sphere works as a closed system where all forces can eliminate each other.



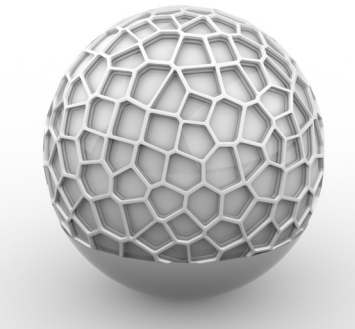
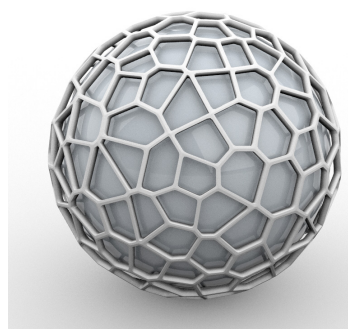
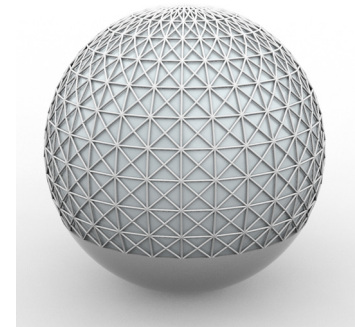
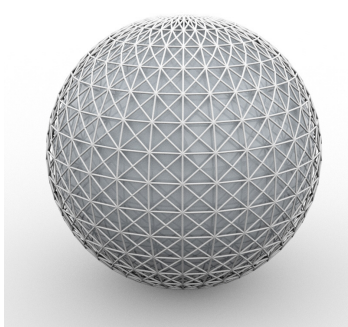
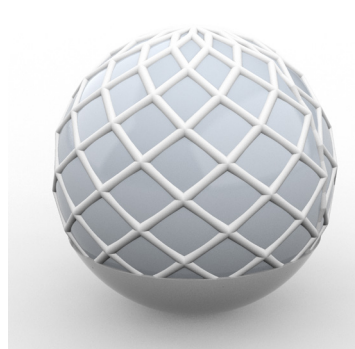
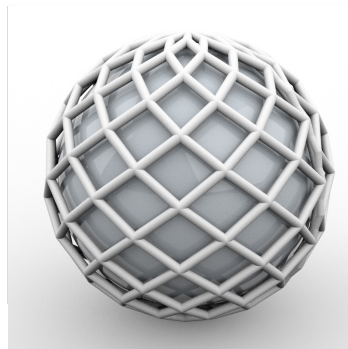
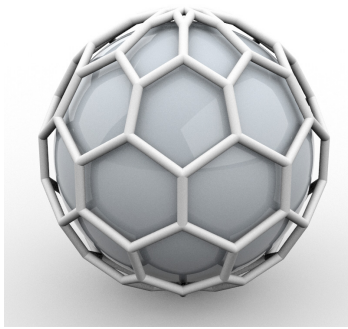


SYMETRICAL STRUCTURE COMPOSED OF ONLY 6 IDENTICAL TUBES

This is the first successful attempt to create a structure that is made out of the repetition of identical units, in this case 6 circular tubes. Aided by a horizontal surface and a vertical "wall" this capsule could easily serve as a Hotel room.



4.1.2 ATTEMPTS TO CREATE A STRUCTURE USING RHINOCEROS 6 AND GRASSHOPPER

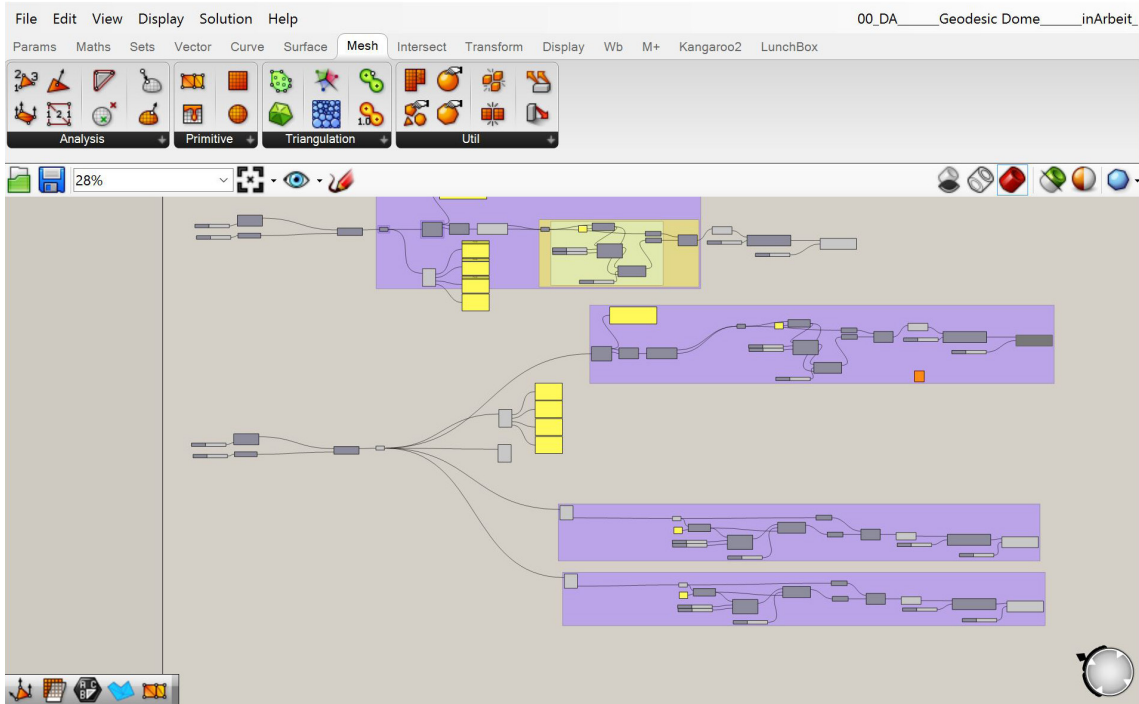


I see the sphere as the most complex geometry because of its brutal combination of free form and perfect symmetry.

Throughout my work with the sphere I have discovered that it is the best example of things that appear as extremely simple but are in fact extremely complex.

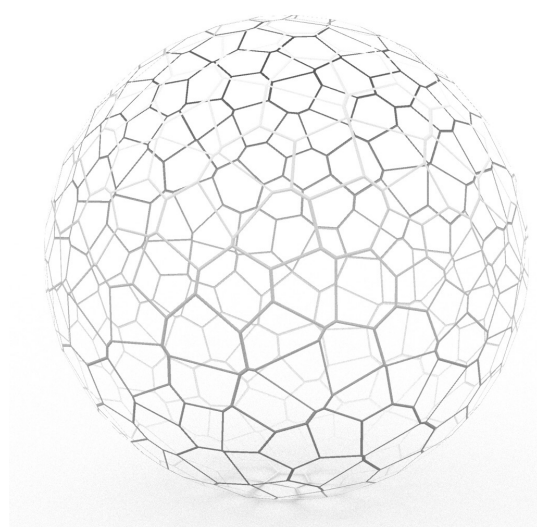
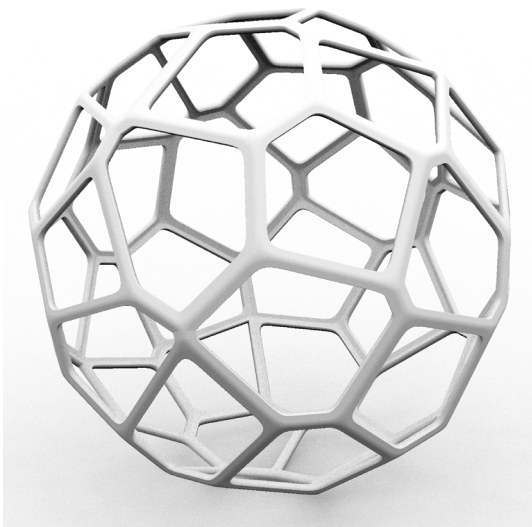
These are examples of experimental designs aiming to find a structure that would make sense for "Lonely Architecture". The difference between the left and the right column is the base of the sphere which in the beginning of the design process was intended to serve as a simple ground to hold the necessary functions.

Through this experimentation I came to the conclusion that I am looking for a structure that will bring some kind of comfort to the manipulation of the geometry.

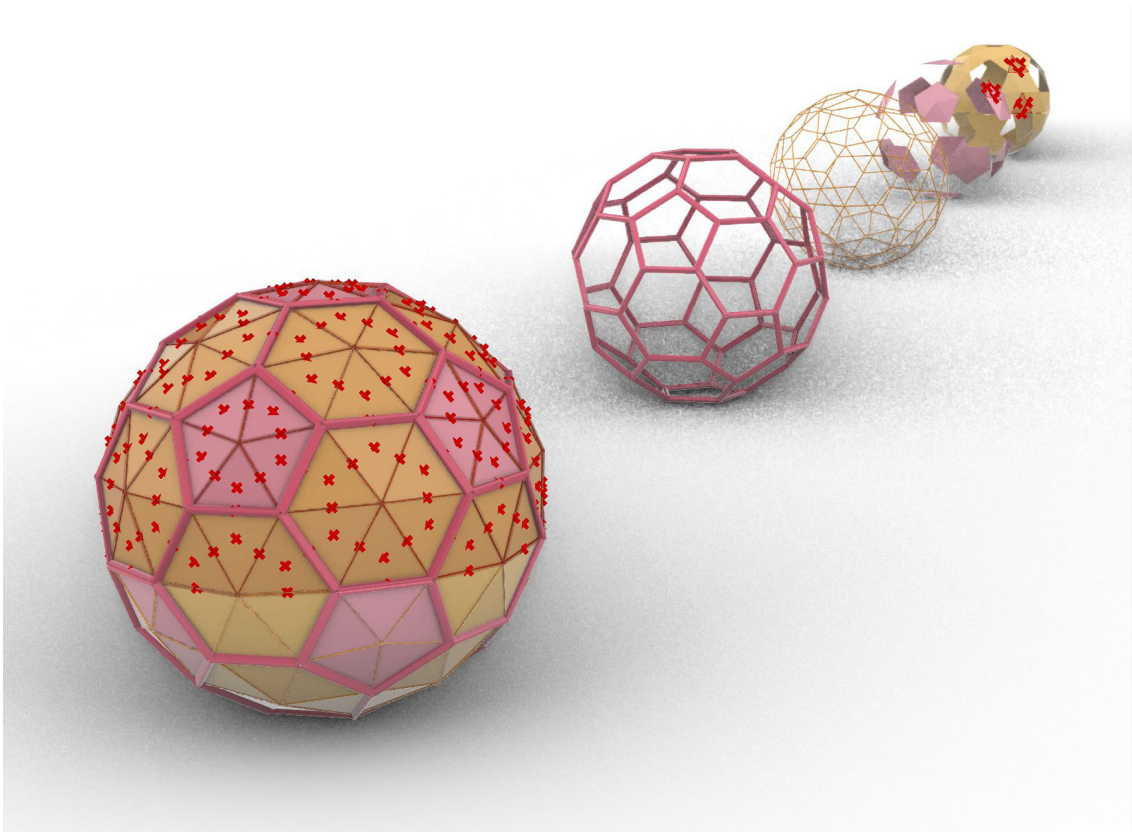


Changing program from ArchiCAD 22 to Rhino 6 aided by Grasshopper was curtail to the further development of the project. With the help of algorithms set up to determine parameters that where accessible all the time, made the

working process much easier. The virtual model could now be modified at any time and much faster than actually building everything from scratch every time a part of the structure was edited.

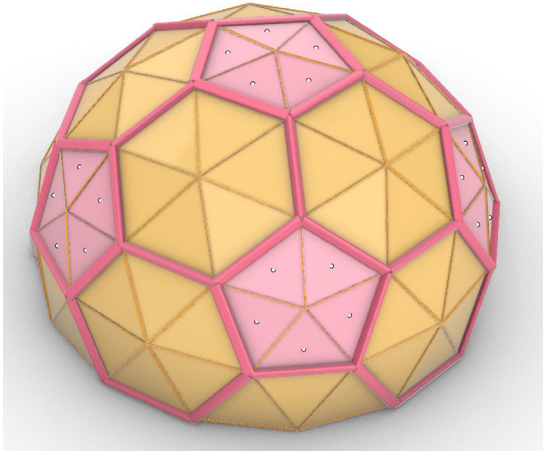


4.1.3 GEOMETRICAL ANALYSIS



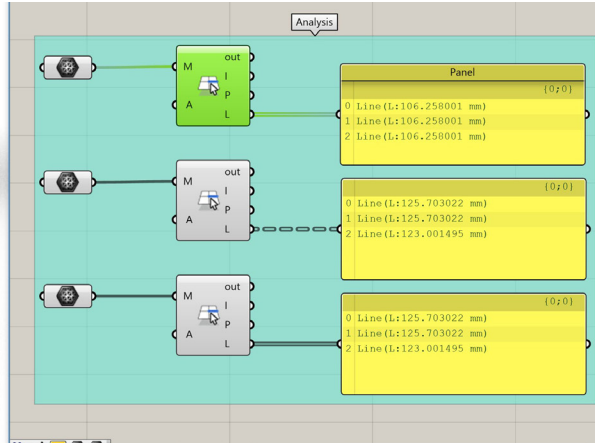
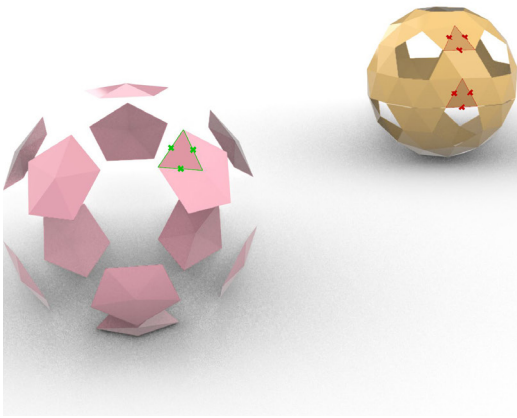
The simultaneous aspect of simplicity and complexity that characterize the sphere led me to experiment with numerous structures while looking for the most suitable solution. I looked for a way to create a sphere out of similar elements so that I could make up for the high costs that come with the production of spherical geometries. Very early in the process I came across the work of Buckminster Fuller with the geodesic dome.

By implementing his findings to my work I came up with a derivation that makes it possible for me to build a sphere out of twenty identical shapes. This was a breakthrough for the search of structure as I started to understand the advantages of the sphere.

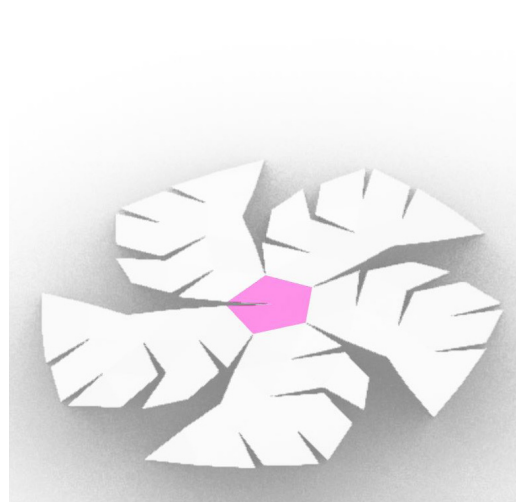
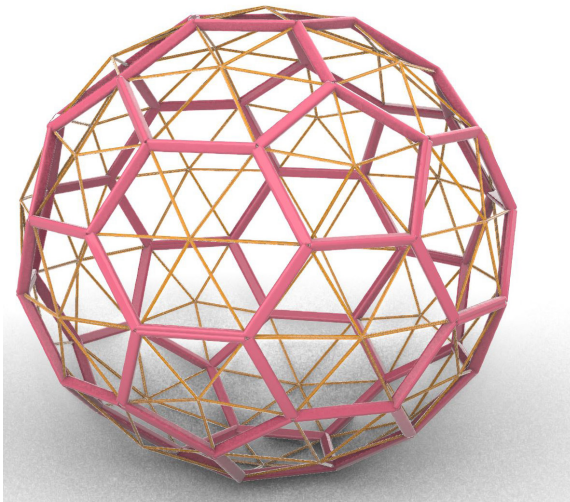


FIVE AND SIX WAY CONNECTIONS

The geodesic dome is made out of five and six way connections which create pentagons and hexagons demonstrated in pink and yellow.



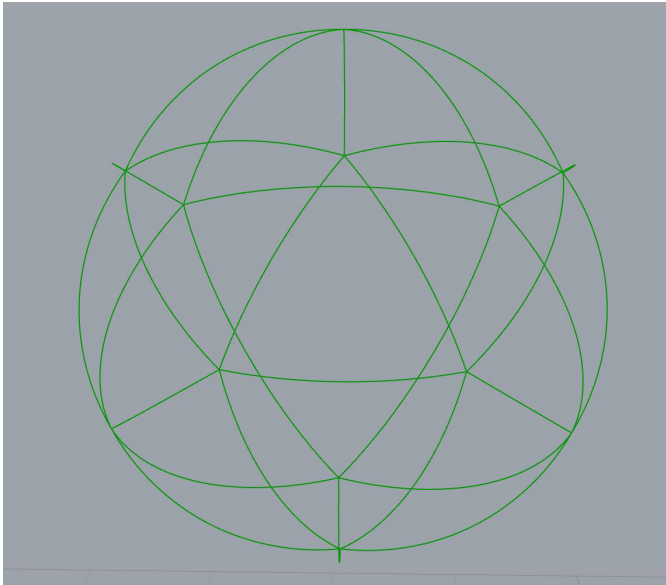
All the edges of the pentagoes are equal while the hexagon is made out of two different edge lengths as explained in the research about the geodesic dome. ,





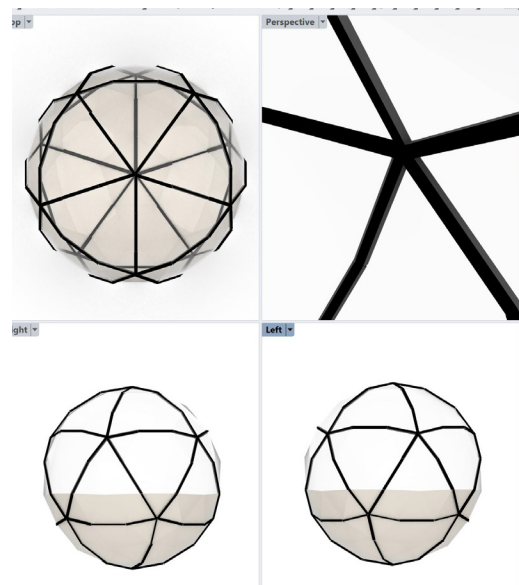
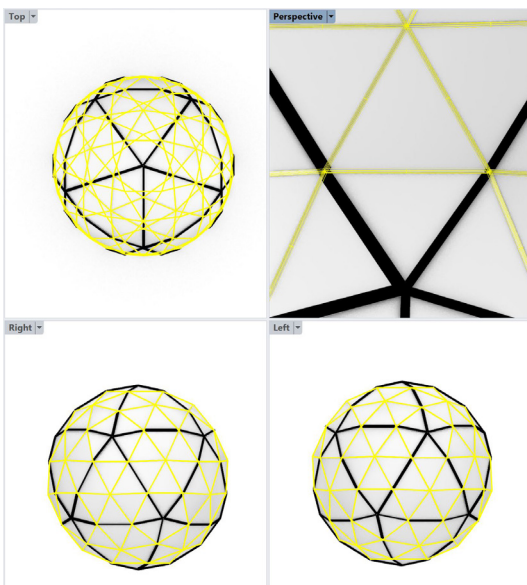
FIVE WAY CONNECTIONS ONLY

The final structure of the capsule is a derivation of the geodesic principals as it makes use of only five way connections and it is a made out of arcs, not straight edges.



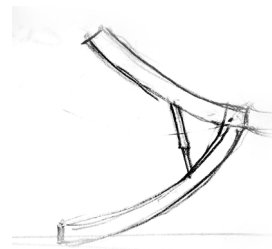
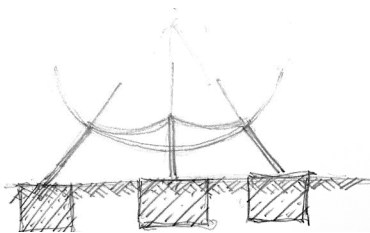
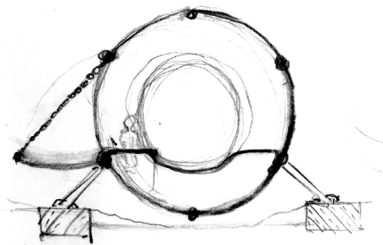
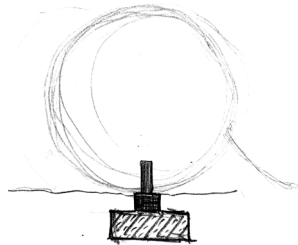
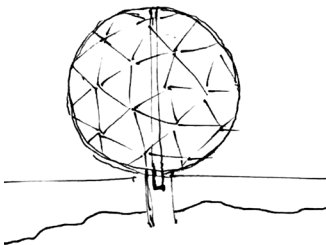
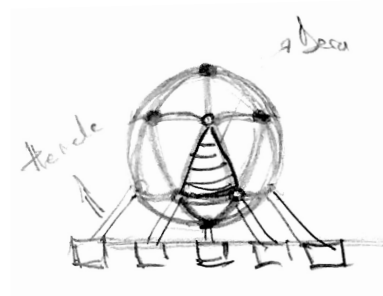
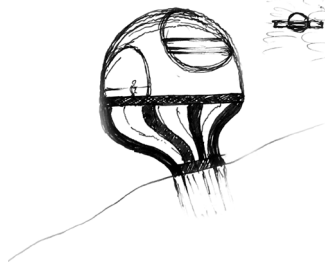
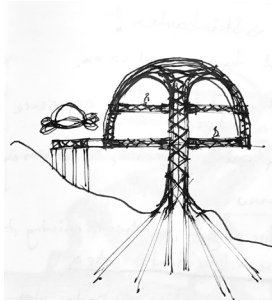
The three-dimensional triangular shape carries the advantages of the triangle into the sphere. Being the simplest most stable geometry, the triangle adds on to the stability of the developed closed system. As a derivation of the perfect symmetry of the sphere, all the edges that make up this triangle that was created are equal. The only difference to the equilateral triangle is the fact that each of the edges is curve, part of a perfect arc that makes up the perimeter of the sphere.

0	4.428
1	4.428
2	4.428
3	4.428
4	4.428
5	4.428
6	4.428
7	4.428
8	4.428
9	4.428
10	4.428
11	4.428
12	4.428
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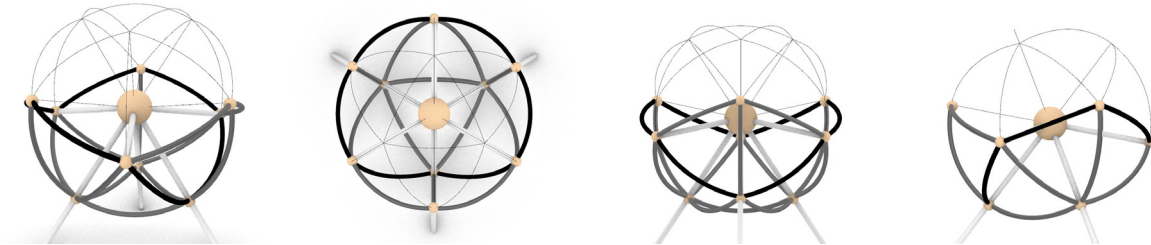


4.1.4 FOUNDATIONS

Foundations have been one of the main issues since day one. The idea of "The Flying Room" started with the bunkers and foundations was the only part of the capsule which could limit its flexibility. Throughout the design process I sketched many ideas while thinking of the different scenarios. In between complete flexibility and having some kind of preinstalled foundation I came to the conclusion that capsules should have independent foundation

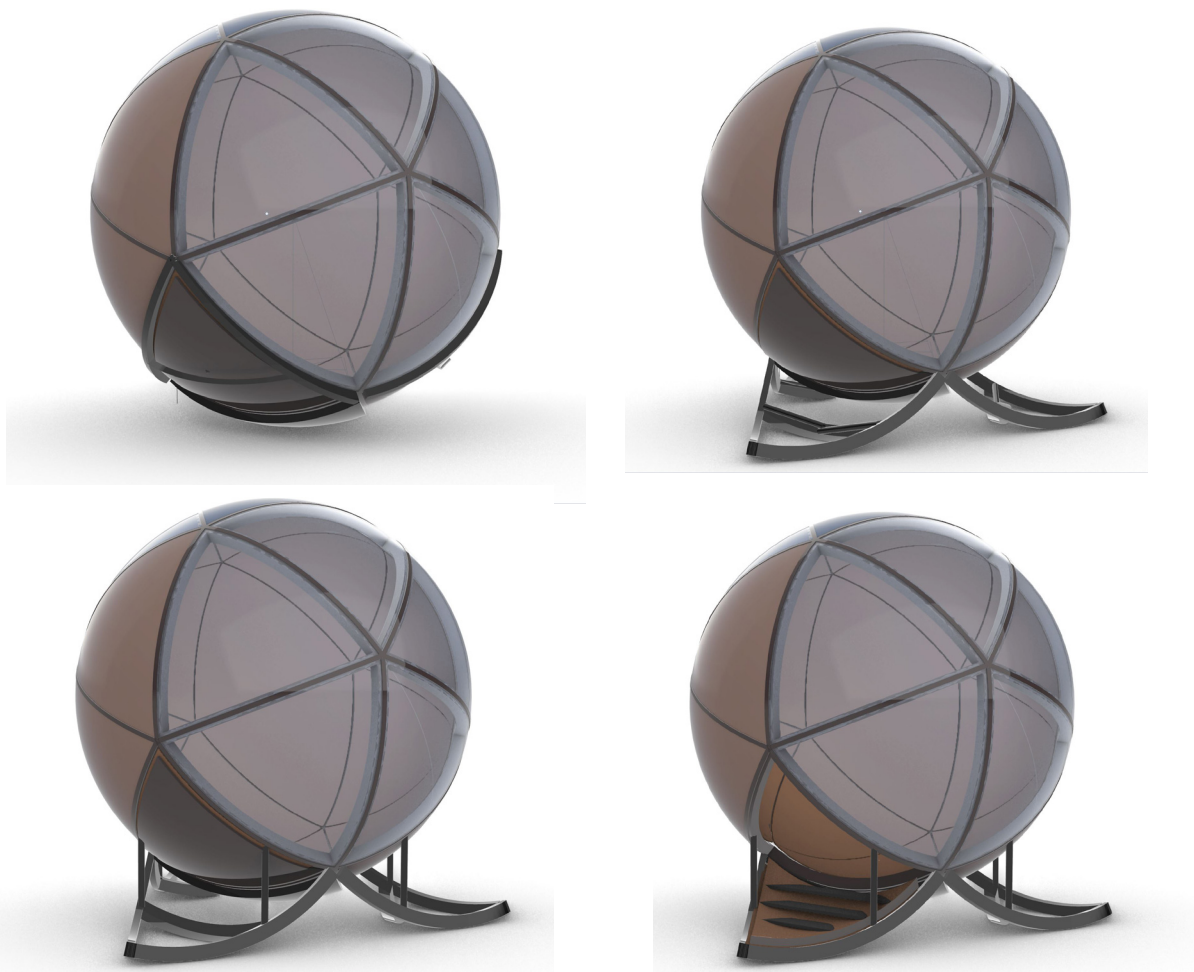


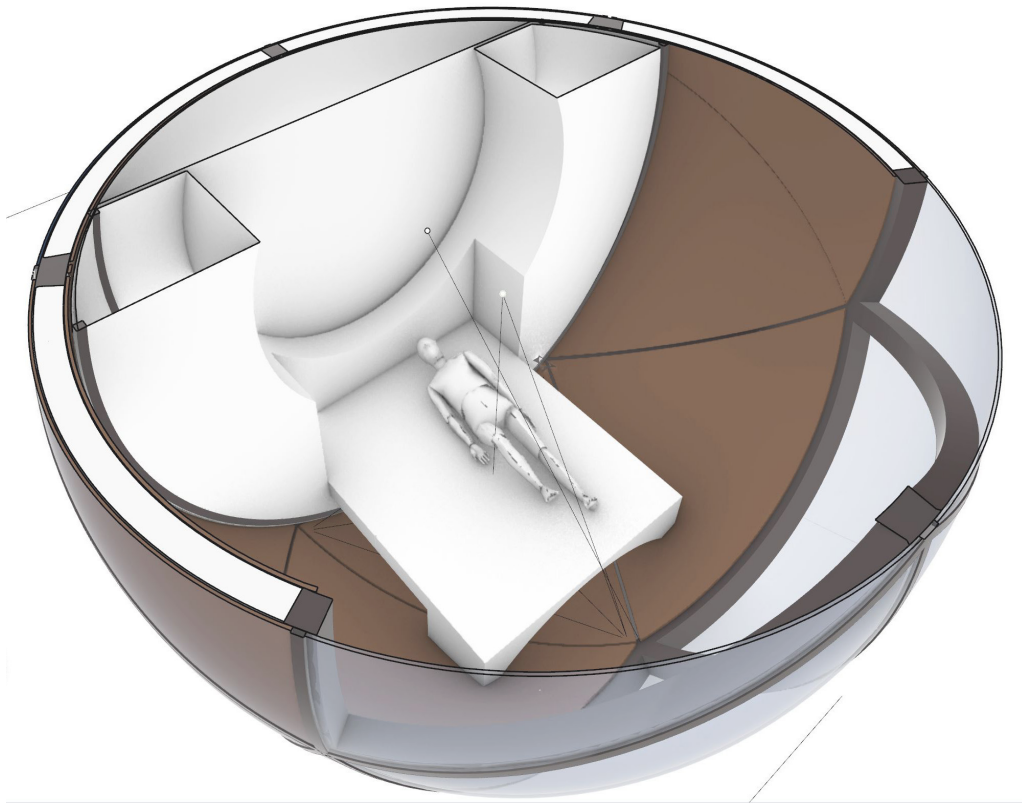
4.1.5 DISTRIBUTION OF FORCES



One big difference between the capsule and most of other buildings is that the capsule should be able to function in two different states: in the ground and being carried by the wings.

4.1.6 Foundation system





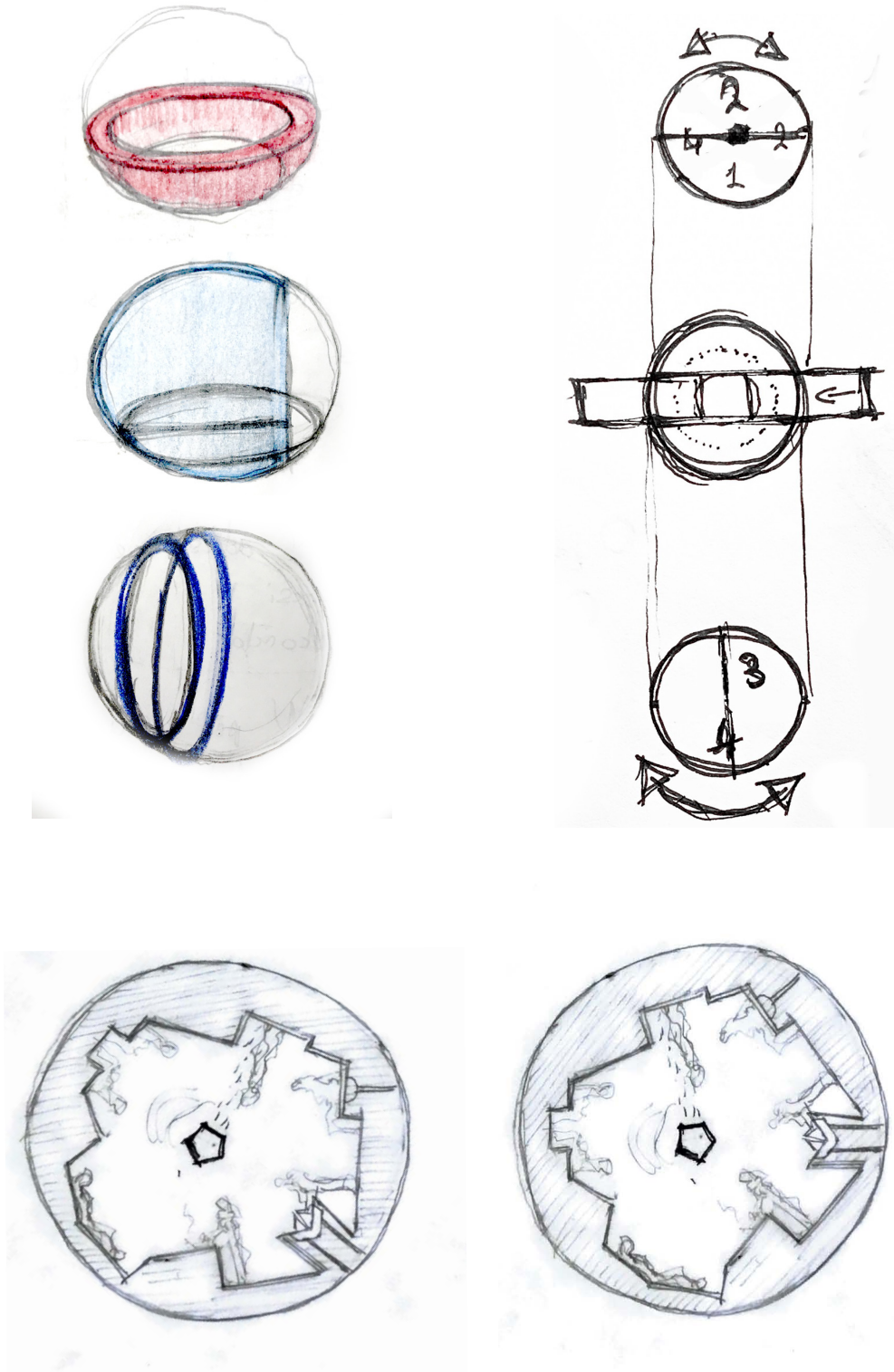
The rotation of the furniture was since the beginning a very logical solution
the the interior of the sphere.

4.2 Interior

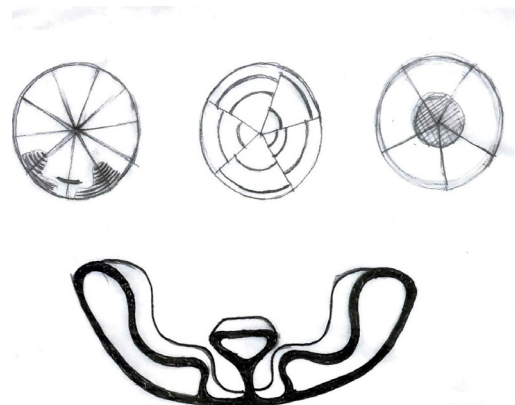
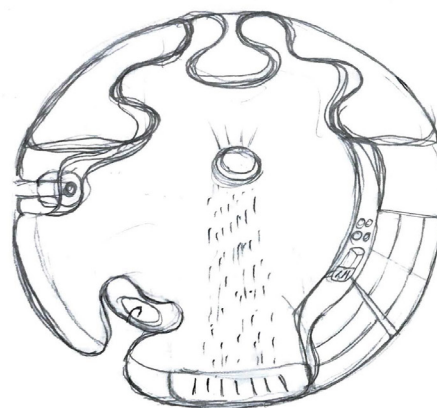
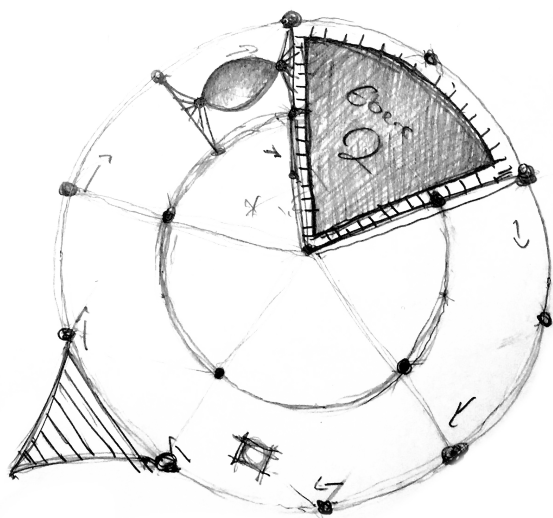
Rotating interior and furniture

What are the spatial qualities of the sphere?
How is the sphere different from other basic geometries?

4.2.1 SKETCHES OF A SPHERICAL INTERIOR



AC



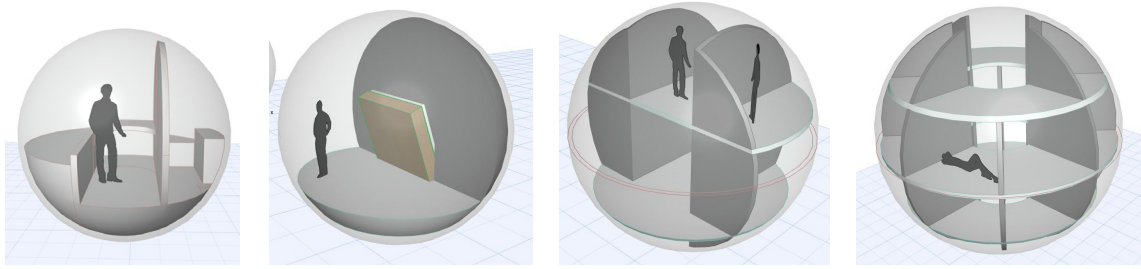
4.2.2 LOGIC OF THE SPHERE

At the same time the structure was being created, I started to play with the sphere from a different perspective, now from the inside out. I started imagining myself inside of a sphere and the bunkers came to mind. Even though the function that I am trying to put into the sphere has nothing to do with the bunkers, the semi spherical shape of the bunkers is one of the only buildings that resembles the sphere. Yet it is incomplete.

The most difficult task was to find a way to see the sphere as an advantage because

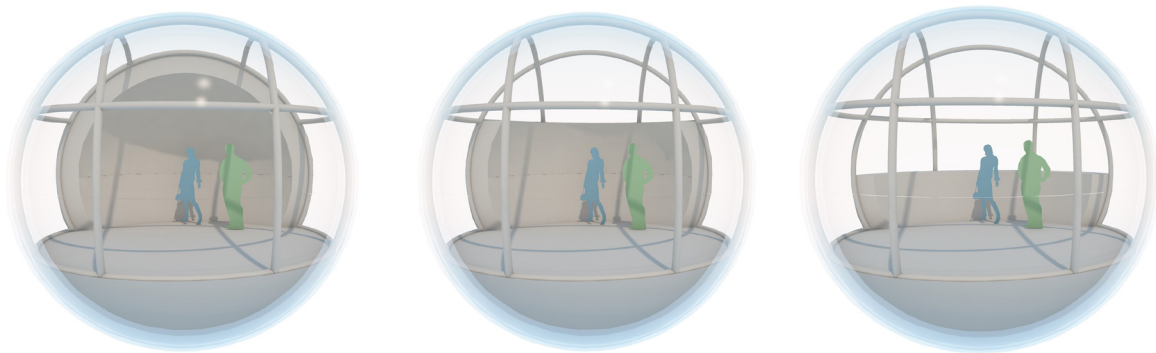
when it comes to the way we live; we are so used to plain horizontal or vertical surfaces that we are almost unable to see things differently. I still find it very hard to imagine the interior of a capsule where the same surface that serves as the ground will naturally extend to walls and then ceiling. In fact, there is no ground, no walls and no ceiling. There is just a membrane that surrounds the interior of the capsule.

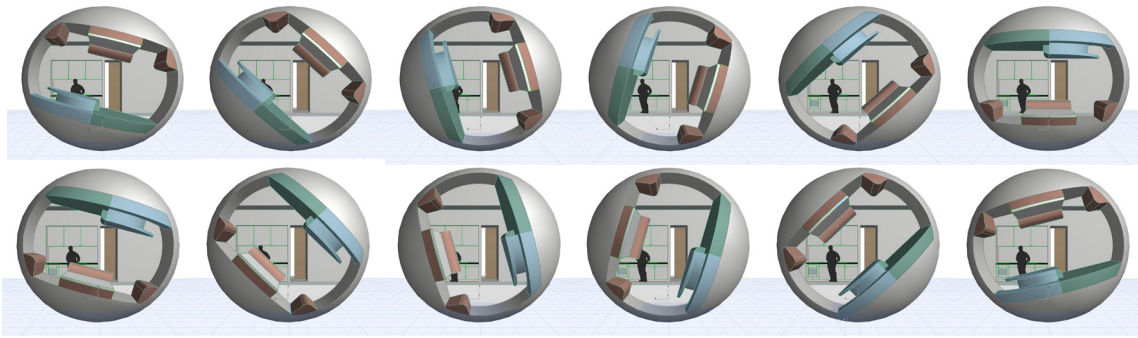
This adds on to the complexity of the sphere but mainly because of our human



instinctive attempt throughout the history to simplify things into straight lines. Once there are no straight lines there are no

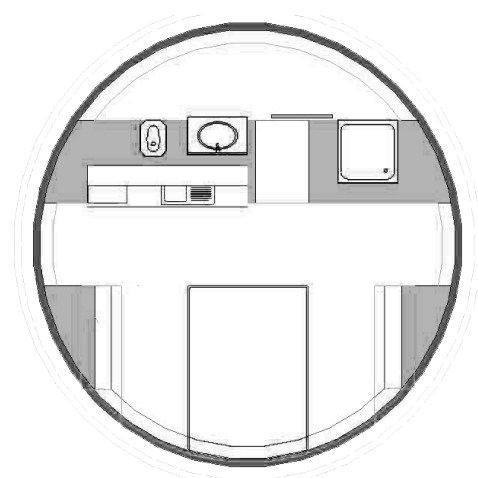
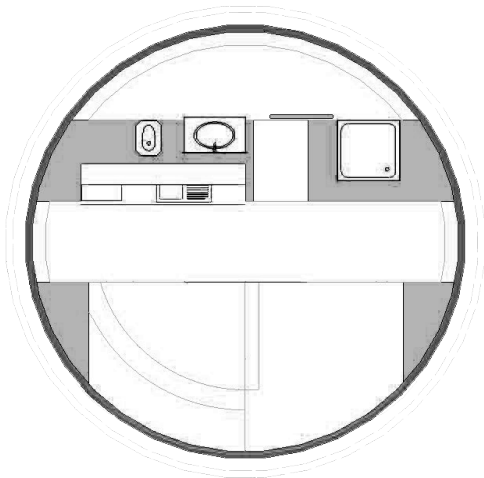
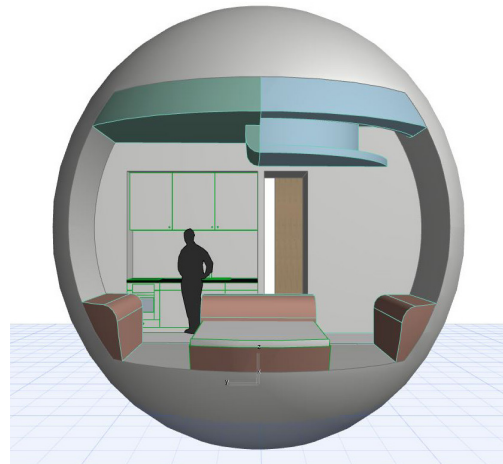
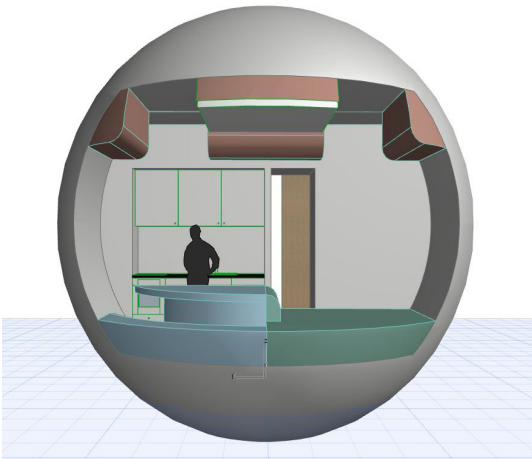
disconnected parts in a building. There is just one shell that creates the boundaries between the inside and the outside.



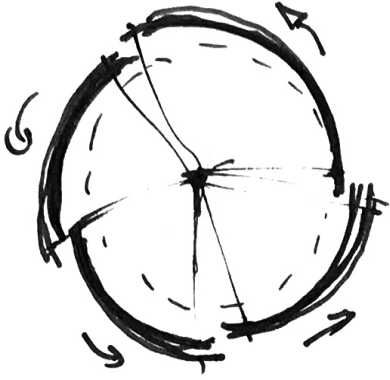


Because of its shape, the sphere doesn't offer much usable area in the ground. No matter how big the sphere is, if no horizontal surfaces are used, there is a very limited to use its bottom properly.

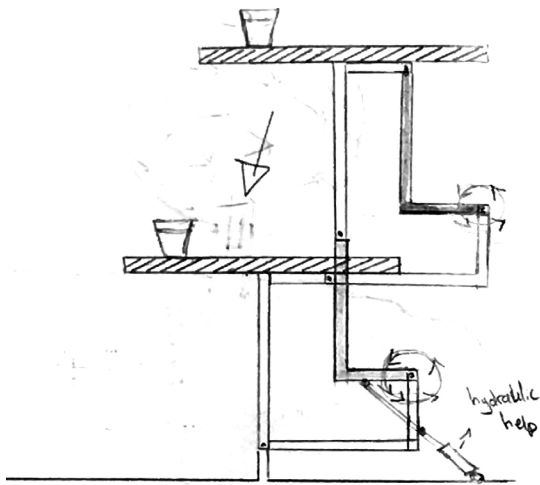
Anyway the sphere is a geometry that motivates rotation and repetition. Through this rotation I tried to take advantage of parts of the sphere that wouldn't be useful otherwise.



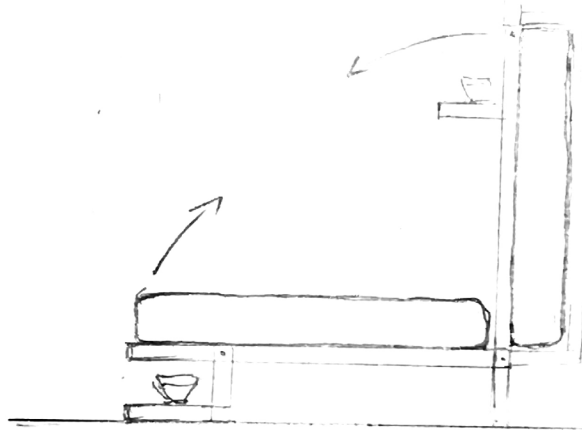
Shading system



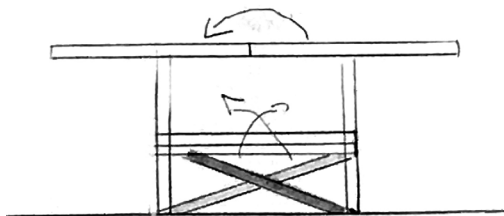
able Table



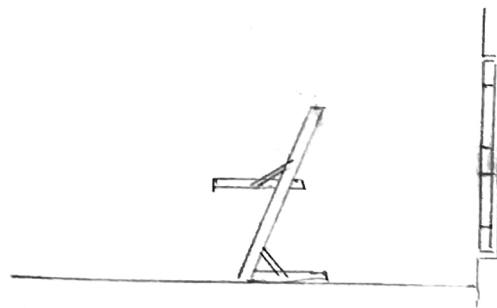
lifiable Bed

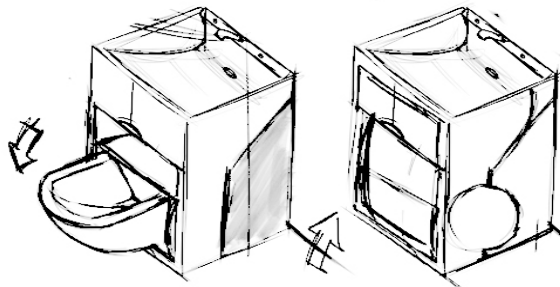
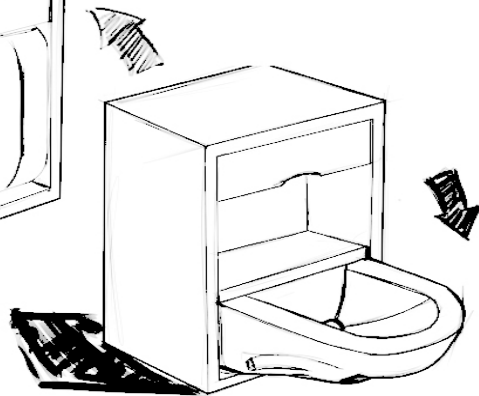
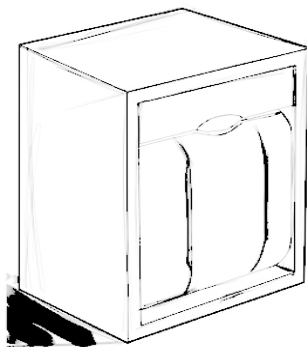
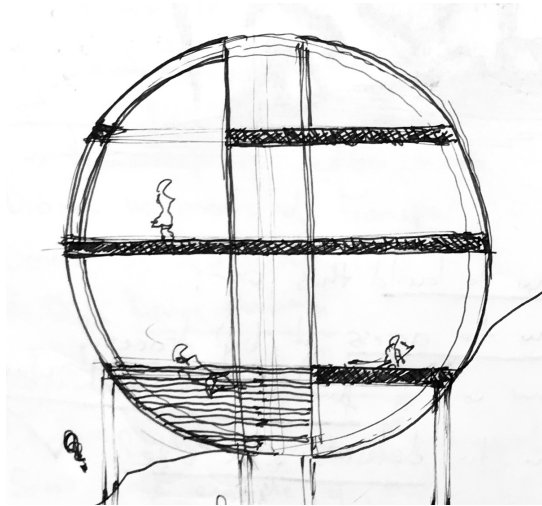


able Table/dining table

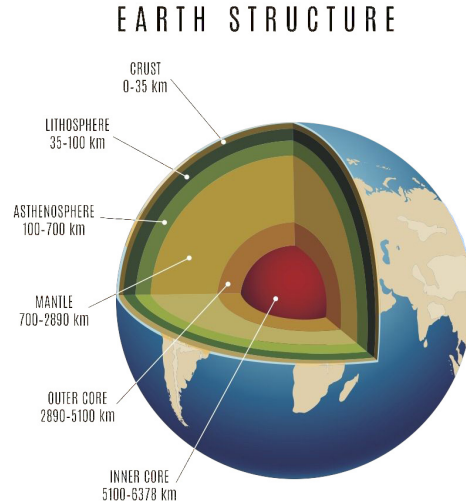
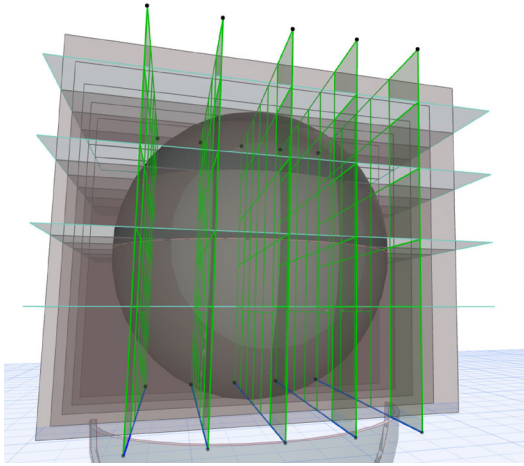


Foldable chair



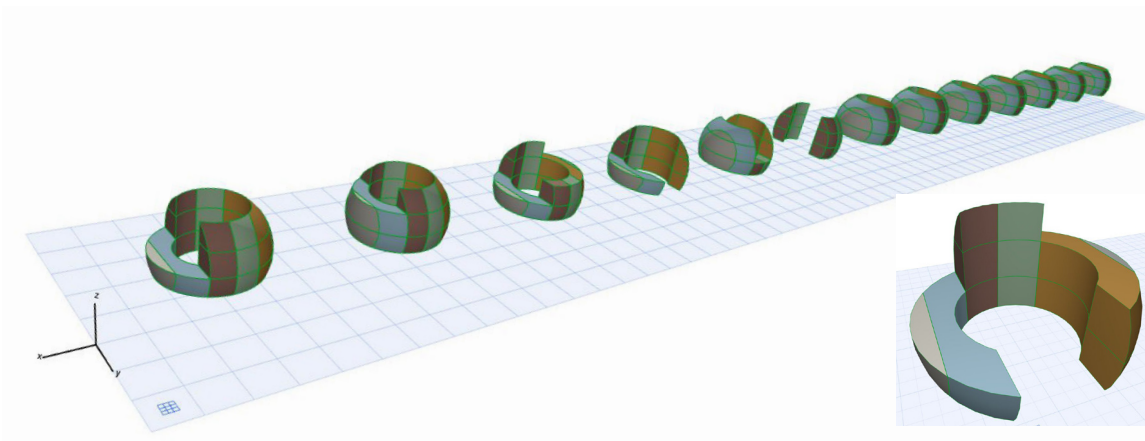


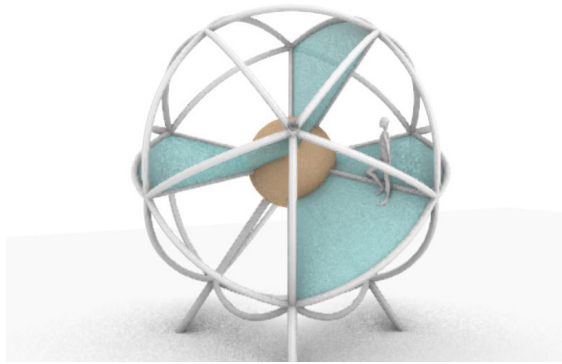
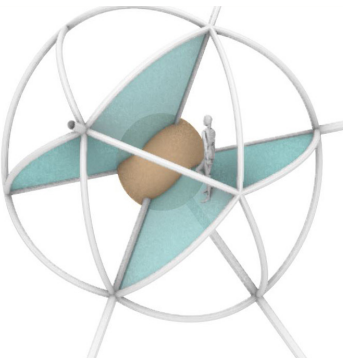
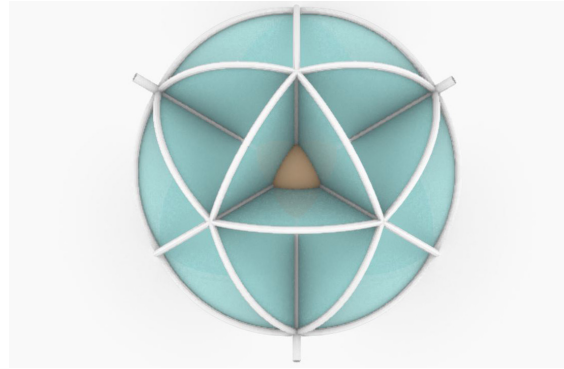
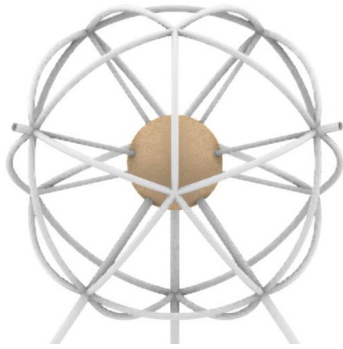
4.2.3 THE SPHERICAL GRID



This analysis and the continuous failure to imagine a hotel room inside a sphere without using straight lines or plain surfaces led to the need to find some kind of a grid that would make things easier, just as in any other shape. Through my research I took reference of our planet Earth and its grid. It is actually very simple, many spheres put inside each other will create a volume

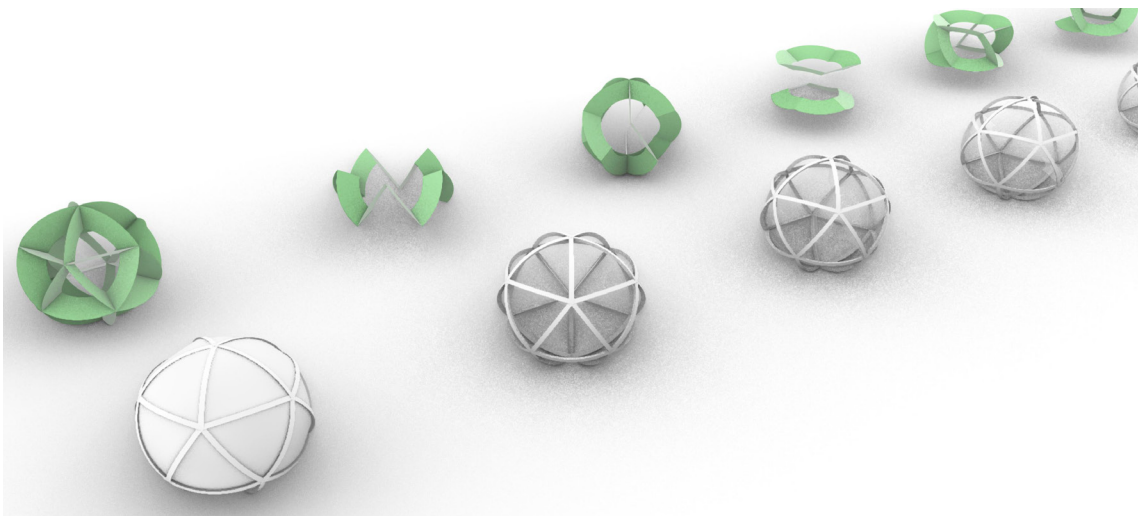
between them. The crucial factor here was the center of the sphere, a simple point. This point has been absolutely necessary in every moment of the design but I hadn't realized how important that was until I started looking for a grid. Every sphere is made from the distance of the shell to its geometrical centre, the point.





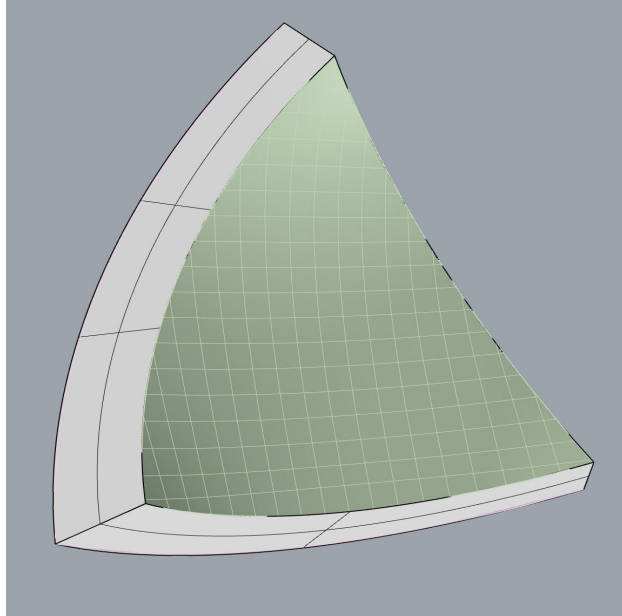
In my case it's not only the sphere that makes up the grid but the geodesic structure as well. Being already very used to the spherical triangle I went further and connected them to the centre of the sphere. This way I spliced the sphere into twenty pyramids with the spherical

triangle as a base. A new geometry that made it simpler for me to point out different locations of the sphere. Only through this second addition to my spherical grid I could start thinking of "walls, ground and ceiling", therefore the façade of the capsule started to take shape.

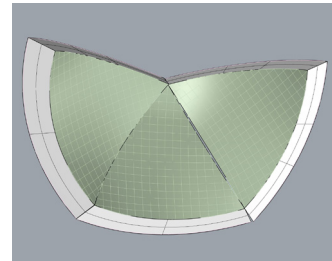
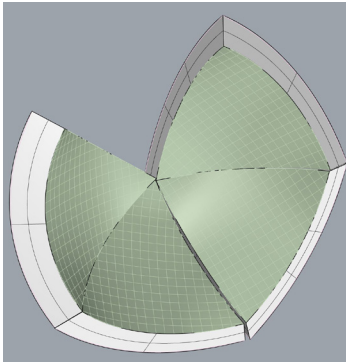
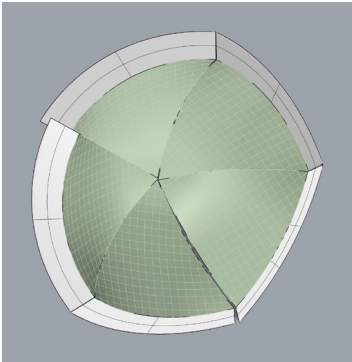
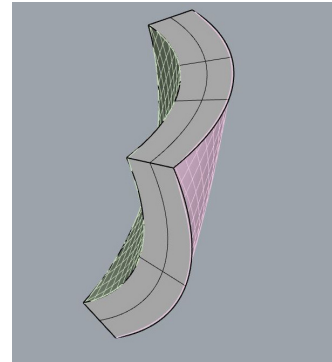
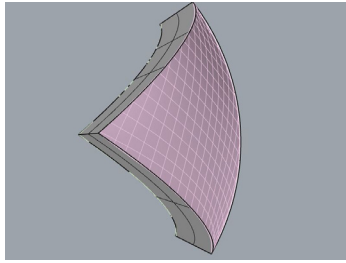
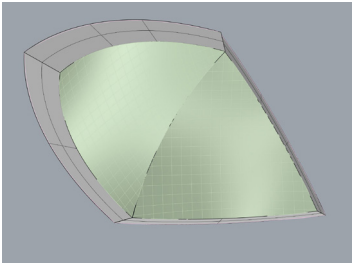


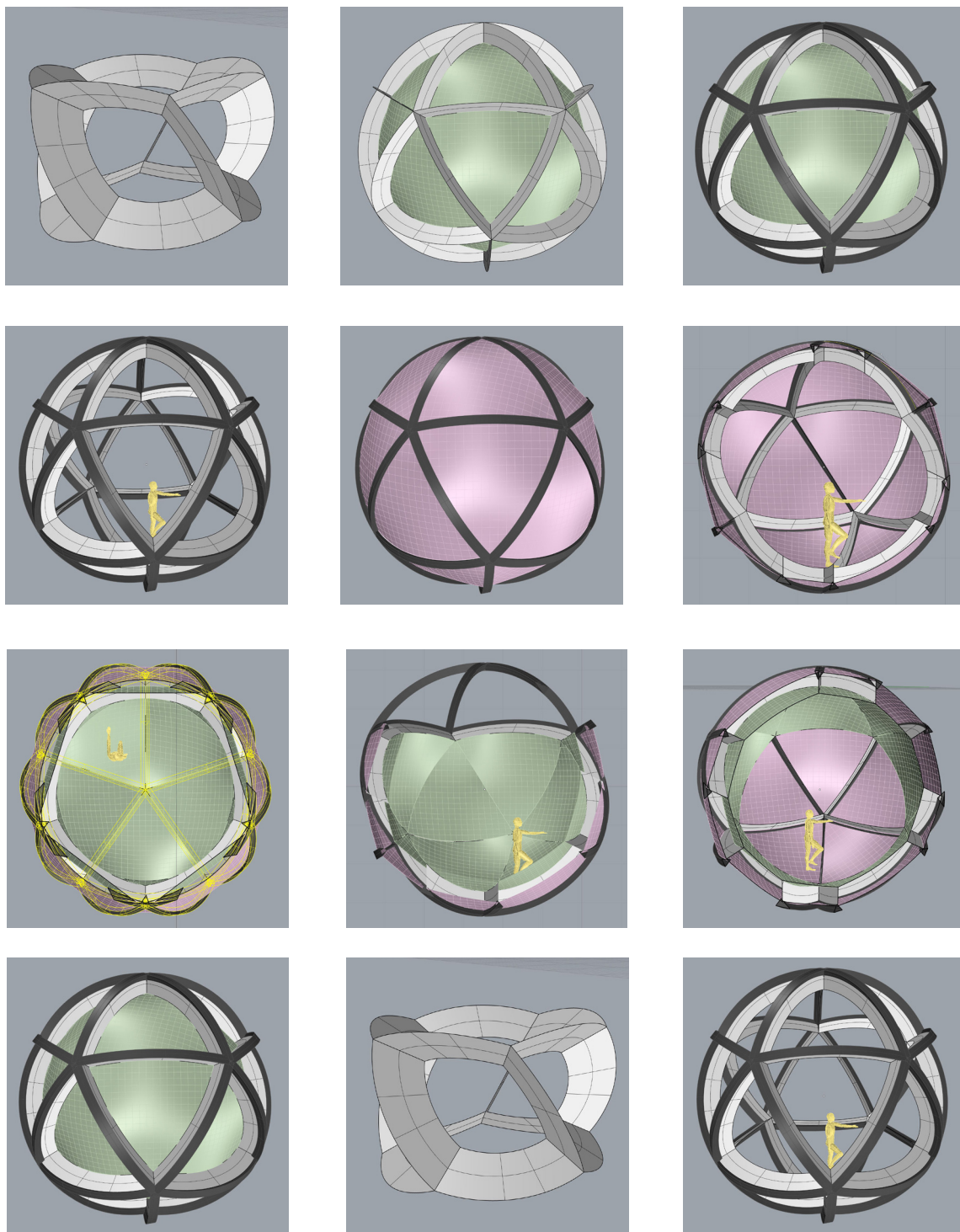
4.2.4 FUNCTIONS

- | | |
|---------------|---|
| Bathroom: | -WC
-Sink
-Shower |
| Kitchen: | -Hotplate
-Sink
-Refrigerator
-Storage
-Table for two |
| Living room | -Place to stay
-Table to work |
| Sleeping room | -Bed
-Garderobe |

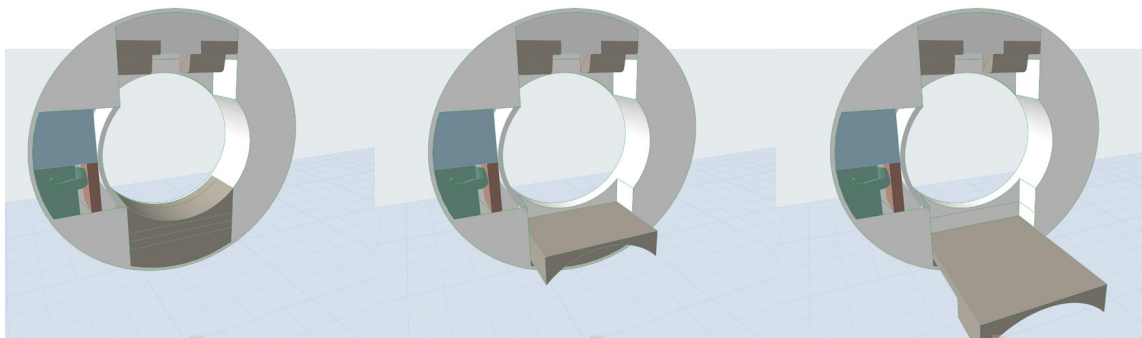
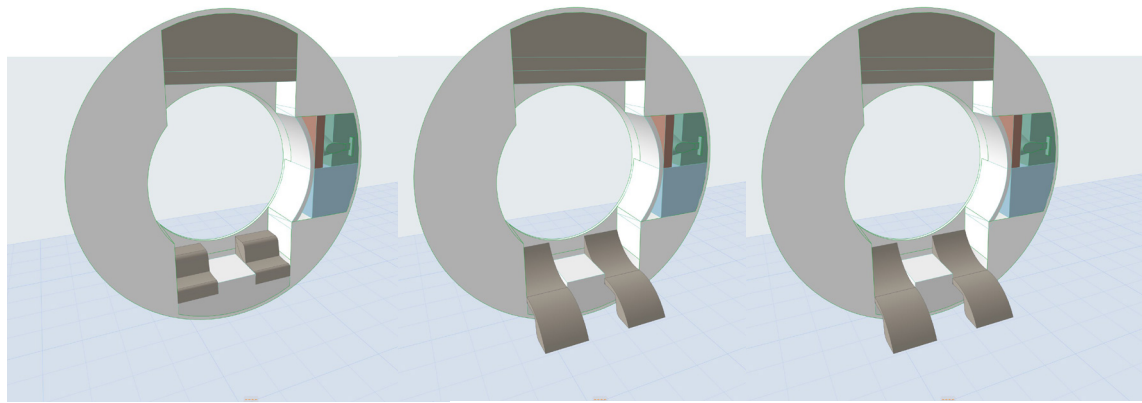
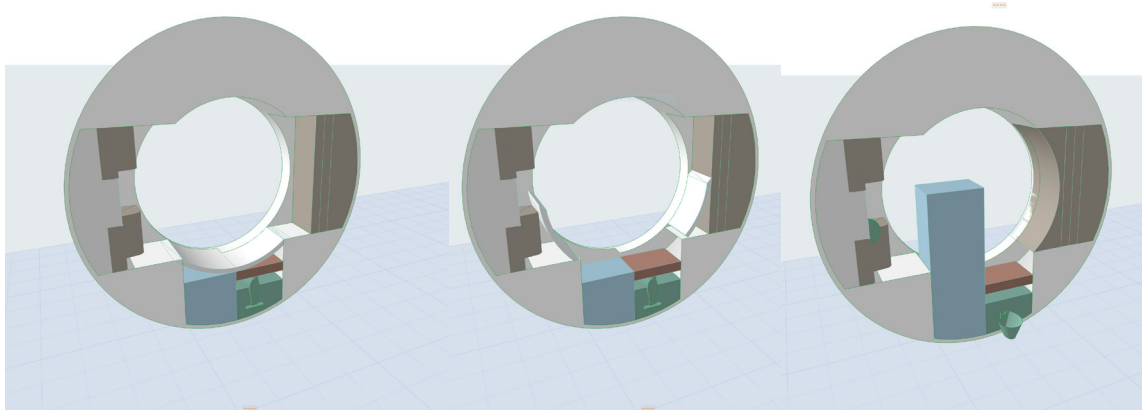


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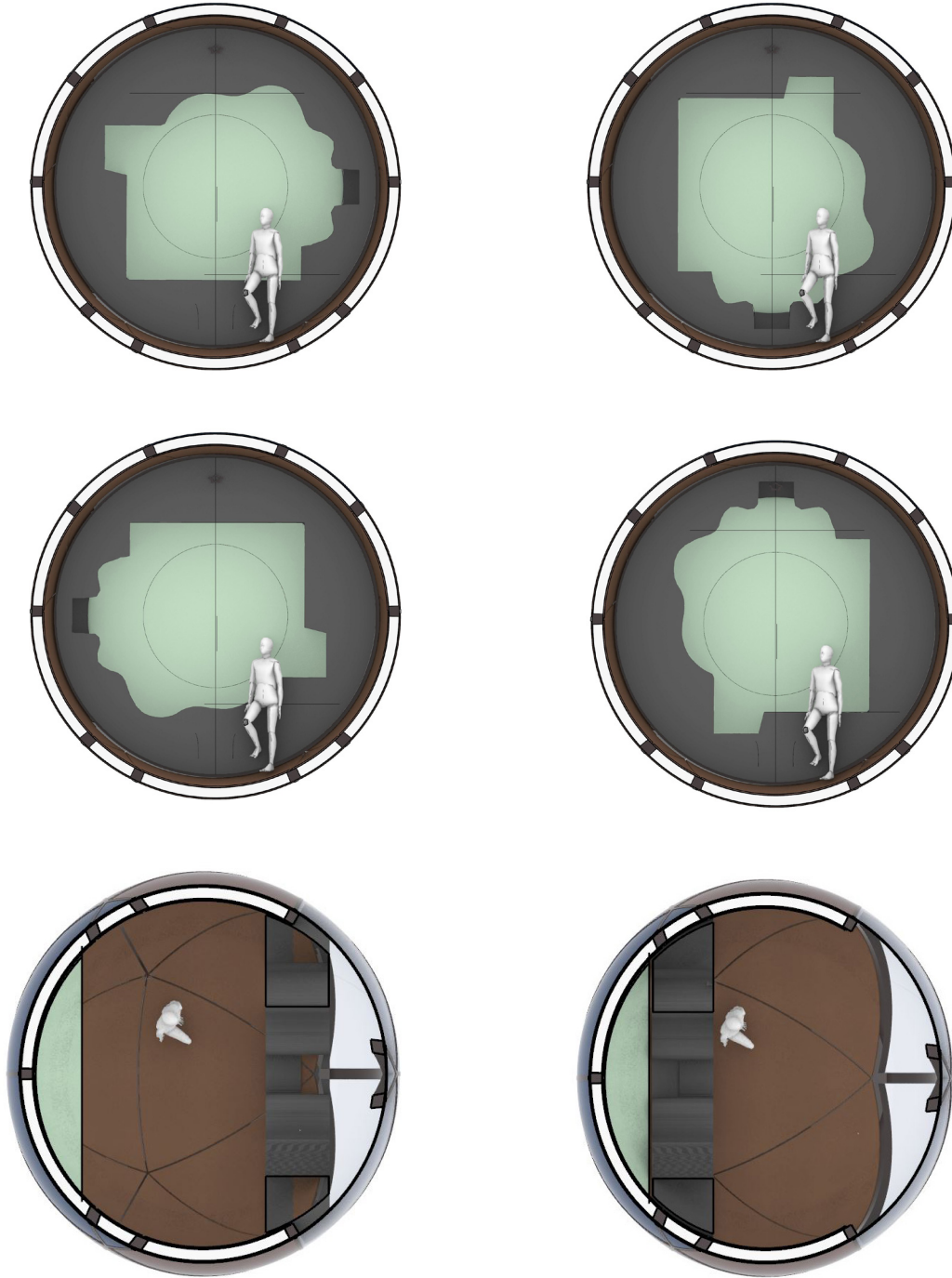




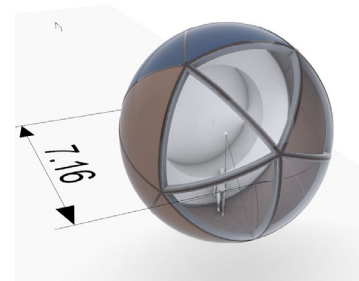
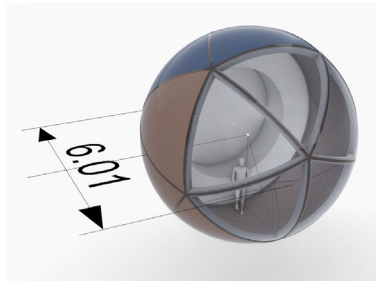
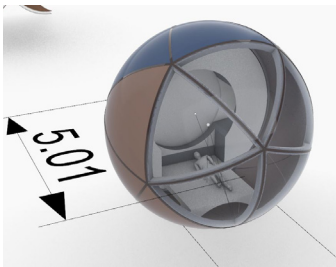
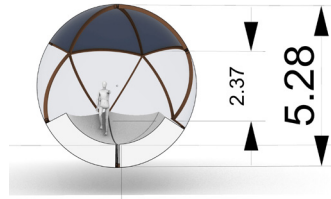
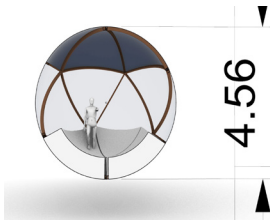
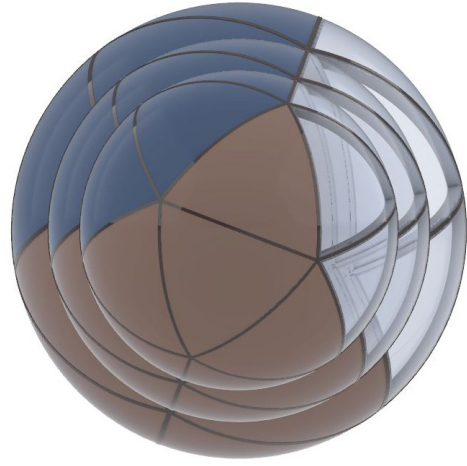
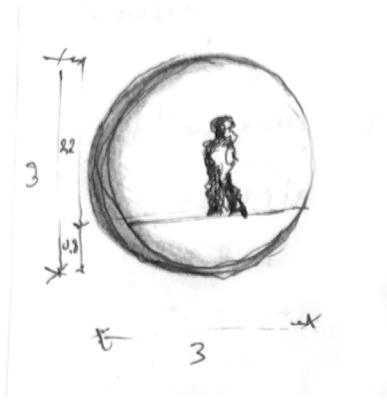
4.2.5 ROTATING FURNIUTE IDEAS

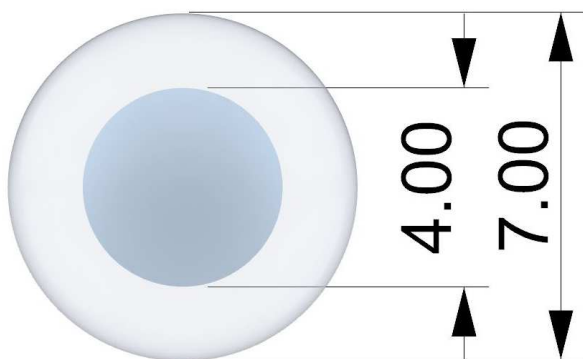


4.2.5 ROTATING FURNIURE IDEAS

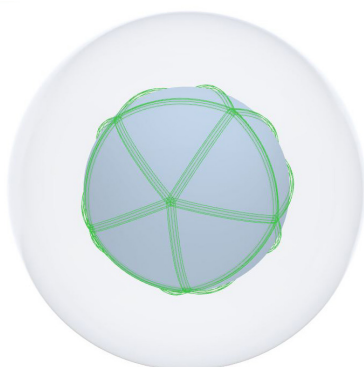


4.2.5 SCALE

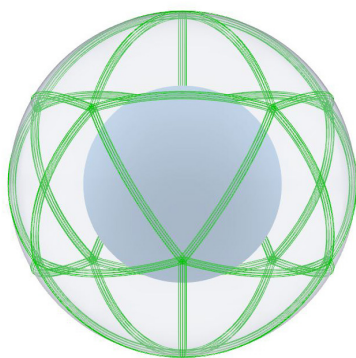




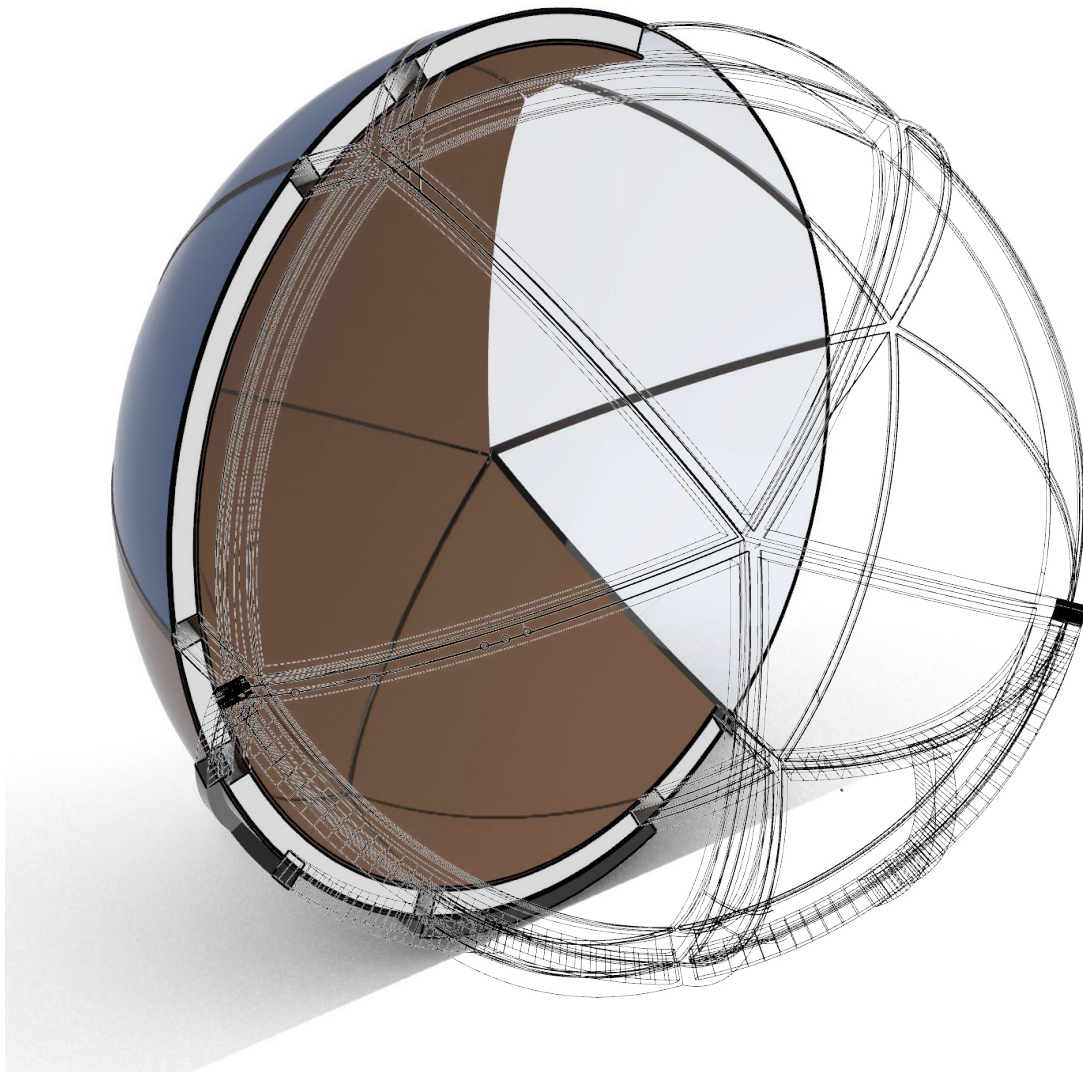
When considering the scale of the capsule, two main parameters are to be considered, the shell and the core. As explained in the spherical grid, playing with these two parameters is what gave shape to the design scale



In different variations the core of the sphere has been treated in different ways. Anyway, in all variations it was important that it is accessible by the average human. So the core has always been seen as the part of the sphere which is scaled in direct proportion to the human scale



The shell is mainly the result of the core. The space needed in addition to what the core provides, determined the size of the core in all the variations.

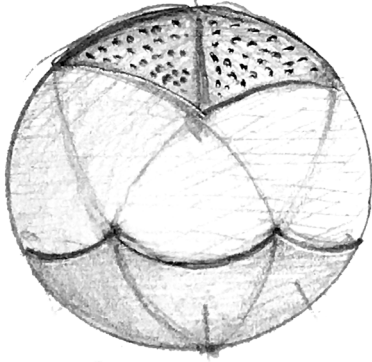


The façade of the capsule is similar to a simple mullion transom façade being forced into a sphere. This geometrical transformation makes sense only because all the profiles needed for the façade are identical.

4.3 Facade

Spherical facade

4.3.1 FACADE

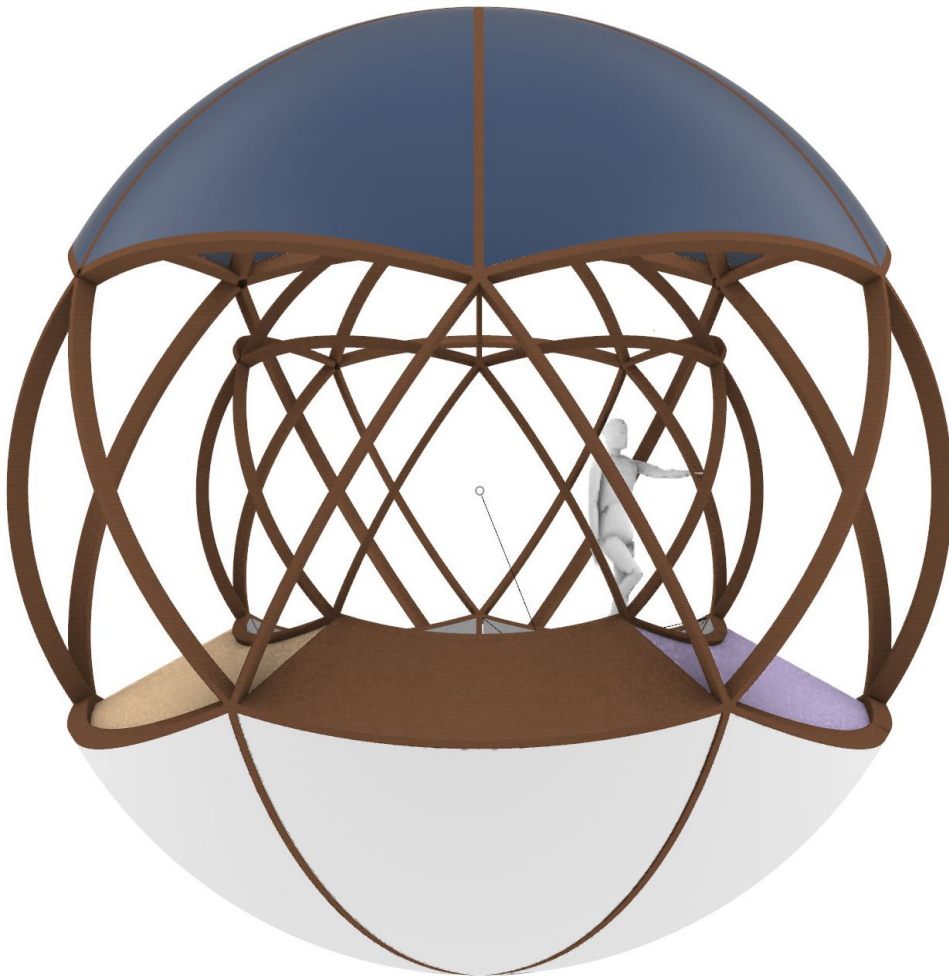


Solar panels

Glass facade

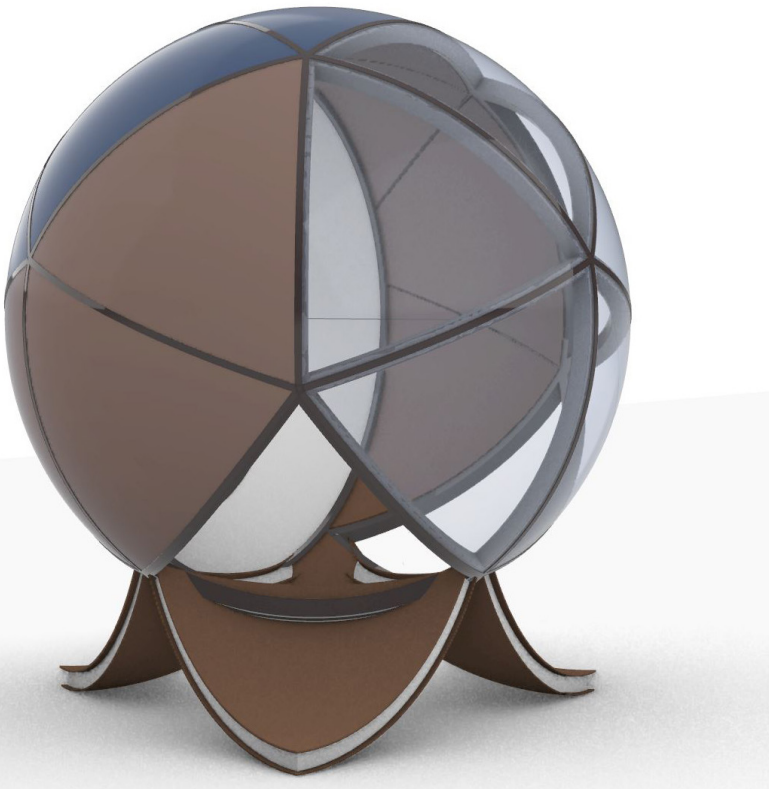
Technical panels

The main issues with the façade have been in finding the right amount of panels that should aid the panorama view, the amount of panels needed for solar panels and the amount of panels needed for privacy. It is very interesting to play with the panels because there is no traditional way of dividing walls, ground and roof. Every panel is identical to the others and could very well be used in the bottom top or sides of the capsule.

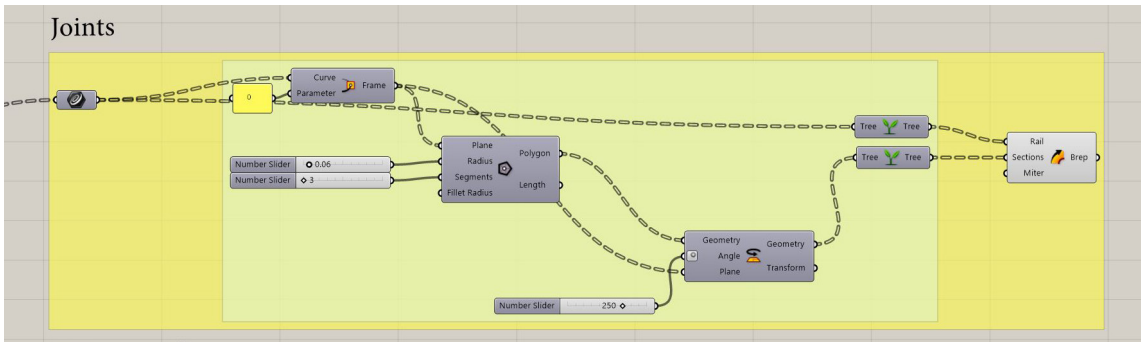
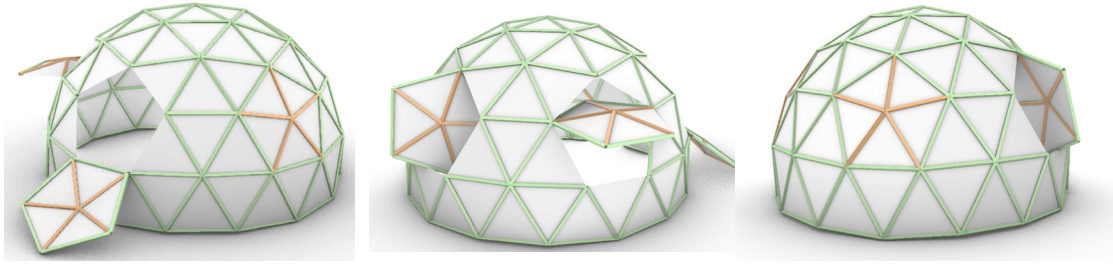
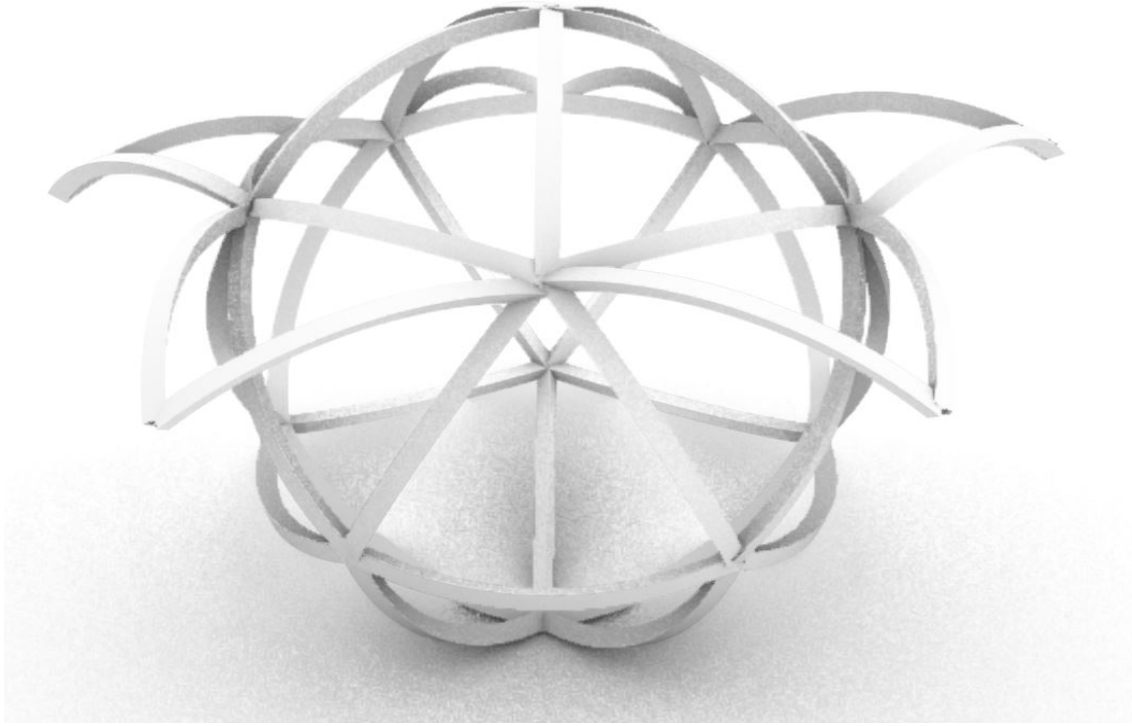




Technically speaking the façade is made of three layers. The outer layer is kind of a skin that is in contact with all sorts of weather conditions. The middle one is insulation separated by the structure and the inner one is out of wood.

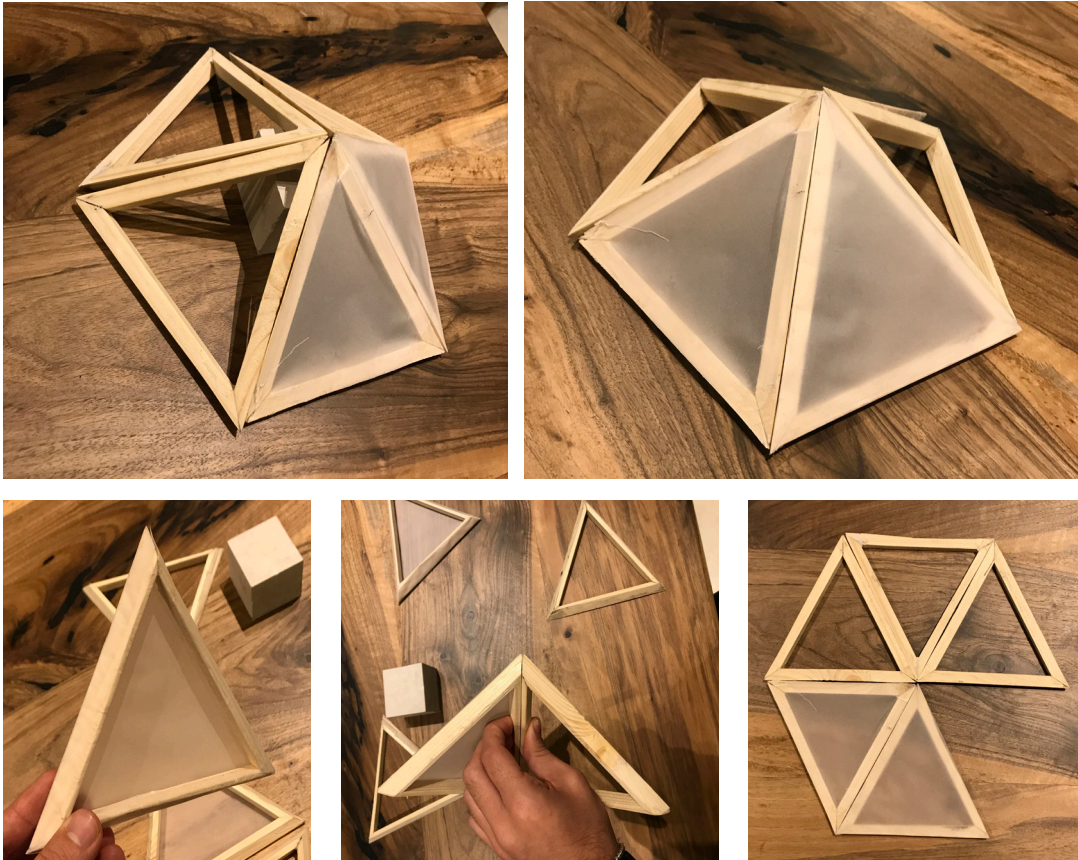


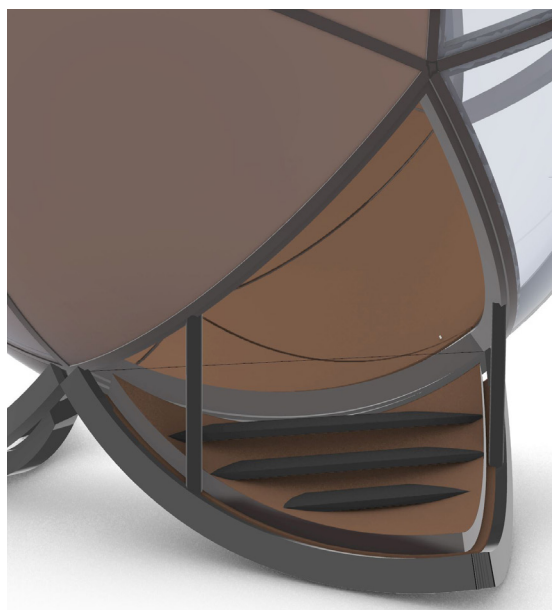
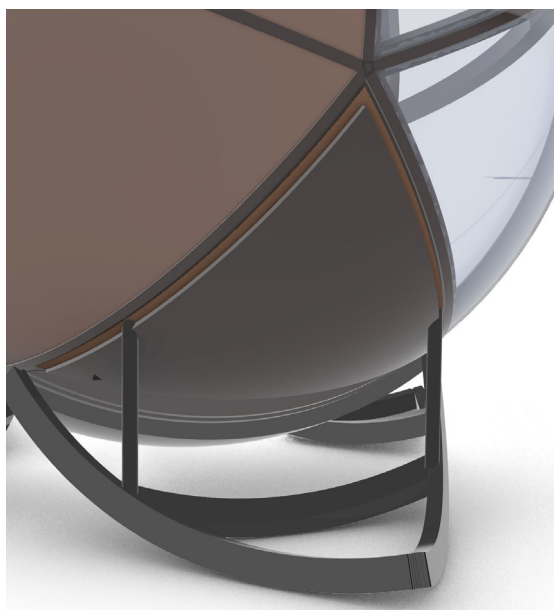
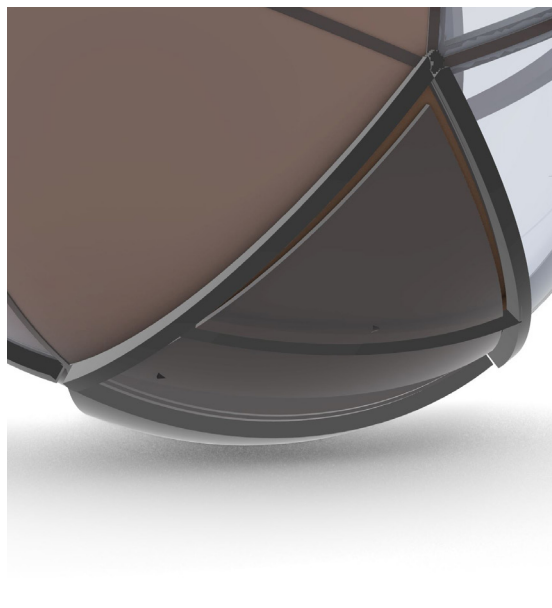
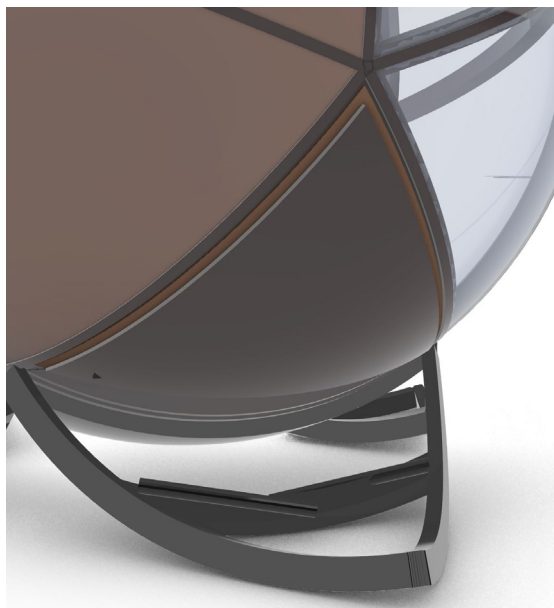
Having the advantage of high mobility and flexibility, the final result of the capsule will have a limited glass façade. This will make it possible for the capsule to be oriented in the best possible direction and get a good view while still providing with enough shadow. The entrance will also serve as natural ventilation.



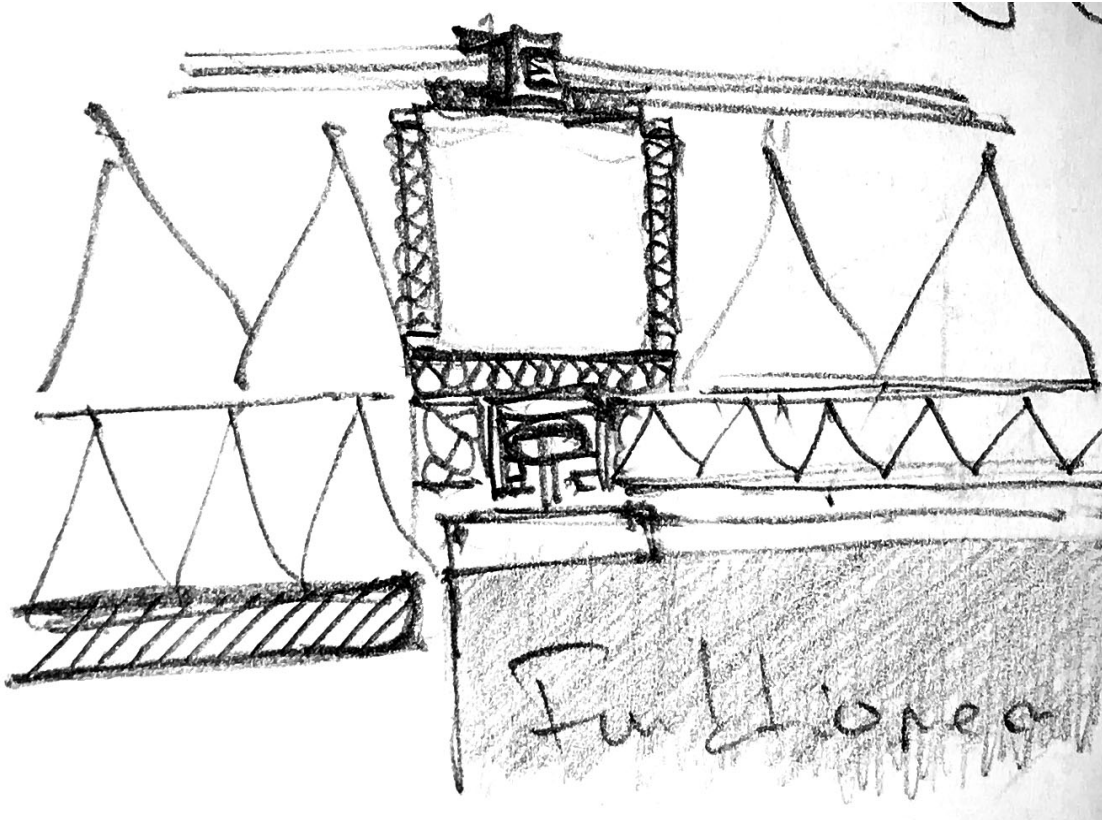
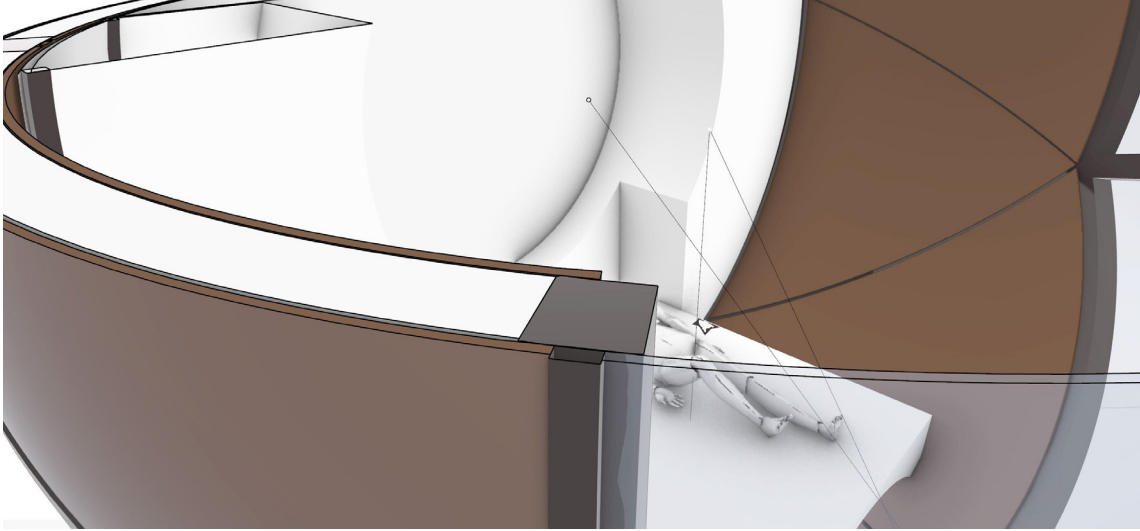
4.3.2 DOOR

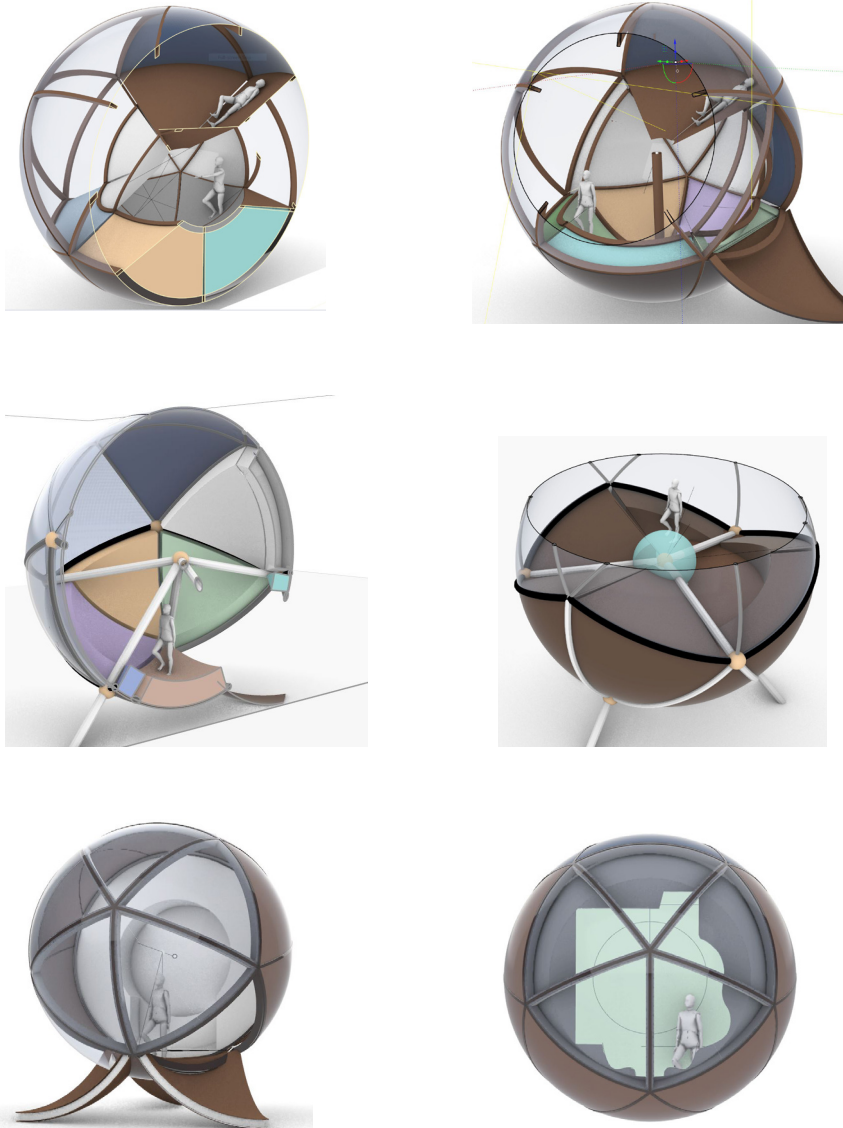
Opening on a spherical shape are very difficult to be done in the traditional way. It was obvious that in order to create doors or windows, the geodesics structure needed to be used. Through experimentation with the shape, technical difficulties started to appear but with the rotation of the capsule in the final position, the optimal solution with the foundation made the door also possible





4.3.2 DETAILS



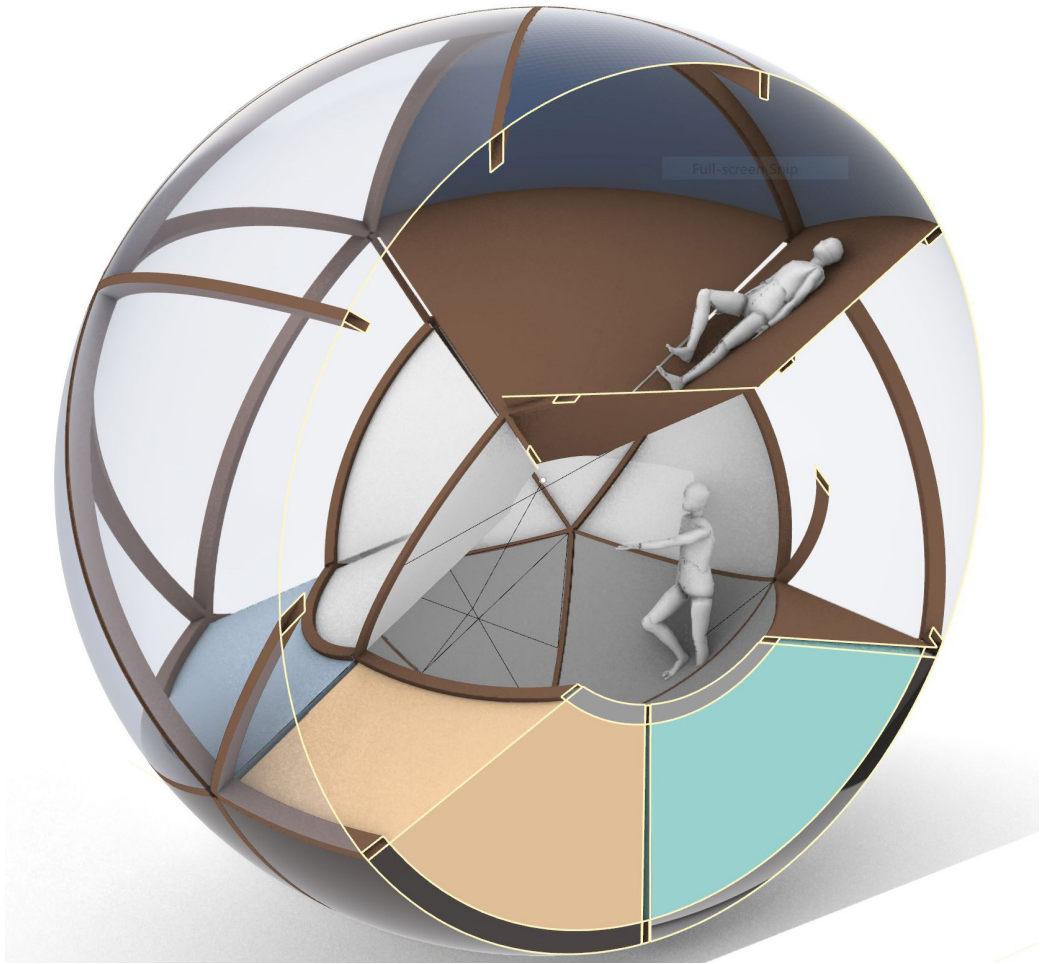


All the research, analysis and experimentation led to a better understanding of the sphere. These six variations reflect qualities and problems that were crucial to the final results.

4.4 Variations

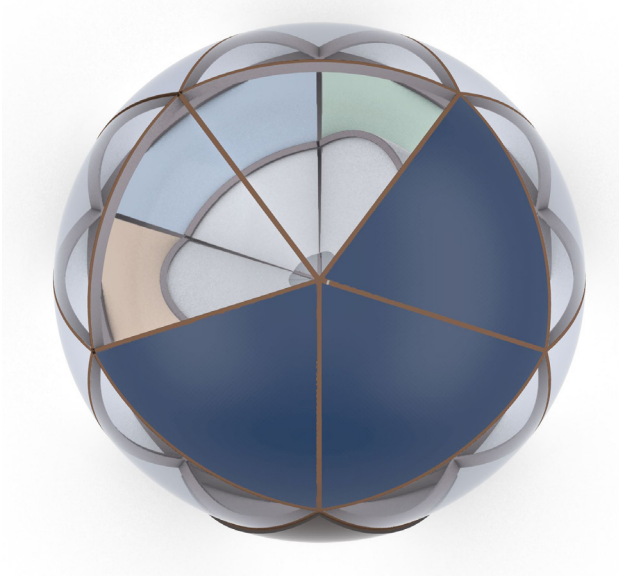
Experimenting with spherical structures

What are the qualities of the sphere?
How does one organise functions inside of a sphere?

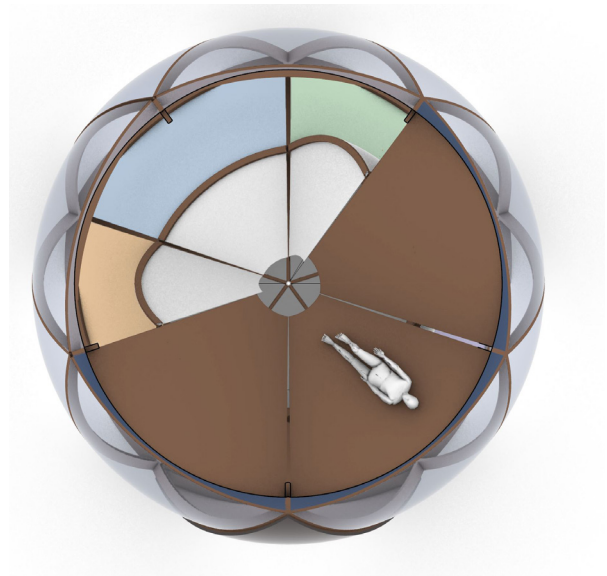


TYPE 1

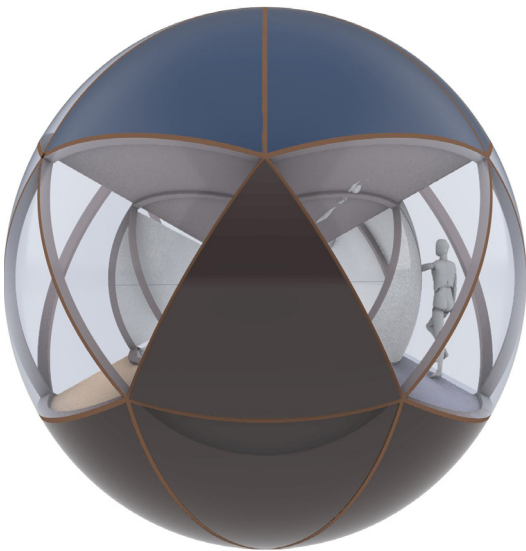
This type of the capsule is composed of a core and a shell. The core was seen as the as a connection to technical equipment illustrated in different colors and the functional spaces of the capsule. The practicality that comes with this allocation does not make sense when one analyses the remaining livable space. The sphere is not perceivable from the inside as a whole and all surfaces are at an angle.



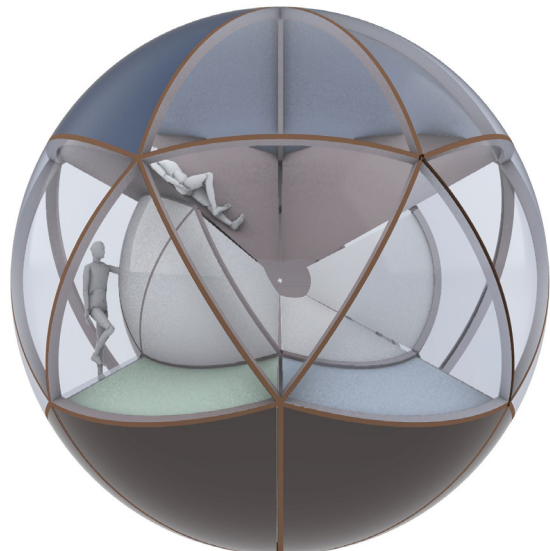
Top view



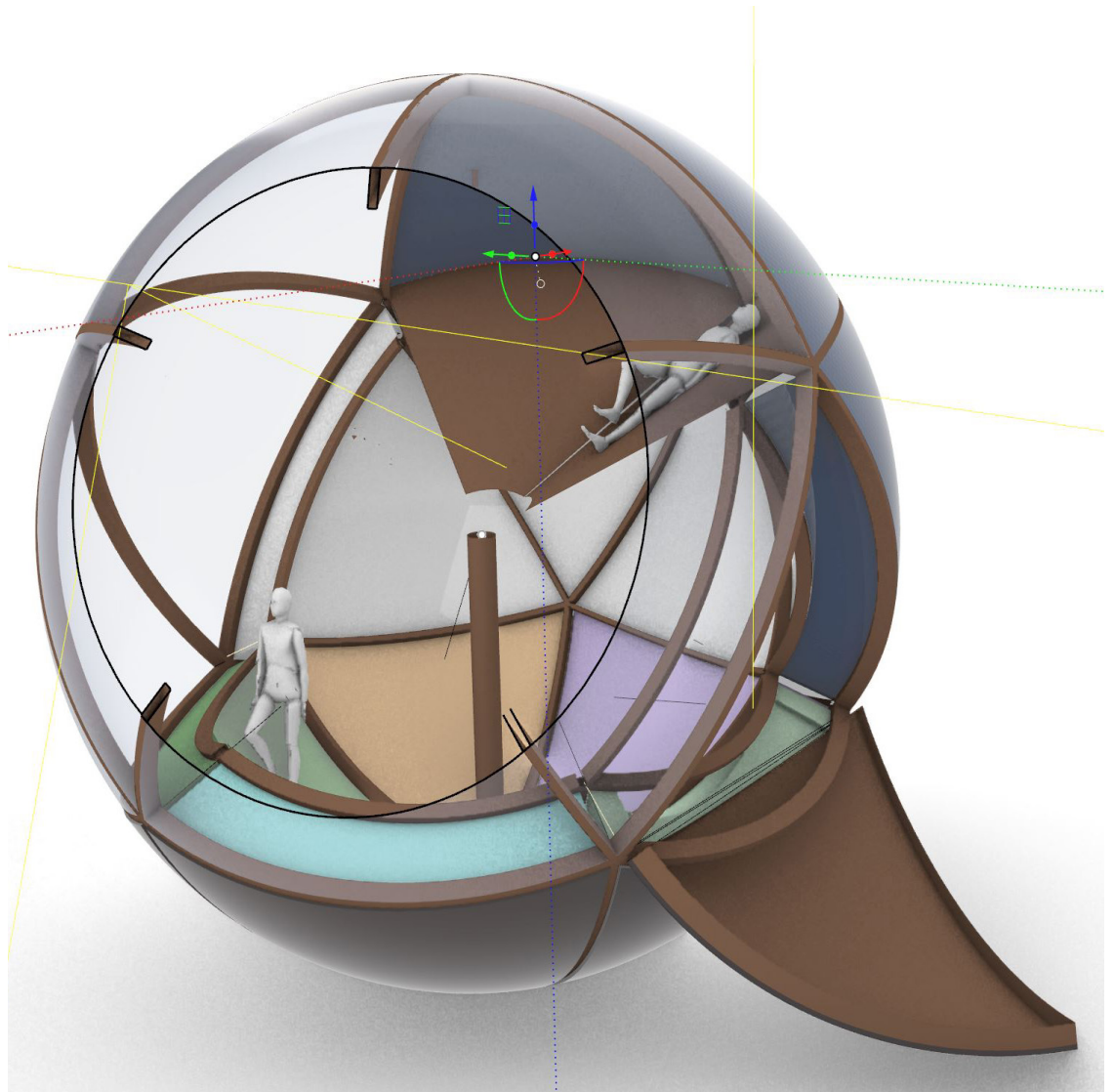
Floor plan



Left view

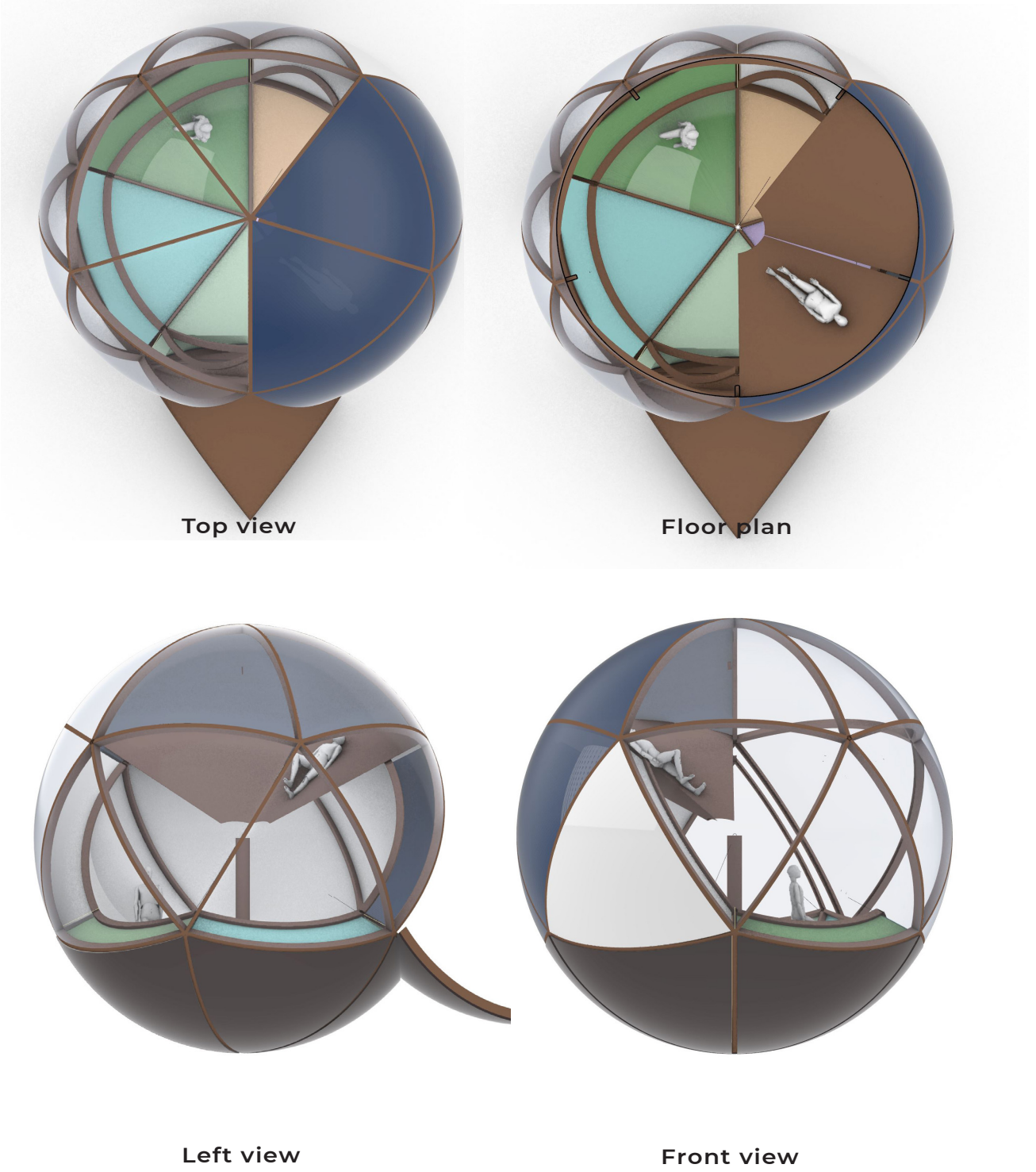


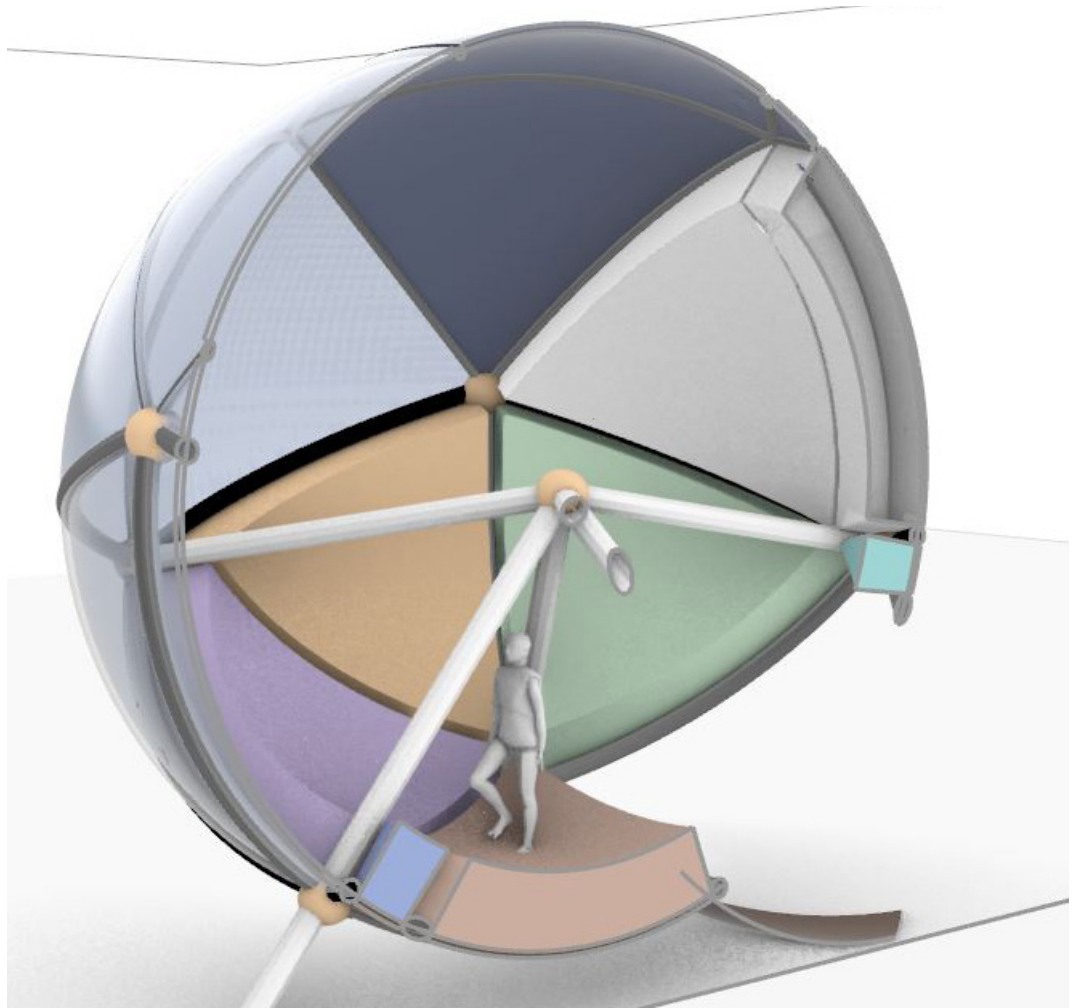
Front view



TYPE 2

This type creates a narrow space between the shell and the core as a result of a much larger core. This space is fragmented through the geodesic structure as in the previous example and is an attempt to allocate functions mainly in the façade. The qualities lie in the very good perceivable spherical geometry but openings are hard to be done and once inside the sphere, one finds himself in a hole with little view





TYPE 3

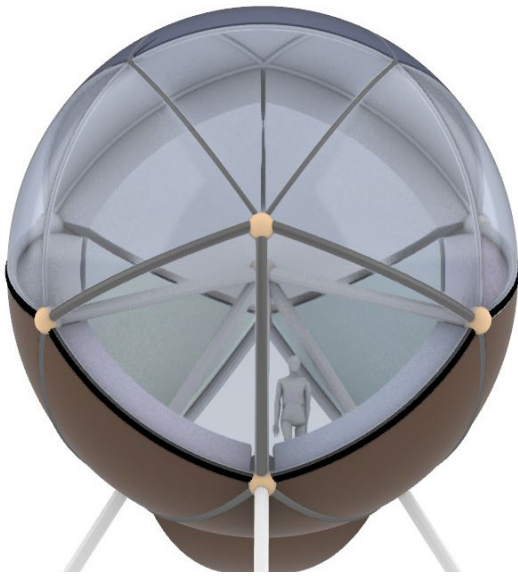
The main difference between this and the previous type is that in type 3 the sphere is rotated. Through the rotation the angle of the door opening became much more practical while the possibility of having three points for the foundation arises. More deconstruction of the facade panels was made in order to increase the visibility from inside out and many of the features here are to be found in the final results



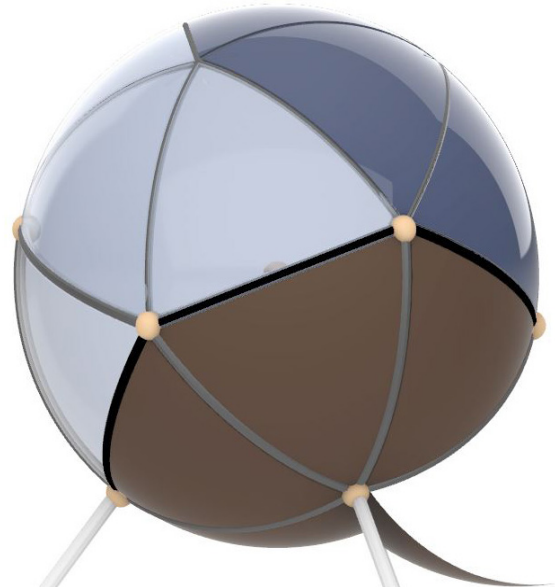
Top view



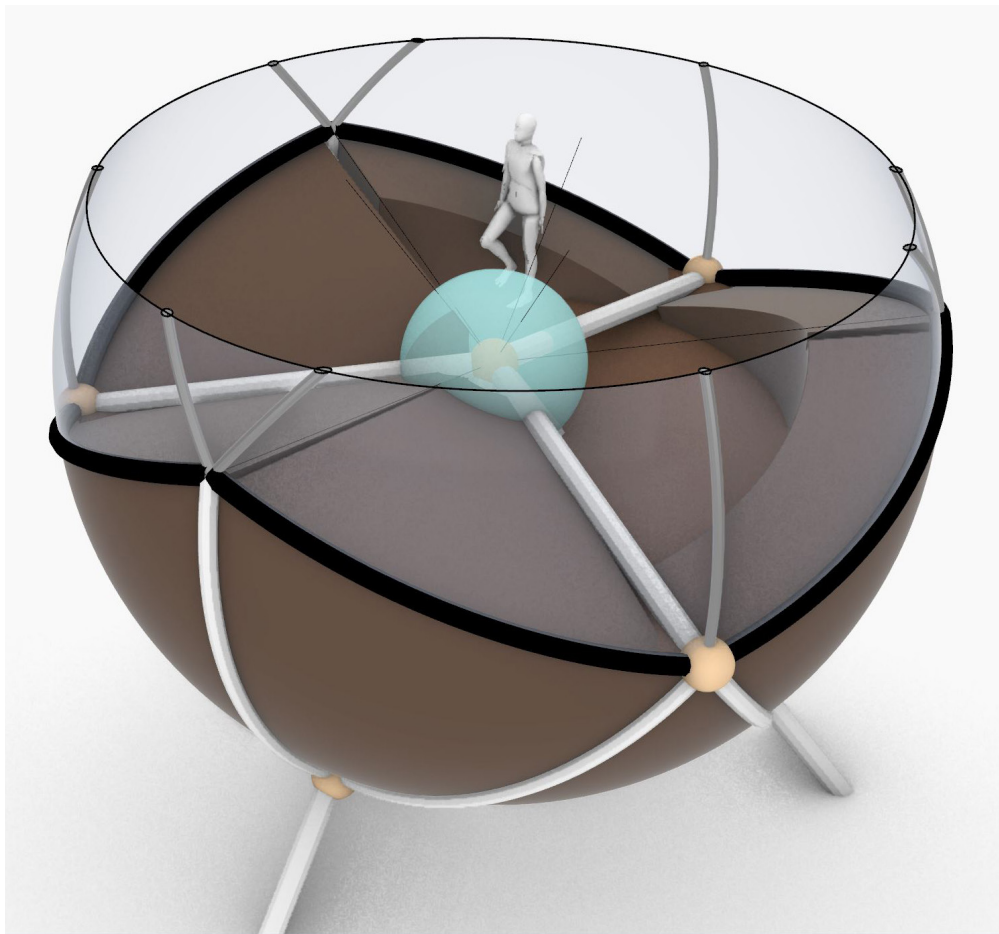
Floor plan



Left view

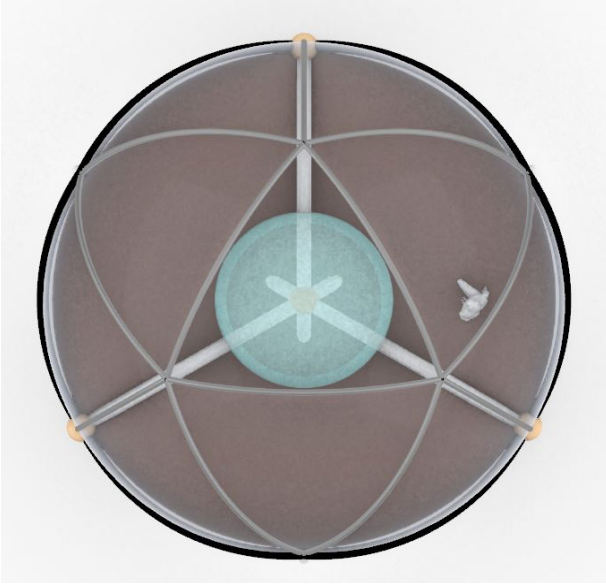


Front view



TYPE 4

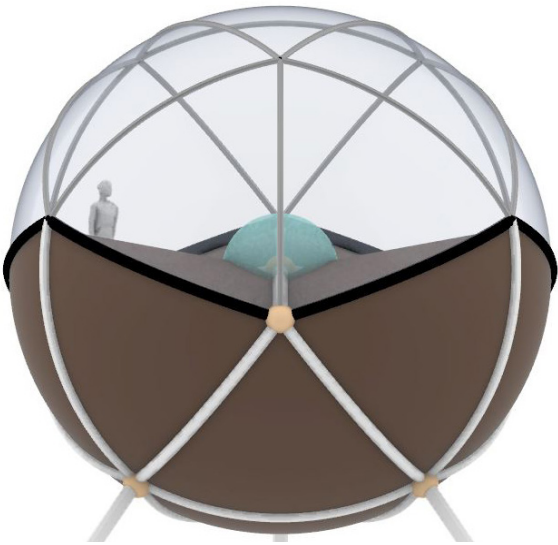
Type four stand as a complete deviation from the previous variations. In this type the focus was in following the geodesic structure to create a simple and functional solution. This solution could very easily support all functions in dome but half of the sphere would be used for technical equipment. The sphere would be fragmented and just the feeling of a dome would be possible.



Top view



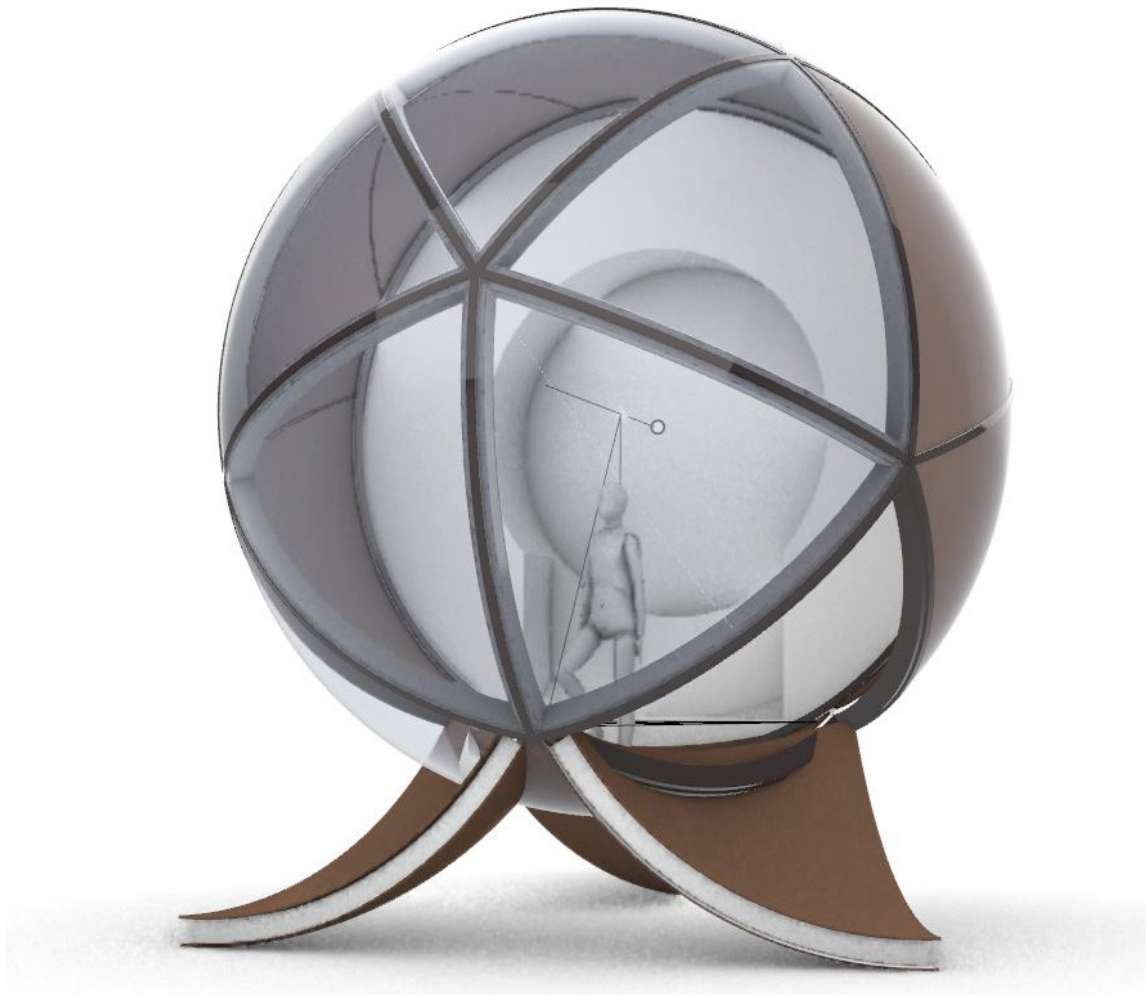
Floor plan



Left view



Front view

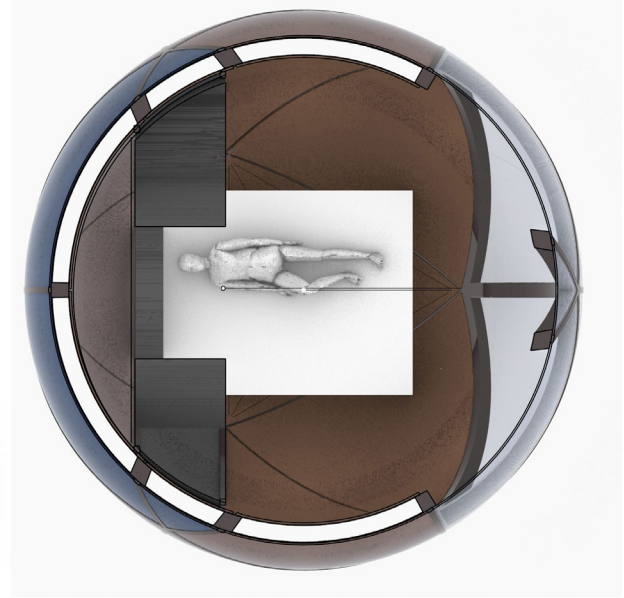


TYPE 5

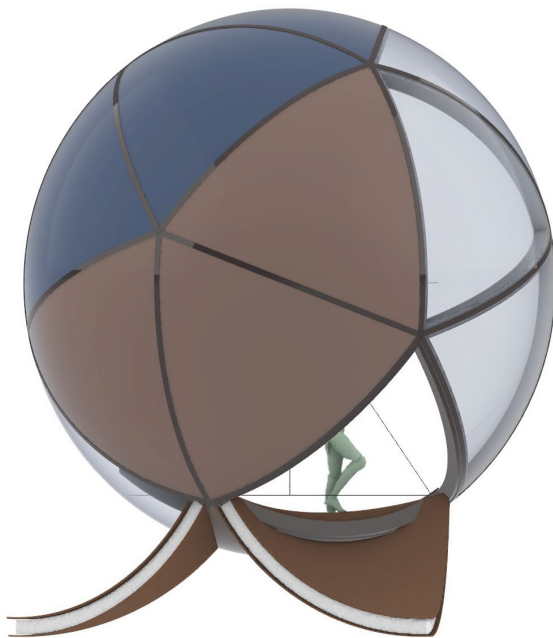
Type five brings together ideas from the beginning of the project and reintroduces rotating furniture as a quality that is possible by the sphere. A slice of the sphere with a thickness of 80cm would rotate in four main positions and foldable furniture would make use of the space. The most impressive quality of this type is that every function would make use of exactly the same space. Four rooms in just one space



Top view



Floor plan



Left view



Front view

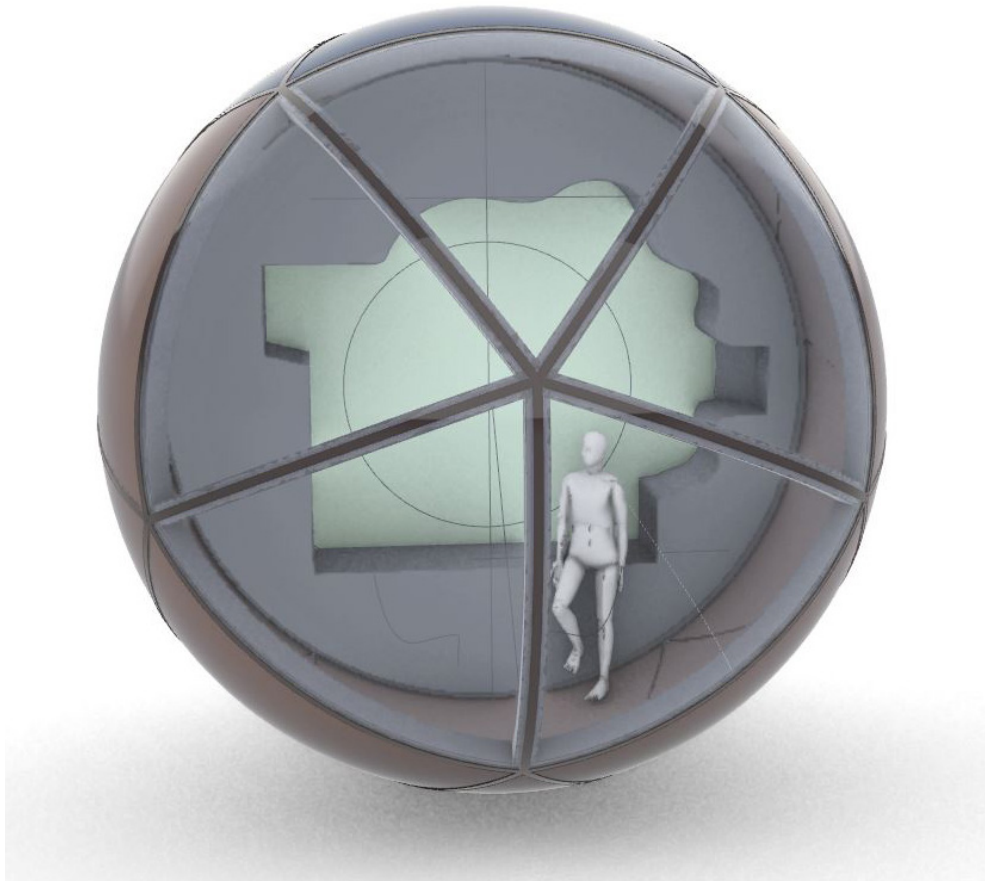


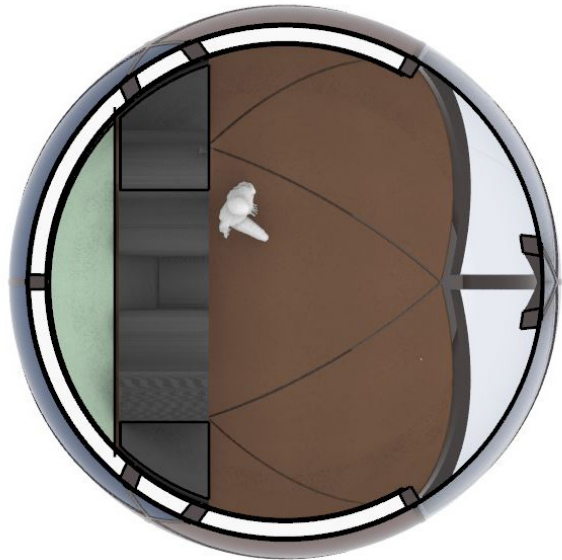
FIGURE 10 - 3D MODEL OF V6

TYPE 6

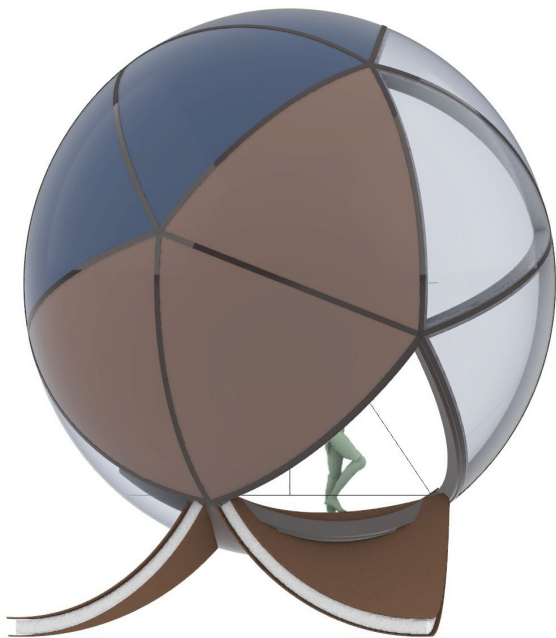
Type six differentiates between two kinds of functions, those with technical necessity and those without. Different scenarios between these two parts of the sphere were the center of attention. While the grey furniture rotates, the green one only offers foldable toilets and kitchen.



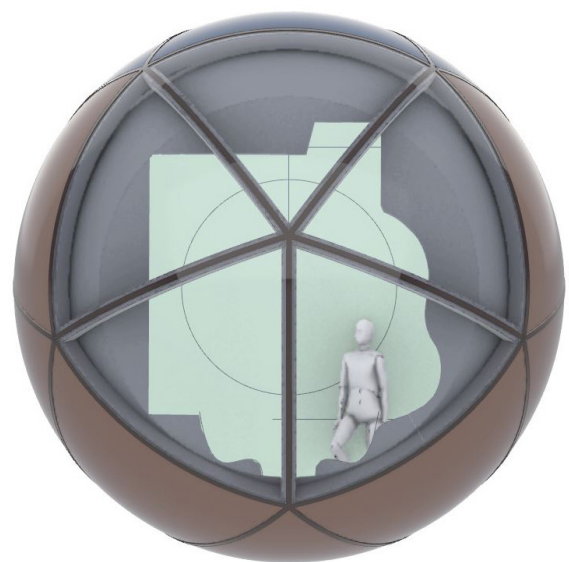
Top view



Floor plan



Left view



Front view

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5. Results

Capsule 001 - The flying room
Capsule 002 - Pandemic

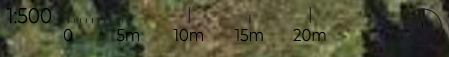


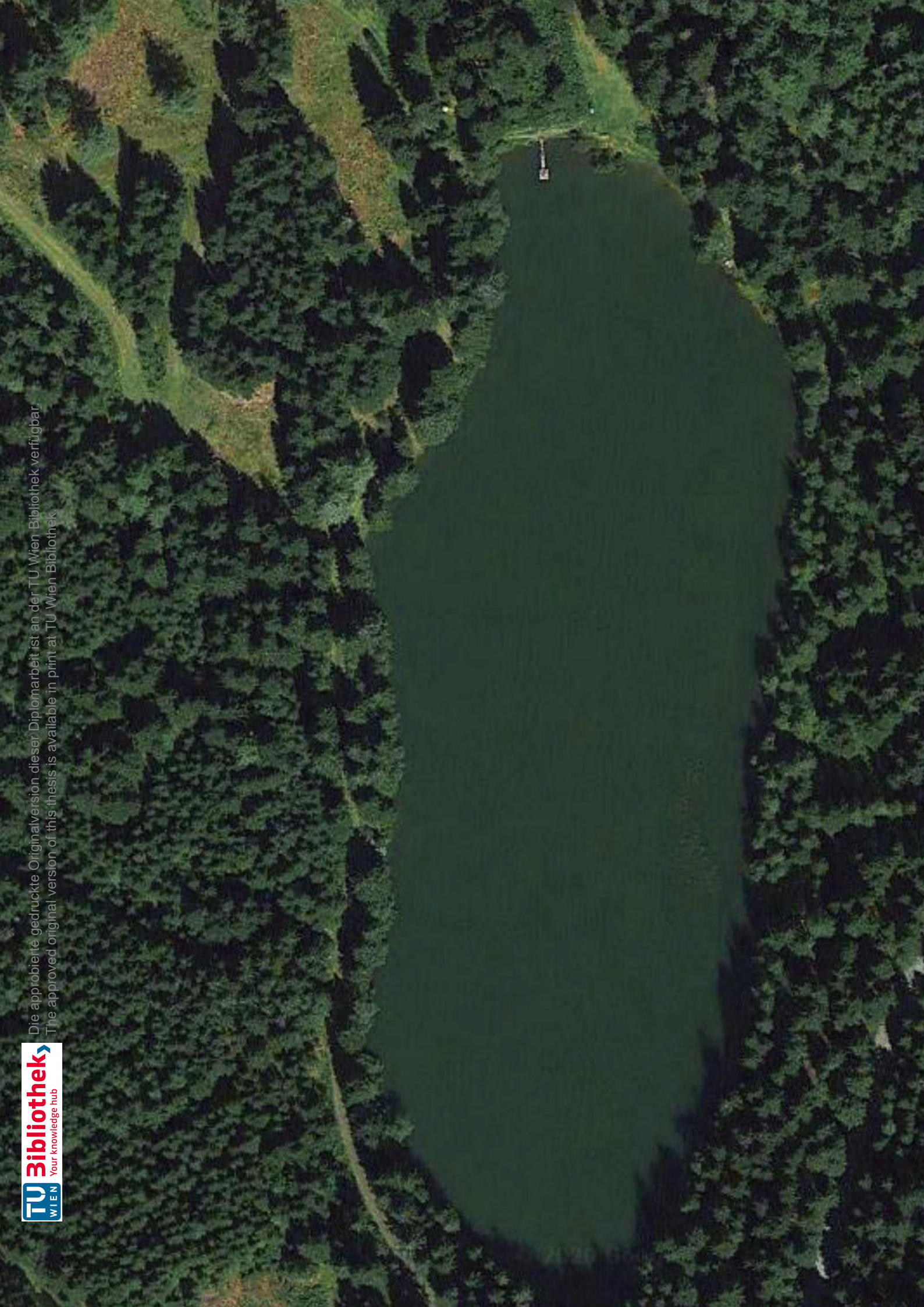
The flying room is the result of the work done while dreaming for better future for Albania. I aimed to create an ecological hotel that dosnt affect nature and saves cites from overdevelopment. It requires no infrastructure and injects money through its tourists to every place it goes. It is a completely new building typology and offers a unique kind of tourism. You can have it all!

5.1 The flying room

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5.1 SITE PLAN M 1:500

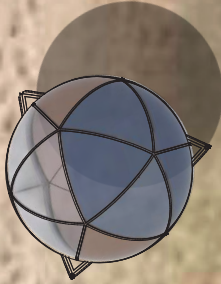
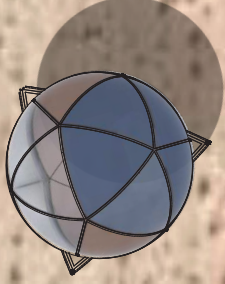
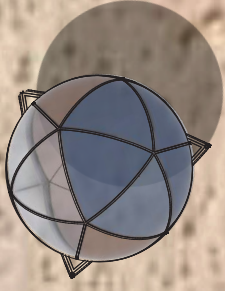
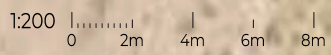




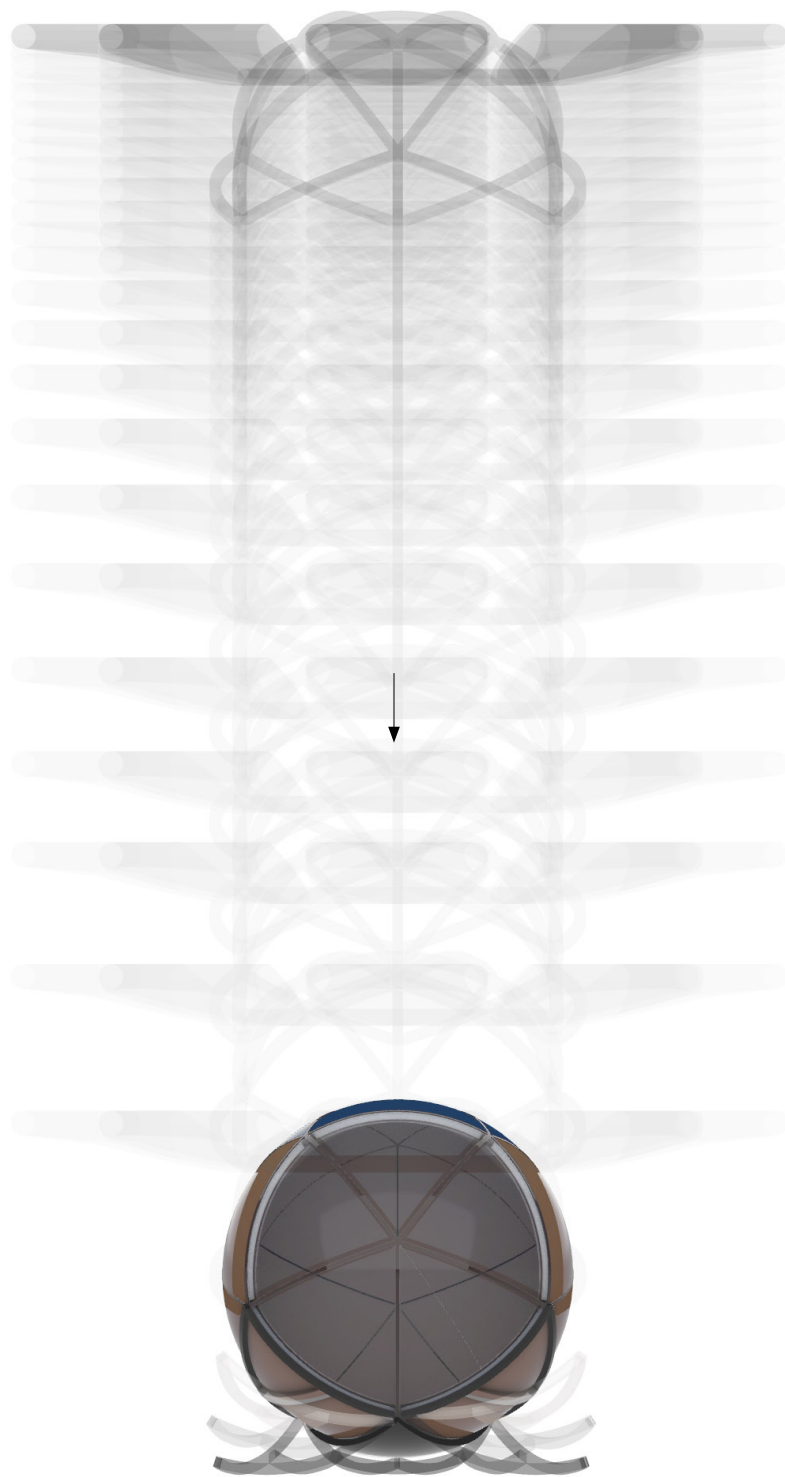
5.2 SITE PLAN M 1:200

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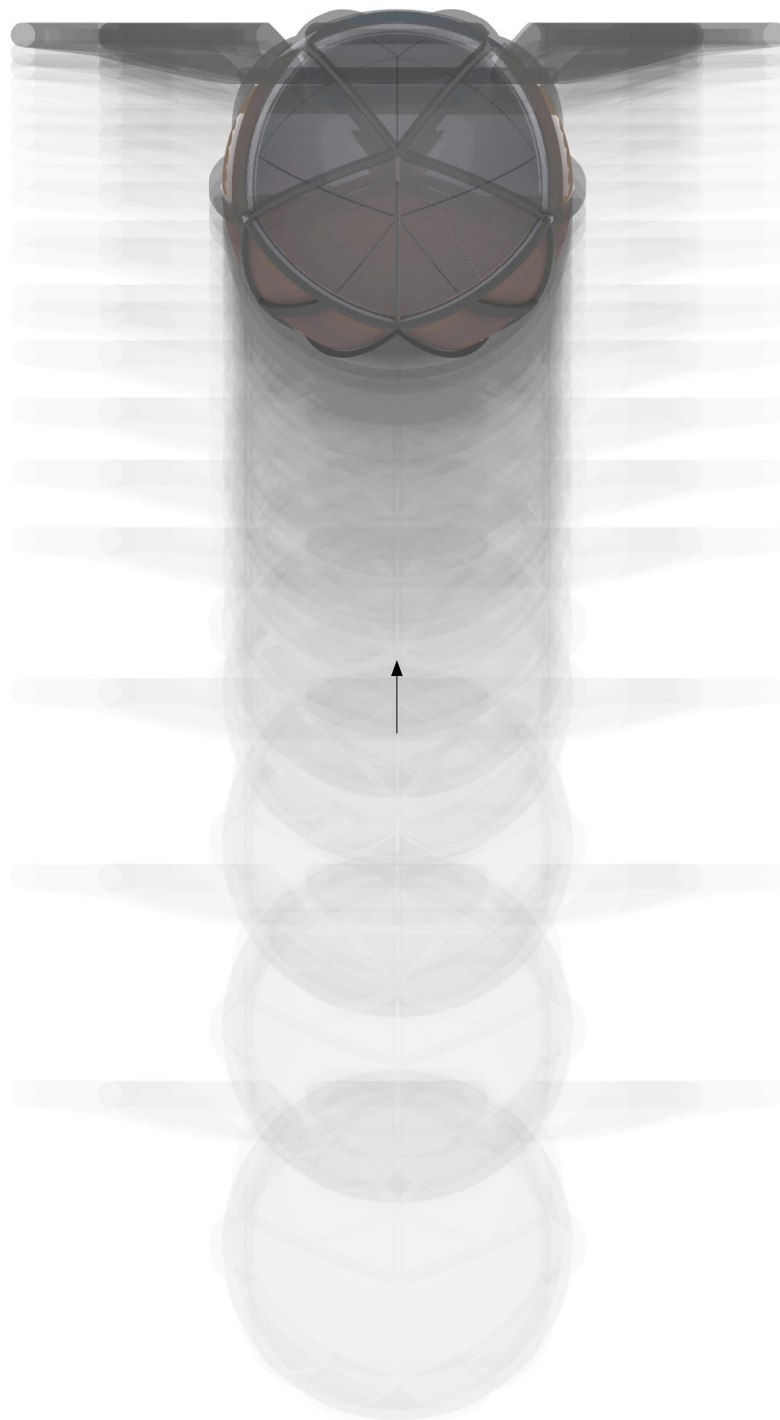
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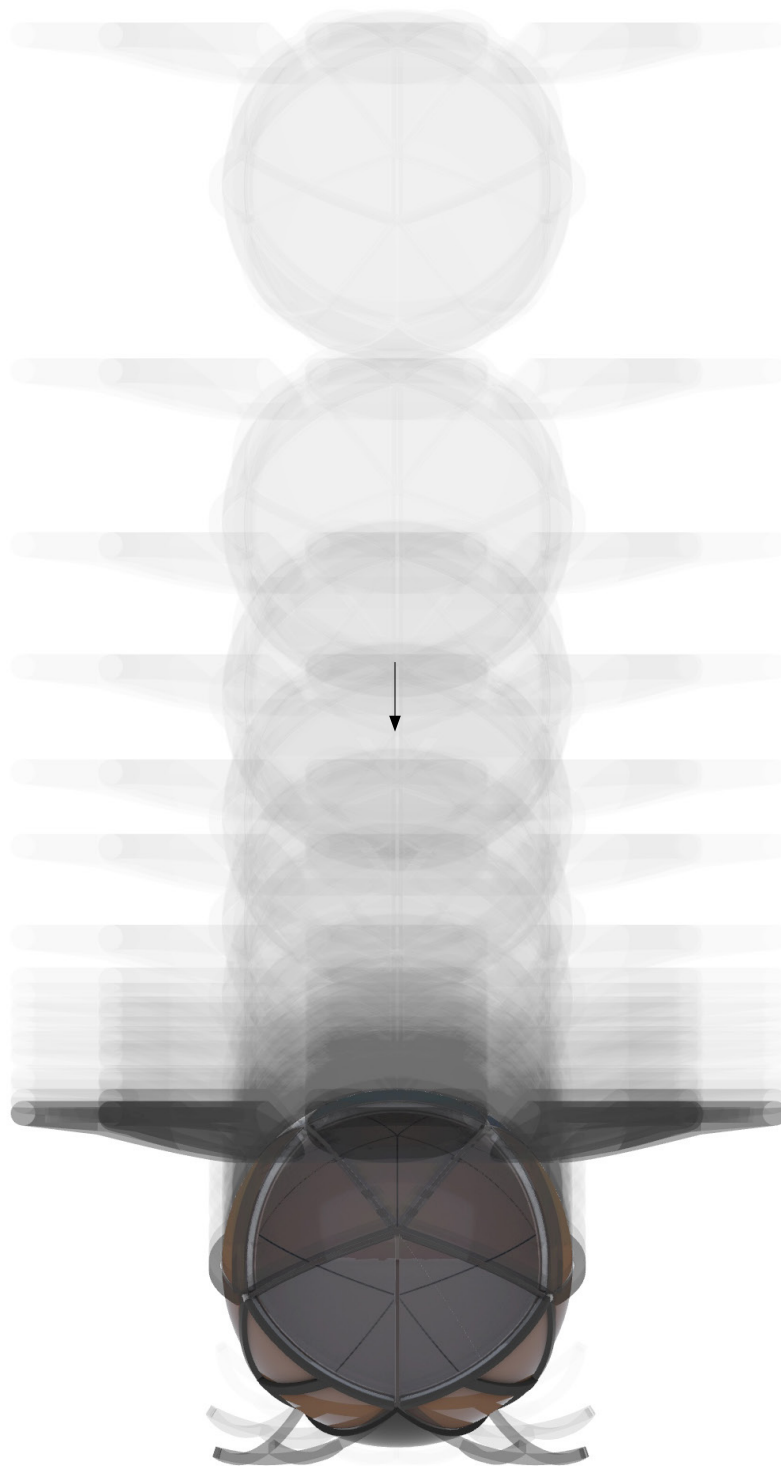
5.3.1 TAKE OFF / WINGS ARRIVE



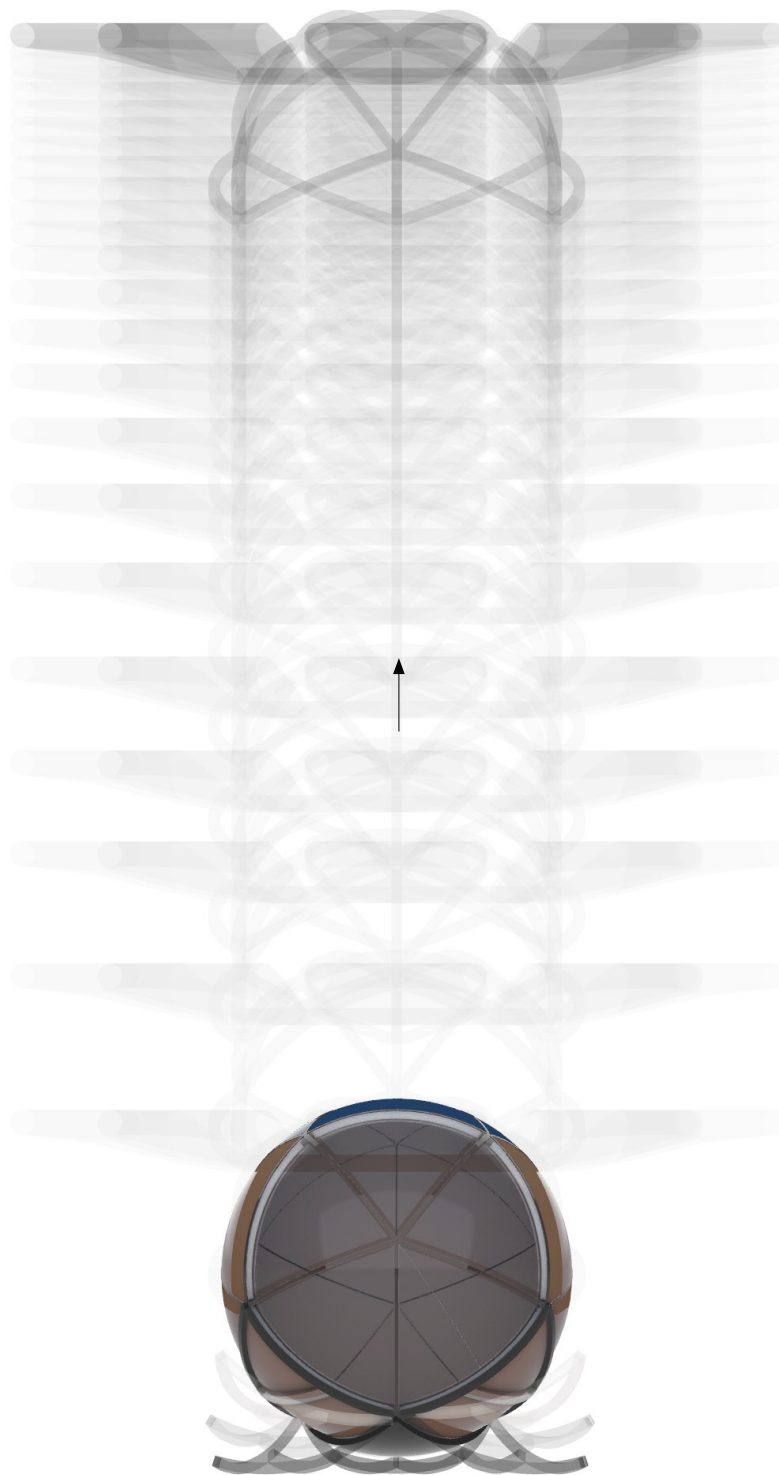
5.3.2 TAKING OFF



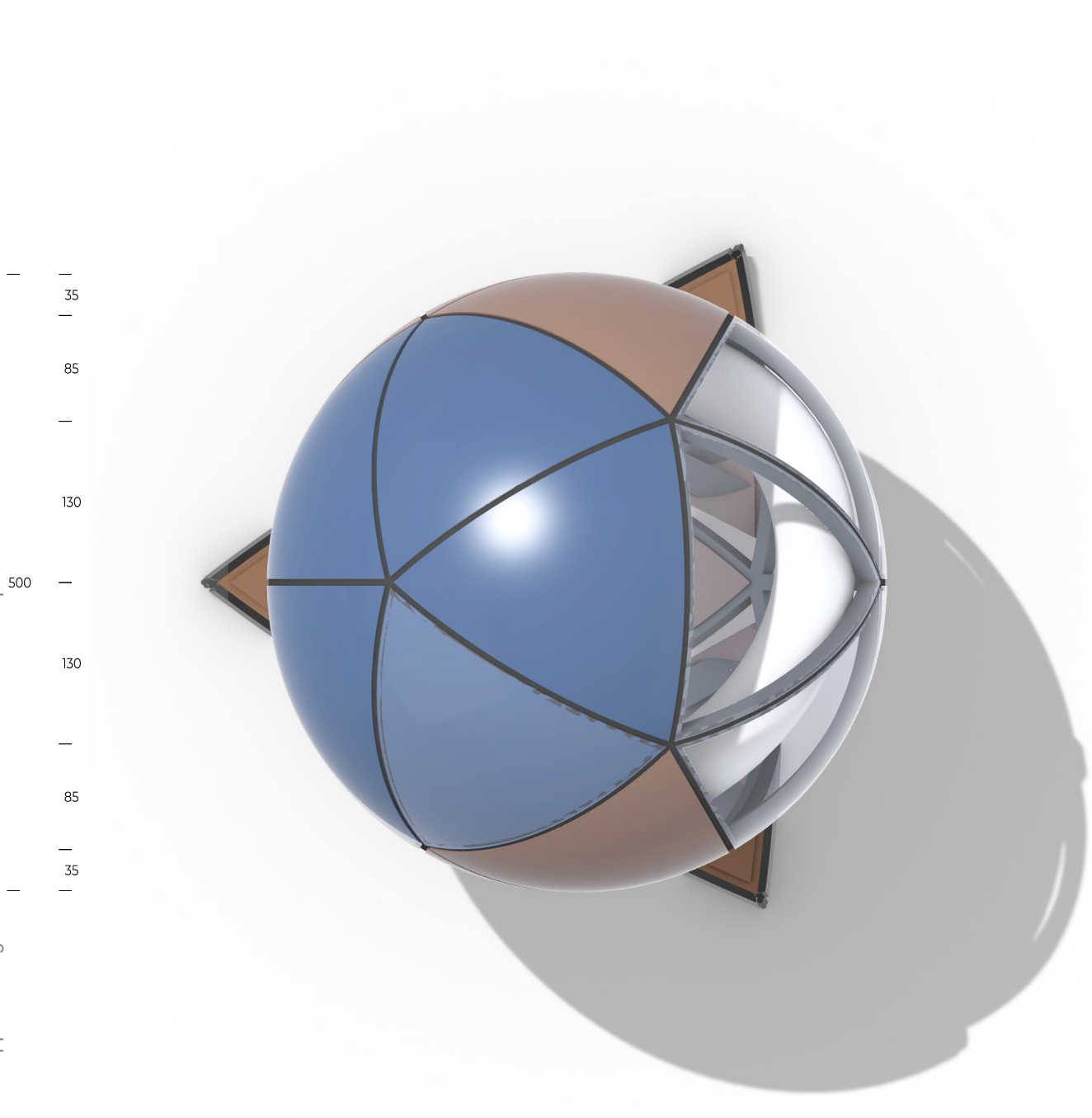
5.3.3 LANDING



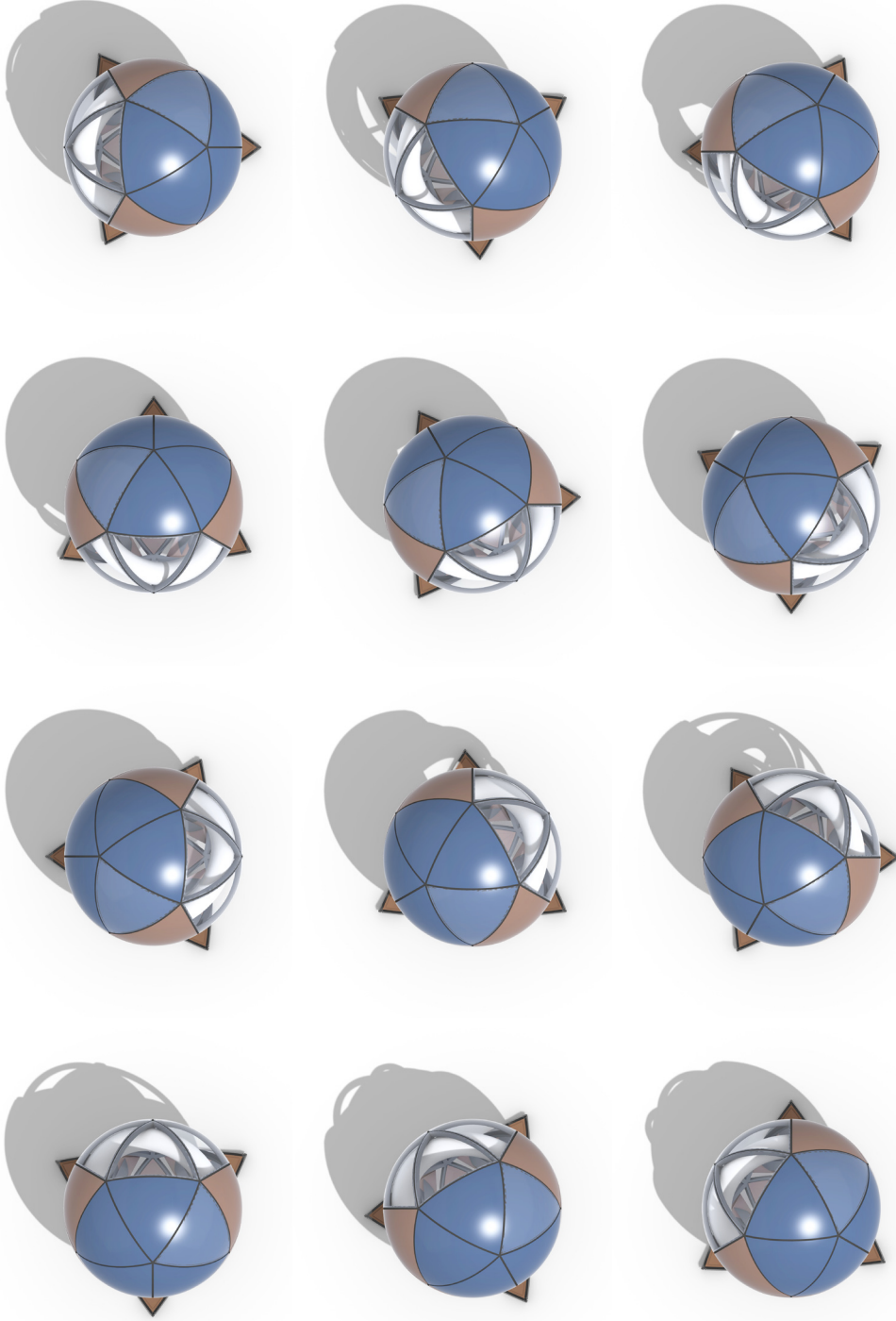
5.3.4 LANDING / WINGS LEAVE



5.4.1 TOP VIEW



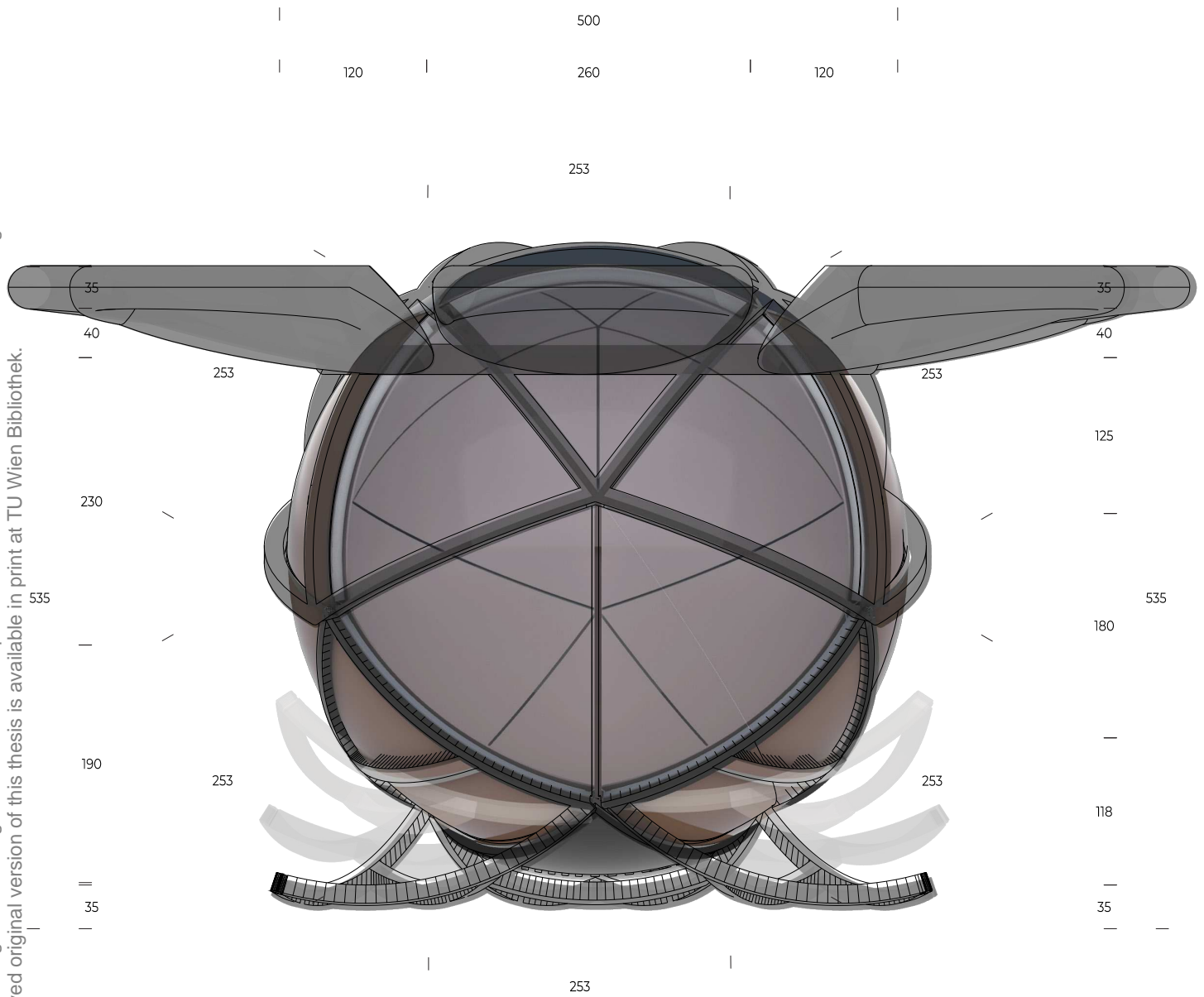
5.4.2 FLEXIBLE ORIENTATION



1:200 0 2m 4m 6m 8m

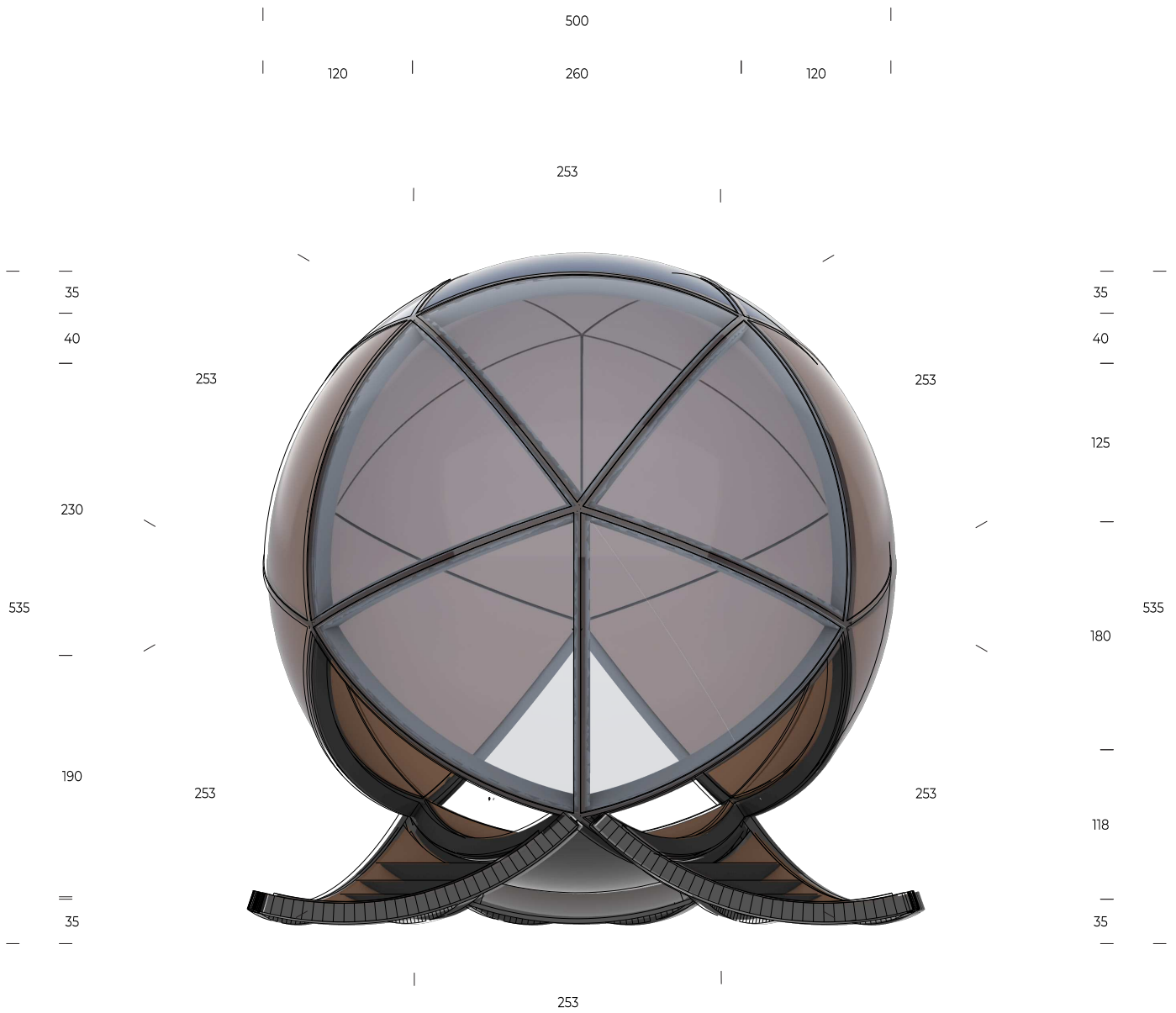


5.4.3 FRONT VIEW / FLYING



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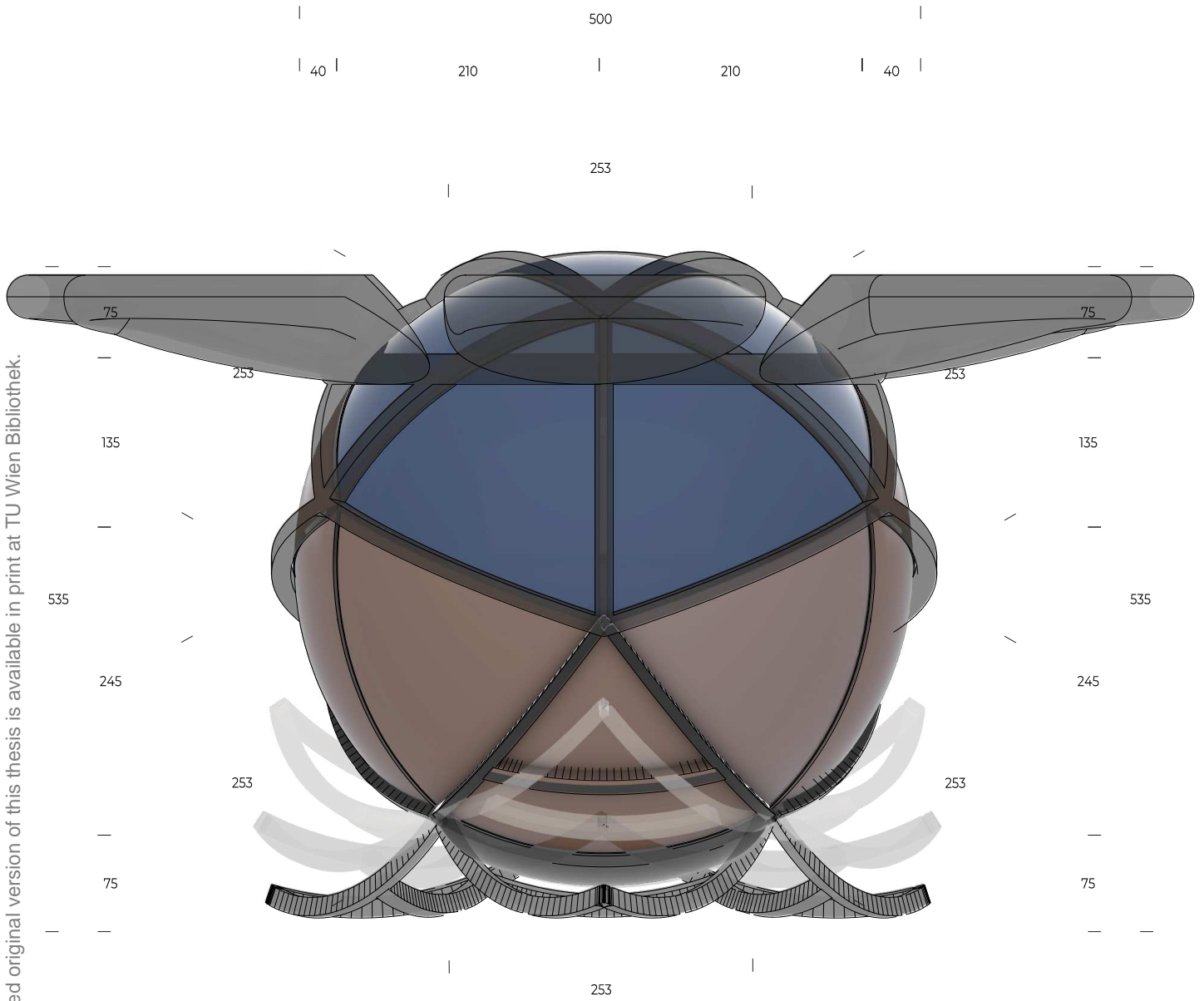
5.4.4 FRONT VIEW



1:50 0 0.5m 1m 1.5m 2m



5.4.5 BACK VIEW / FLYING

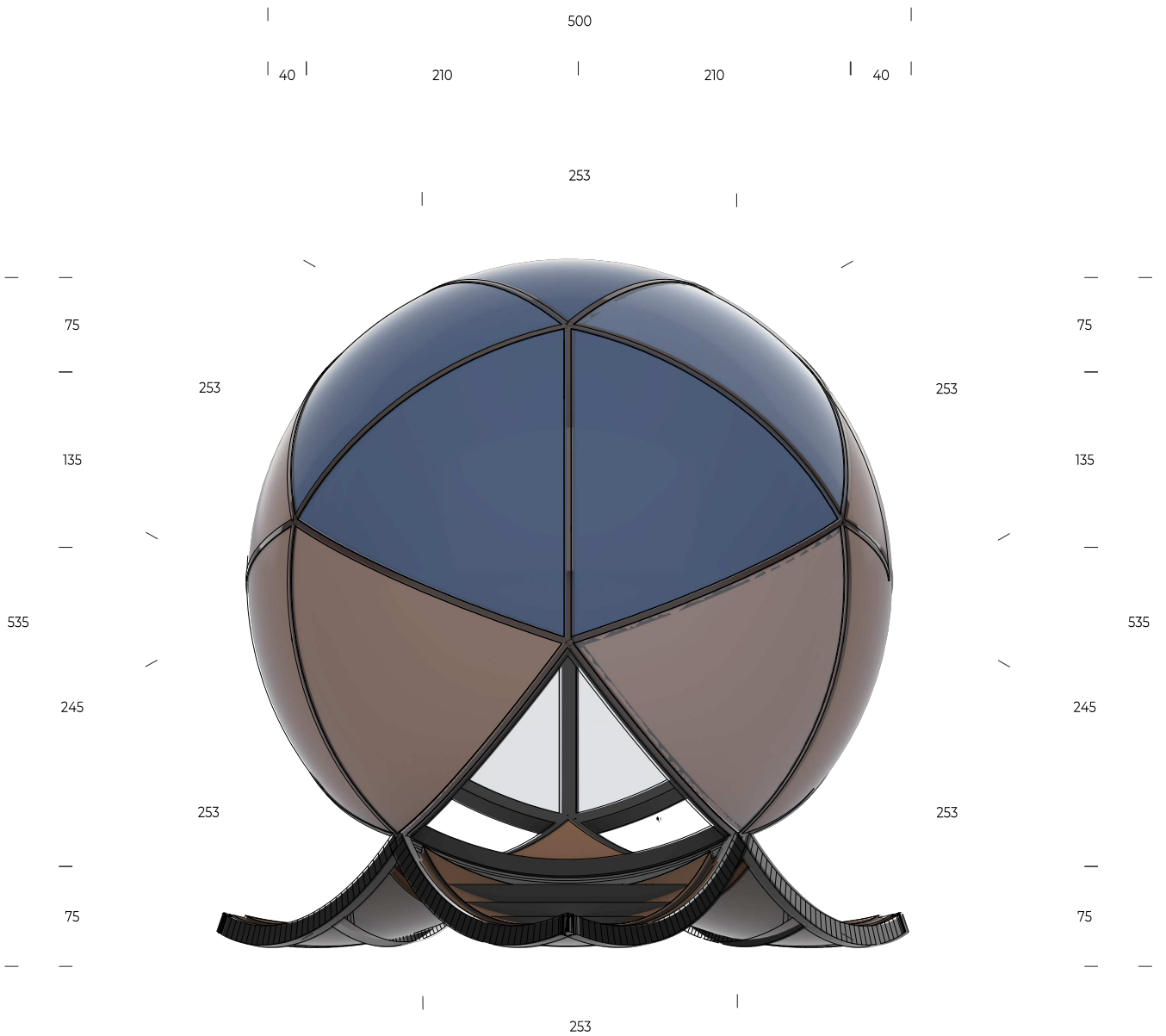


1:50
0 0.5m 1m 1.5m 2m



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5.4.6 BOTTOM VIEW

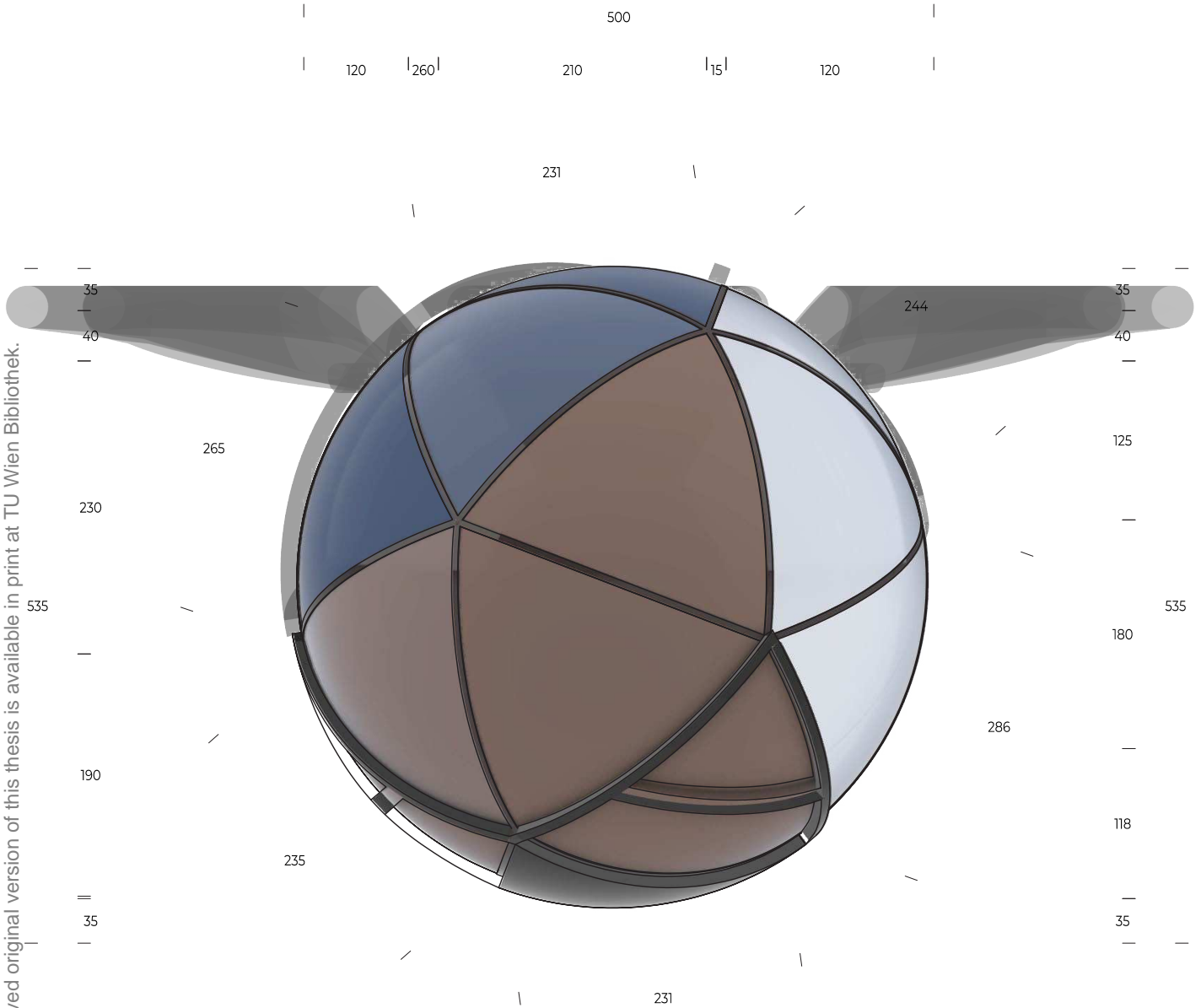


1:50
0 0.5m 1m 1.5m 2m



5.4.7 SIDE VIEW / FLIGHT M 1:50

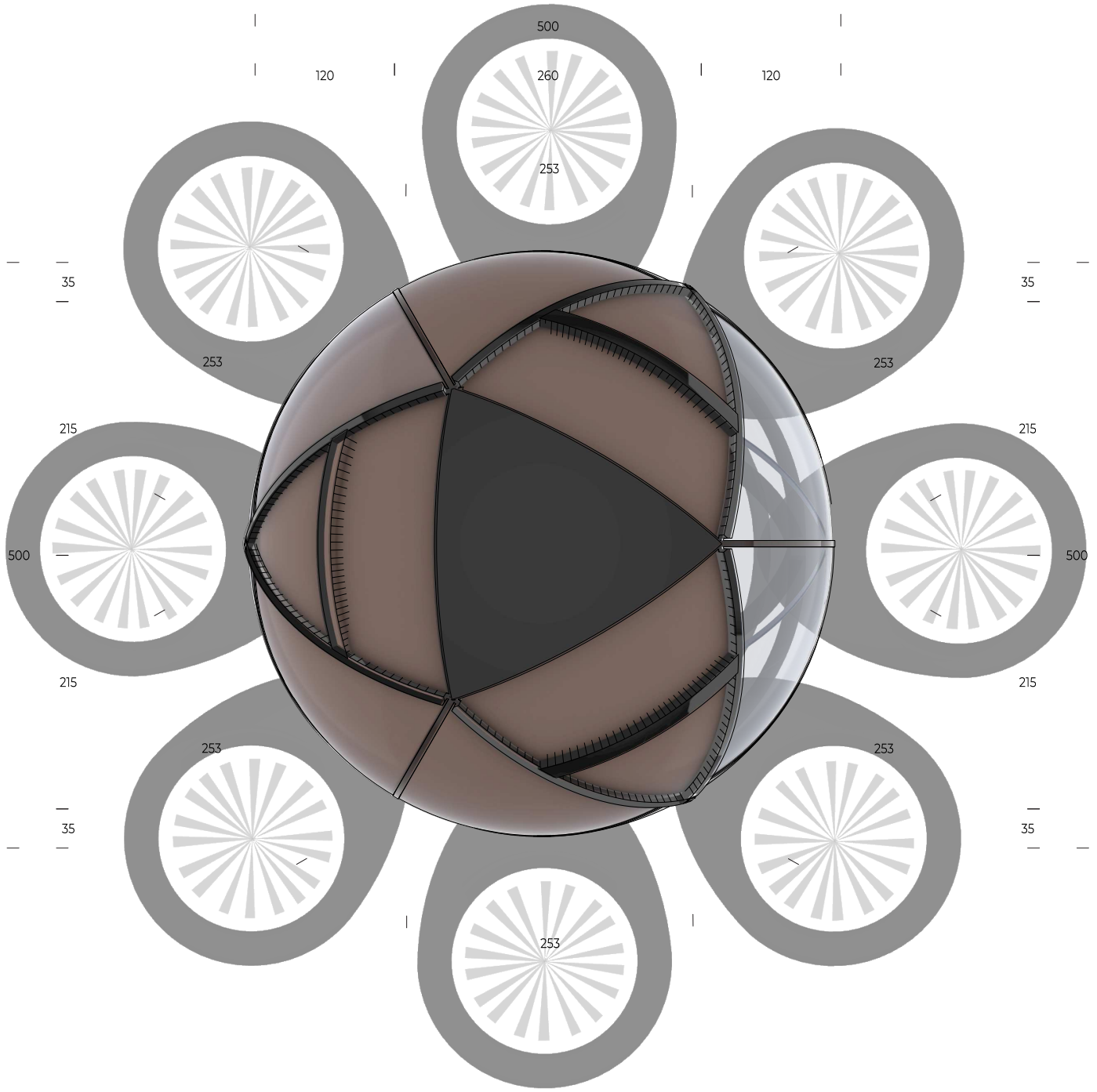
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1:50 0 0.5m 1m 1.5m 2m



5.4.8 BOTTOM VIEW / FLYING

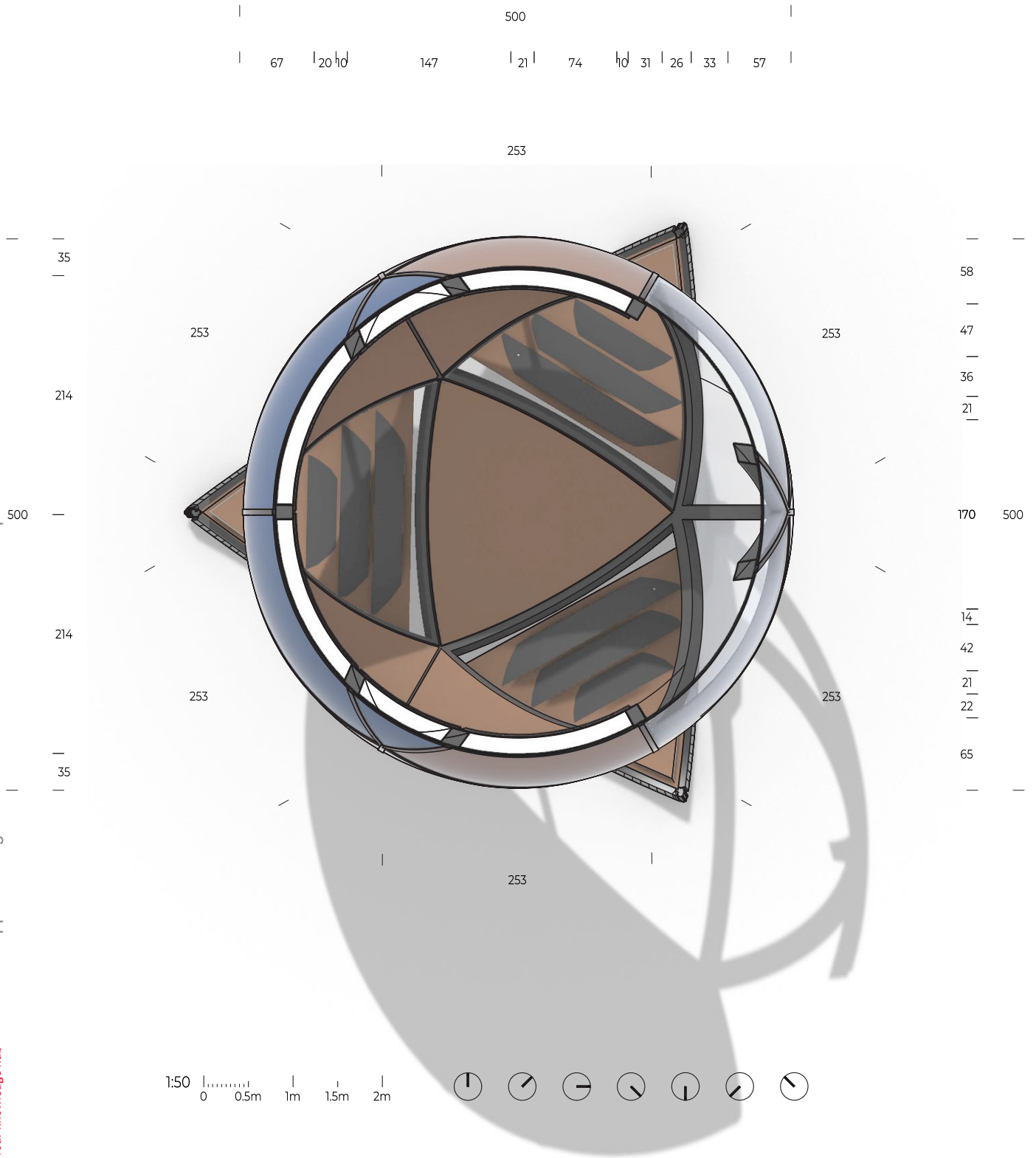


1:50
 0 0.5m 1m 1.5m 2m



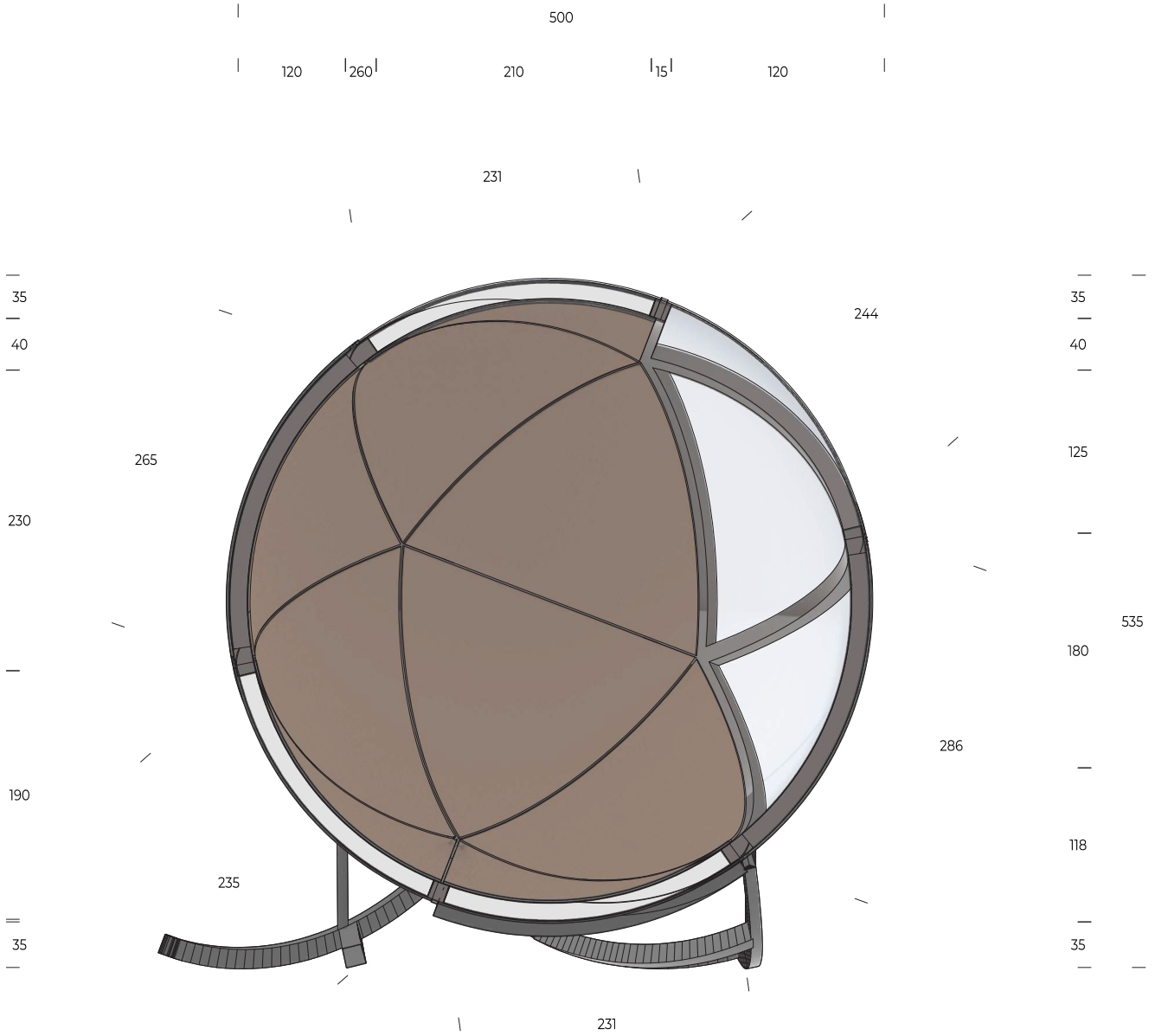
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5.4.9 TOP SECTION M 1:50



5.4.10 SIDE SECTION M 1:50

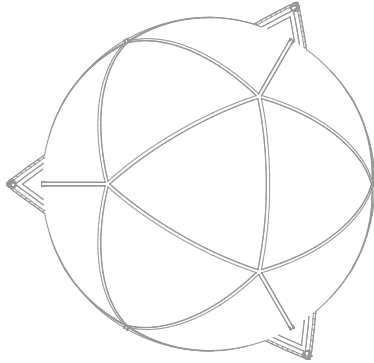
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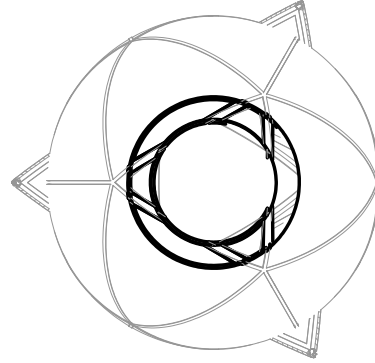
1:50 0 0.5m 1m 1.5m 2m



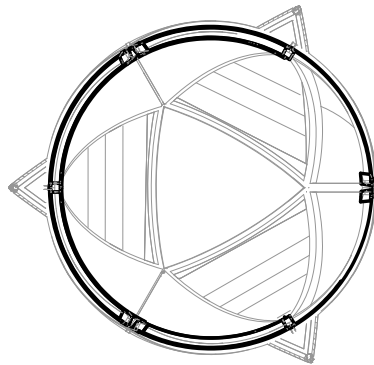
5.5 TOP SECTION SEQUENCES



Top view uncut

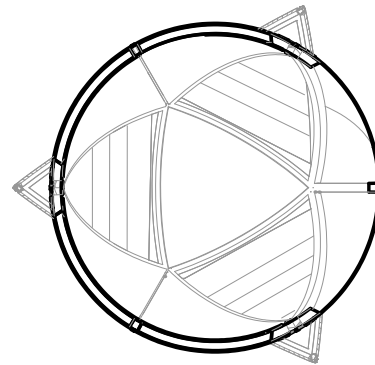


Cutting plane +5.2m



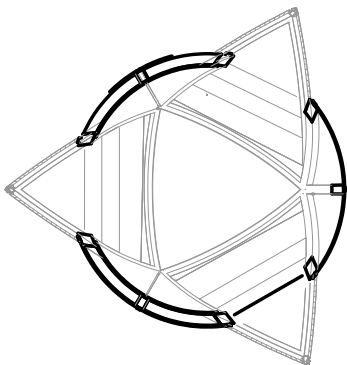
Cutting plane + 3.7m

4.8



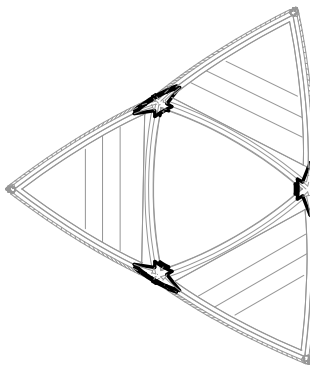
Cutting plane +3.2m

4.9



Cutting plane +1.7m

4.1

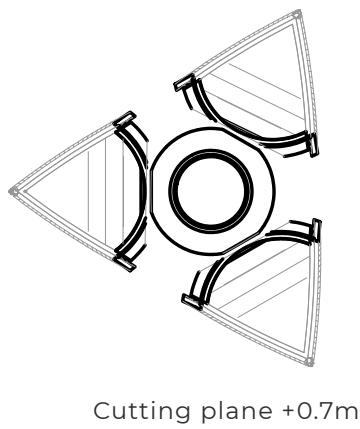


Cutting plane +1.2m

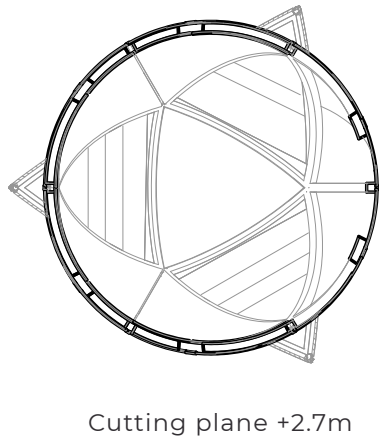
3.1

1:100
0 1m 2m 3m 4m

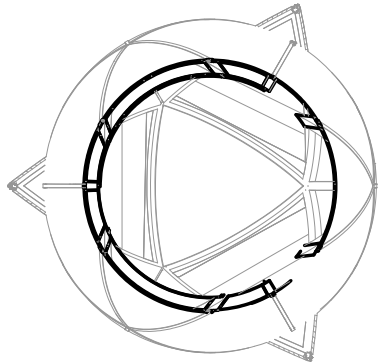




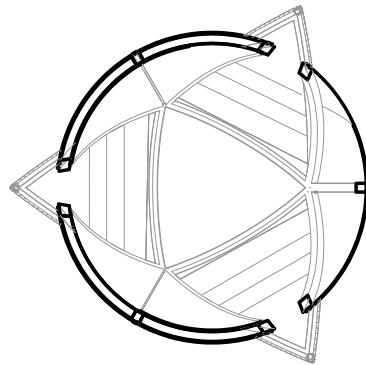
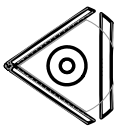
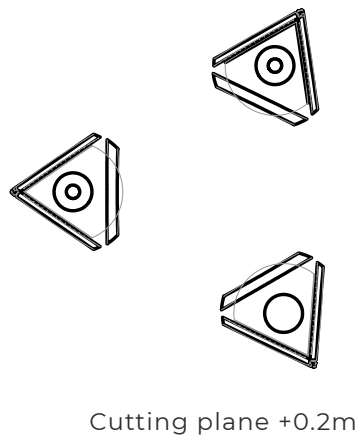
1.9



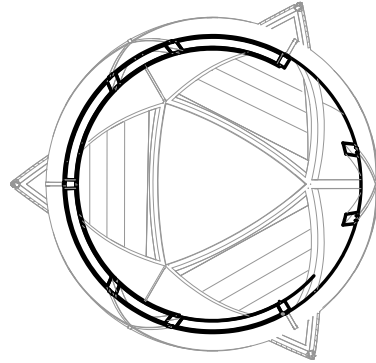
5



3.8

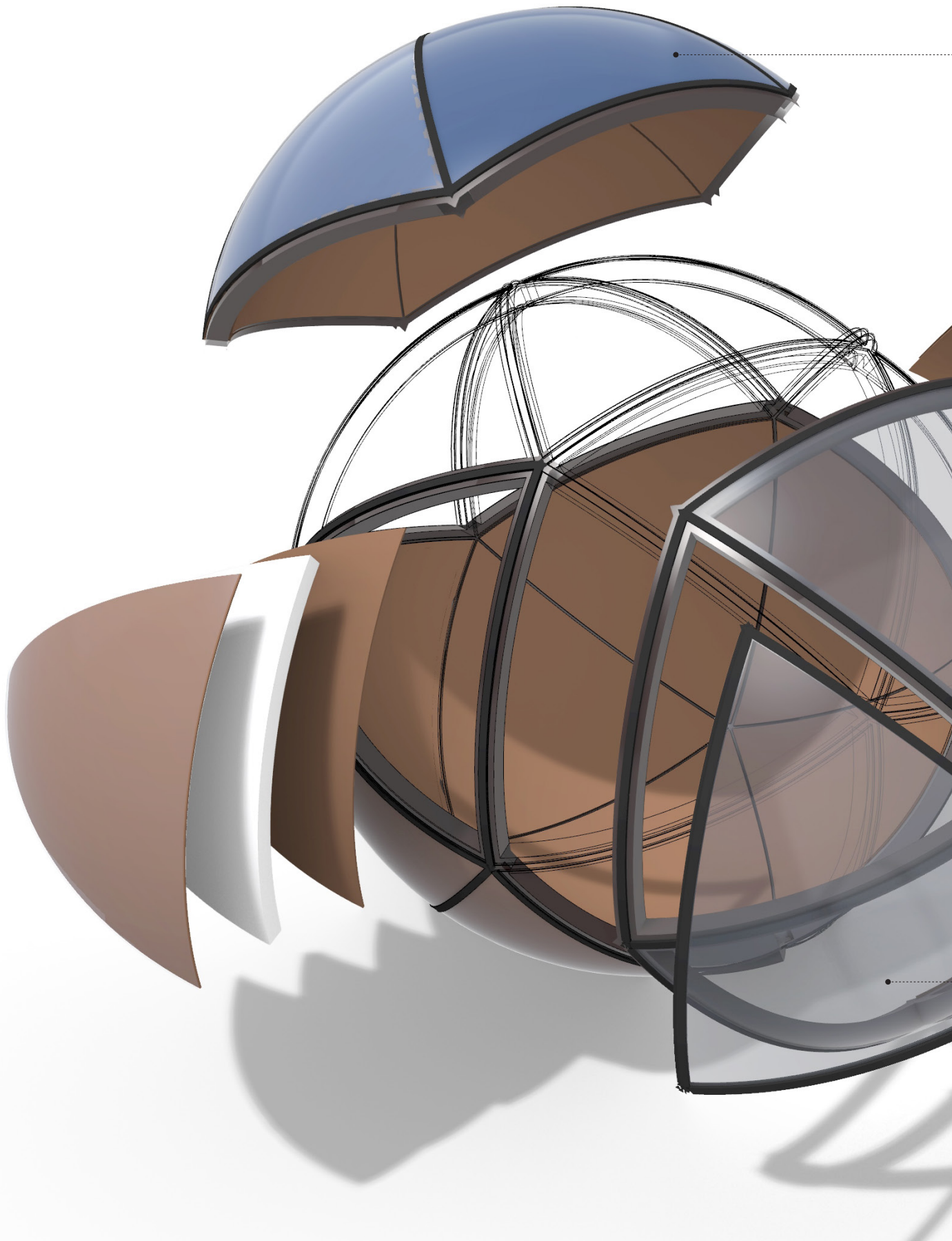


4.6



4.4

5.6 EXPLODED 3D MODEL



Solar Panels

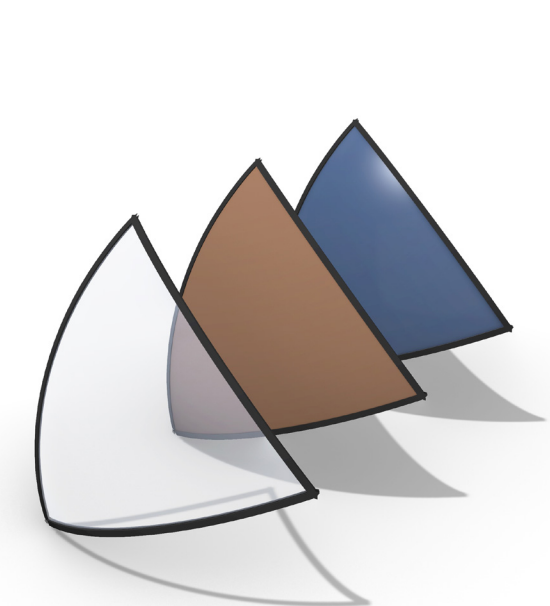
Aiding to the self-efficiency of the capsule as well as provide shadow.

Arced beams

The dome is made out of 30 identical arced beams.

Isolation

The gap between the external and internal panels is filled with isolation

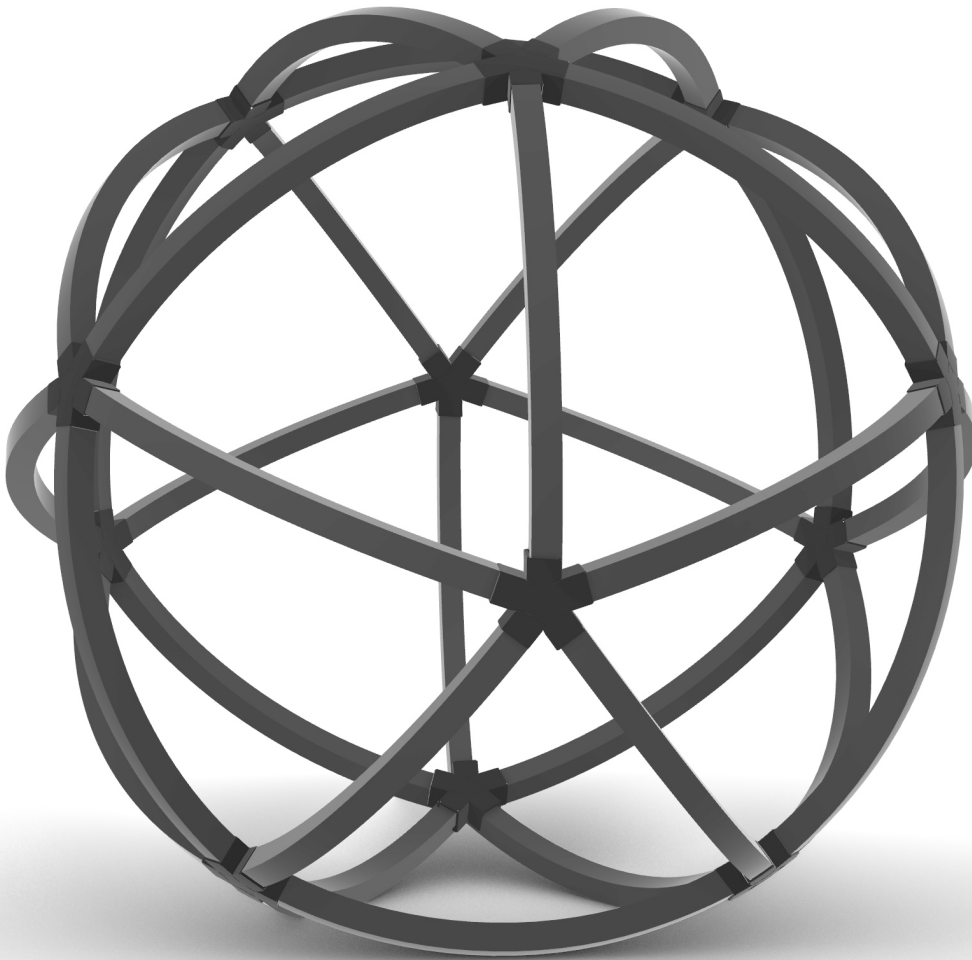


Panles

The dome is made out of 20 external and 15 internal identical arced panels.

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5.7.1 STRUCTURE

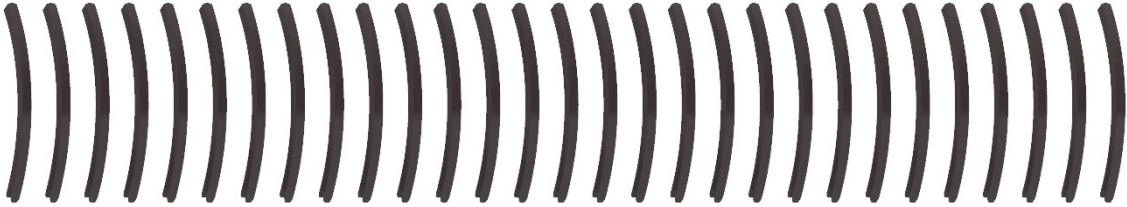


The final structure looks very simple at first but it is not. It is made of two main parts, the arced beams and the star joints. Their composition creates arced triangles which are then connected to each other through the principals of the Geodesic dome. There is a total of 20 panels which are symmetrically distributed but the usual two or three dimensional symmetry does not apply here. Instead, a spherical three dimensional symmetry is created.

5.7.2 MAIN PARTS NEEDED TO ASSAMBLE THE STRUCTURE

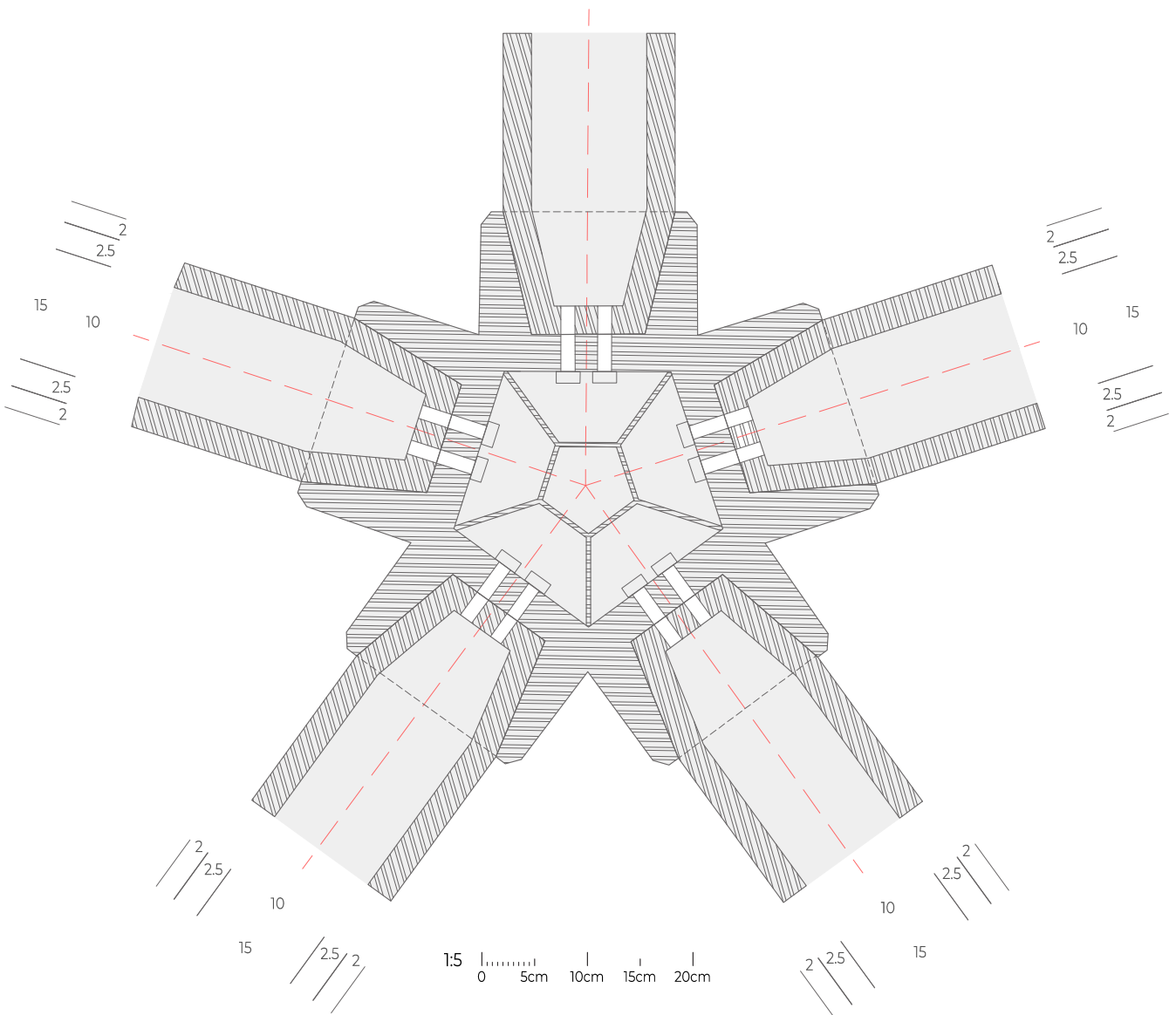


12x star joints

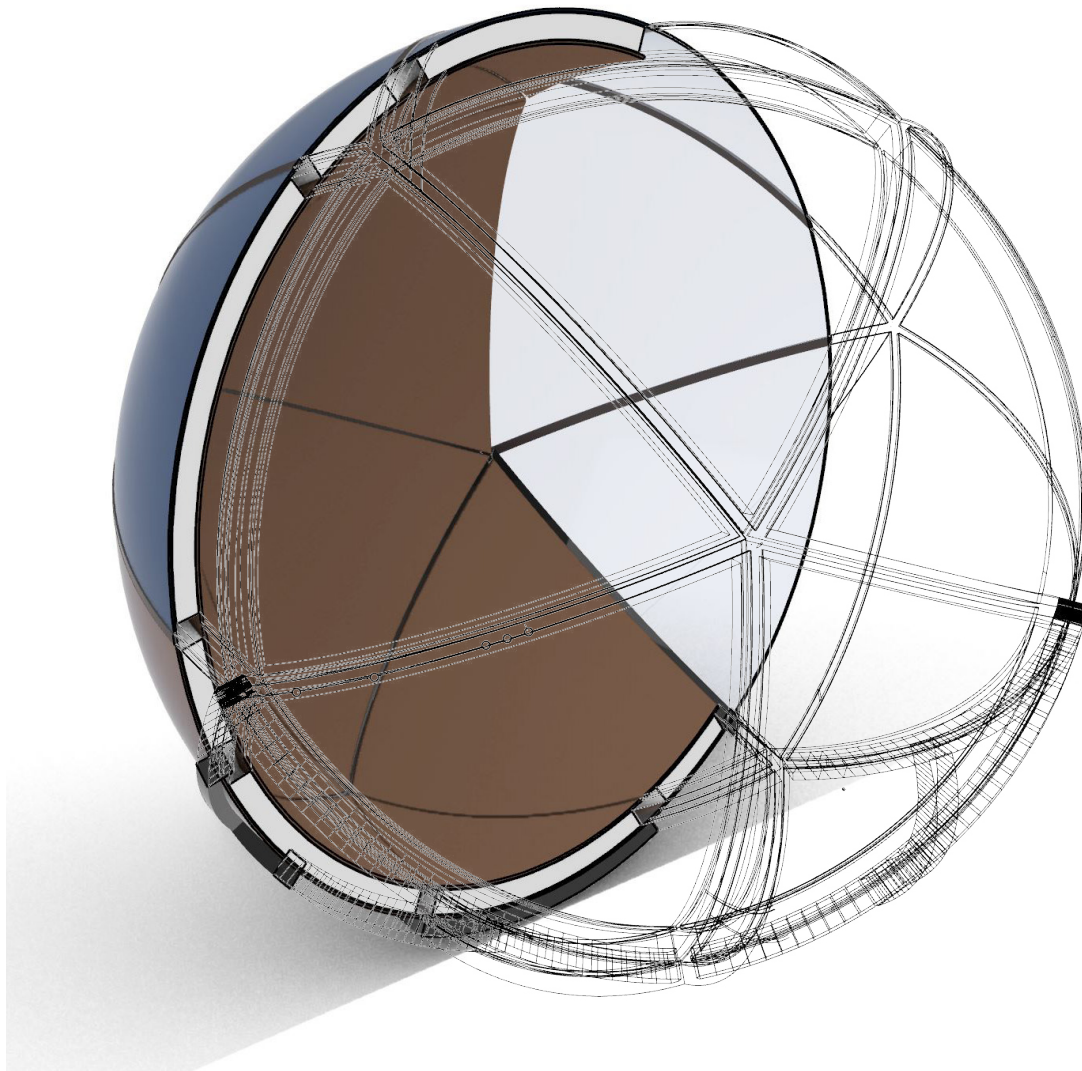


30x arced beams

5.7.3 STRUCTUARAL DETAIL



5.8.1 FACADE



The most interesting fact about the façade of the capsule is that there is no wall, ceiling or roof but only one façade made out of three geometrically identical panels.

The façade is made out of 20 outer and 15 inner panels. All the panels are identical to one another and that creates the possibility for cost effective manufacturing. The façade of the capsule mimics simple and standard flat facades

5.8.2 EXPLOSION OF ONE UNIT

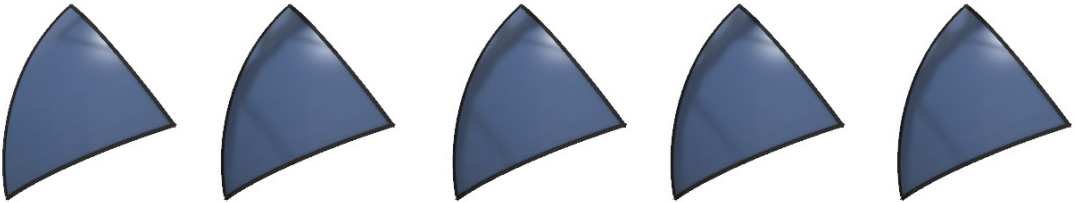
This explosion shows the order of the components needed to assemble the façade. In this case both the inner and the outer panels are made out of wood



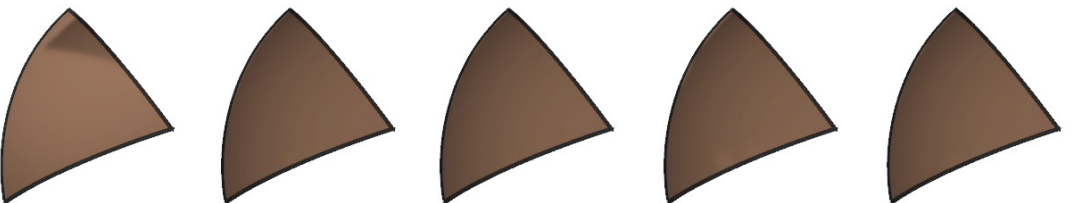
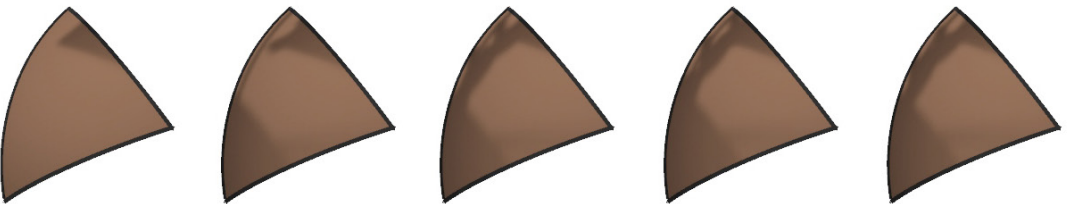
5.8.3 THE UNITS REQUIRED TO ASSAMBLE THE FACADE



5x glass panels

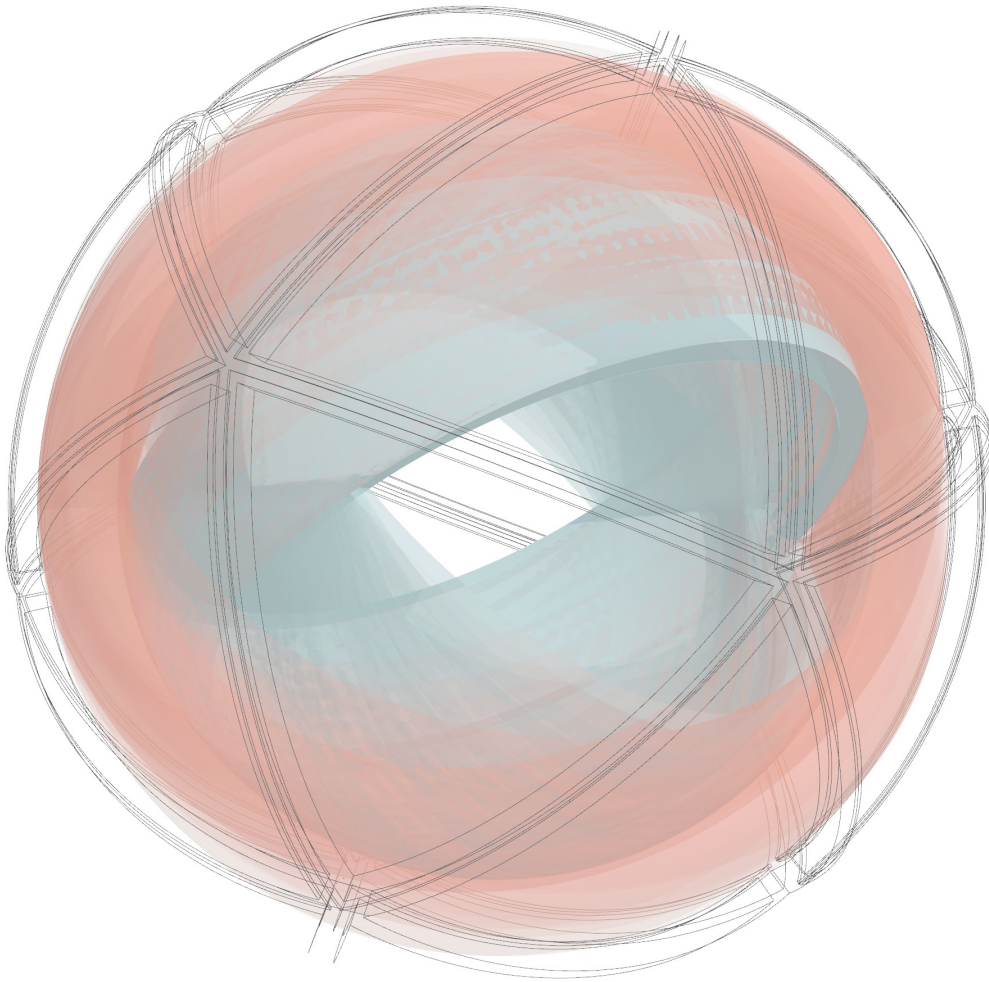


5x solar panels



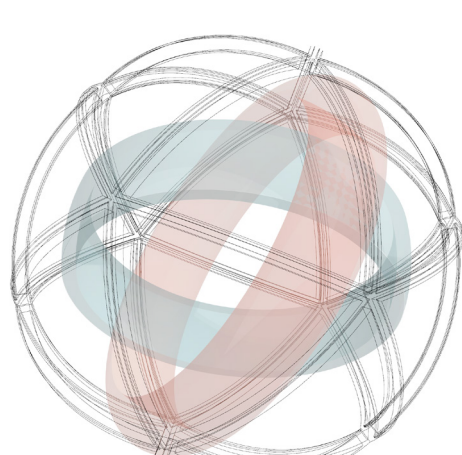
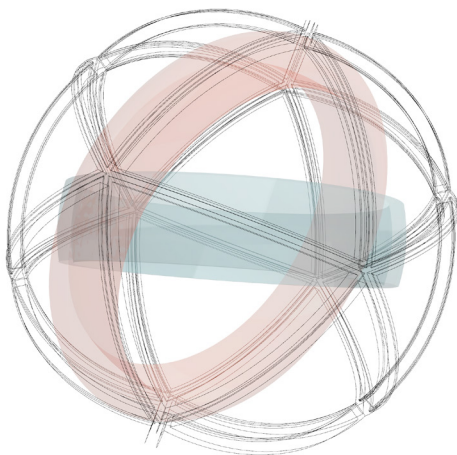
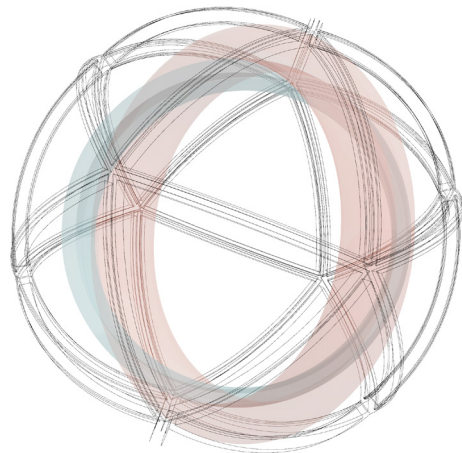
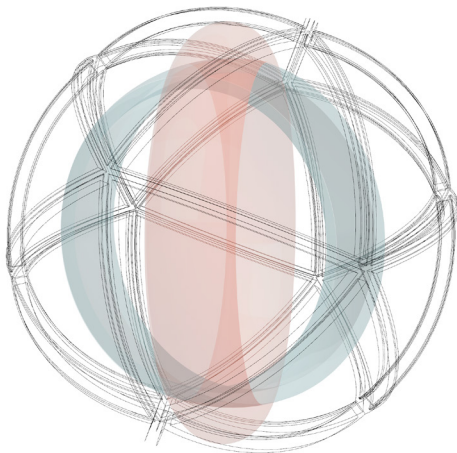
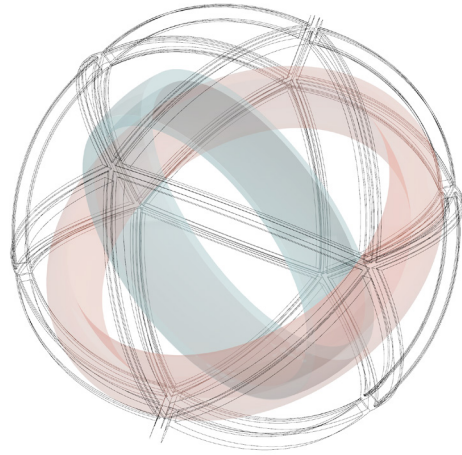
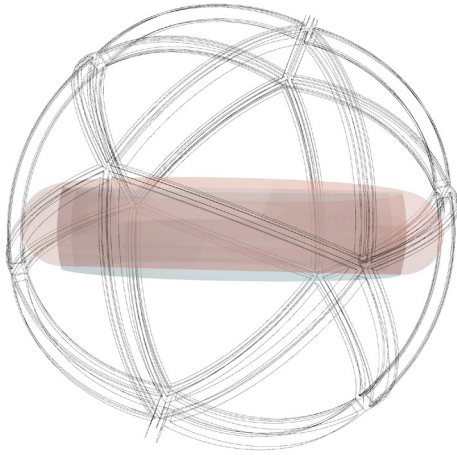
10x wooden panels

5.9.1 INTERIOR CONCEPT



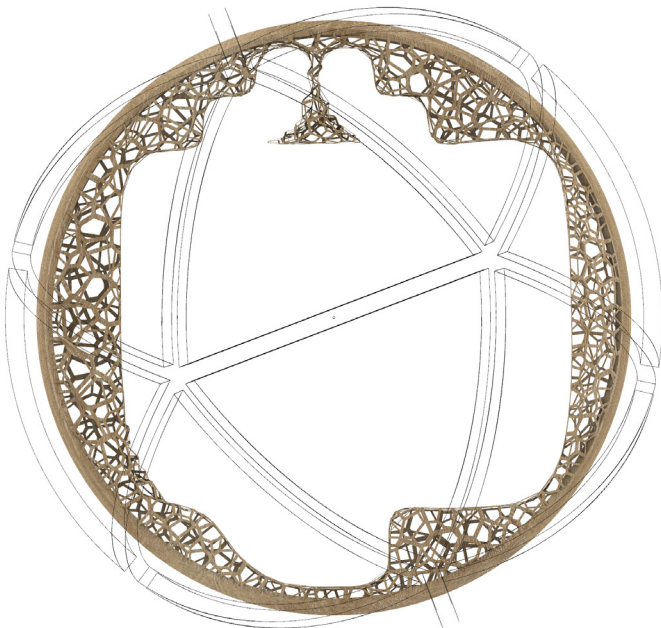
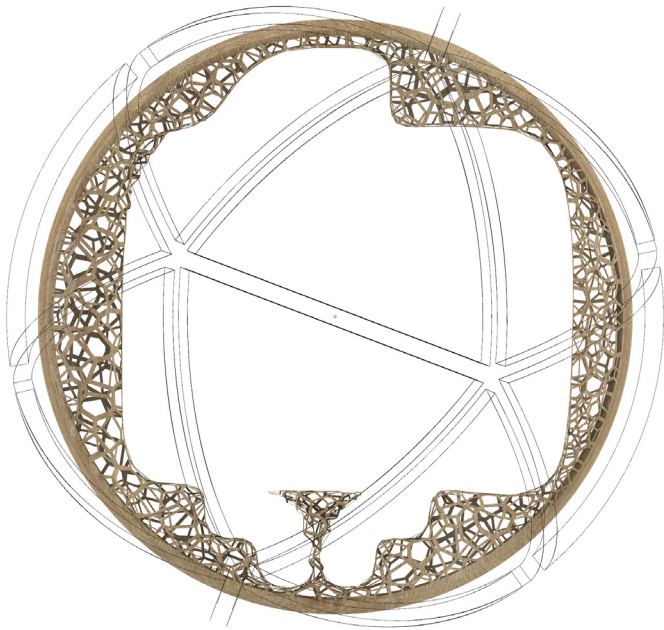
The interior of the capsule is made out of two donut shapes which rotate inside the sphere and inside each other. These two shapes can rotate in every possible direction and that is a quality unique to the sphere. Each of this “donuts” contains three to four functions around it. Benefits of this very high flexibility have to do with space efficiency. By being able to push a function away and bring the other one at the same position makes it possible for the inhabitant to make use of the sphere as a whole.

5.9.2 MAIN DONAT POSITONS



5.9.3 INFRASTRUCTURE

The interior of "Lonely Architecture" takes full advantage of the sphere. It can be rotated 360 degrees in the X, Y, Z axis. This would be possible through a detail that could be installed in the structure.



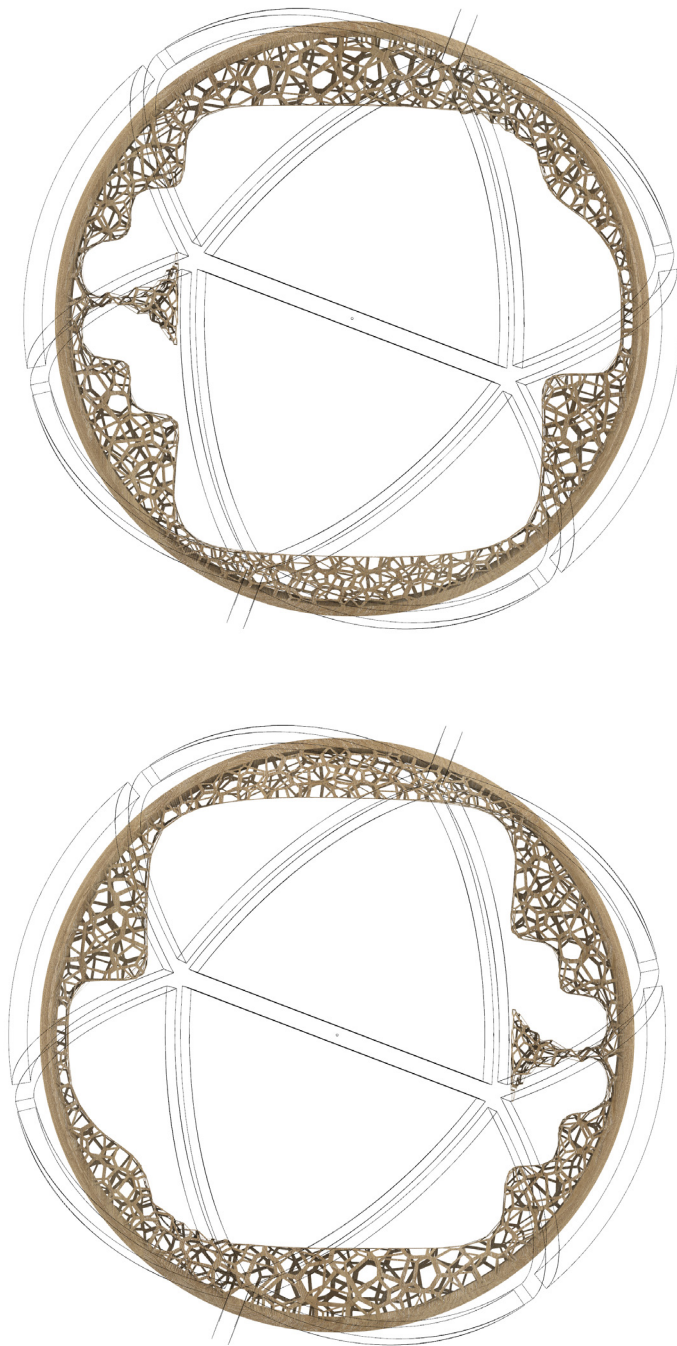
EATING ROOM

When the donut is rotated in this direction, it creates the possibility to sit on a table. This is a very basic necessity which can be used in so many different ways.

TOILETTE

The toilette set up is a very simple one. On the left is the shower and right next to it is the FOLDABE WC and the sink.

Both the eating and the sleeping room can be used while the donut is rotating. This effect adds on to the 360-degree panoramic view of the capsule.



SLEEPING ROOM

The sleeping room is the only wider part of the donut, creating a space where one can rest. Under the bed surface there is enough space for some drawers.

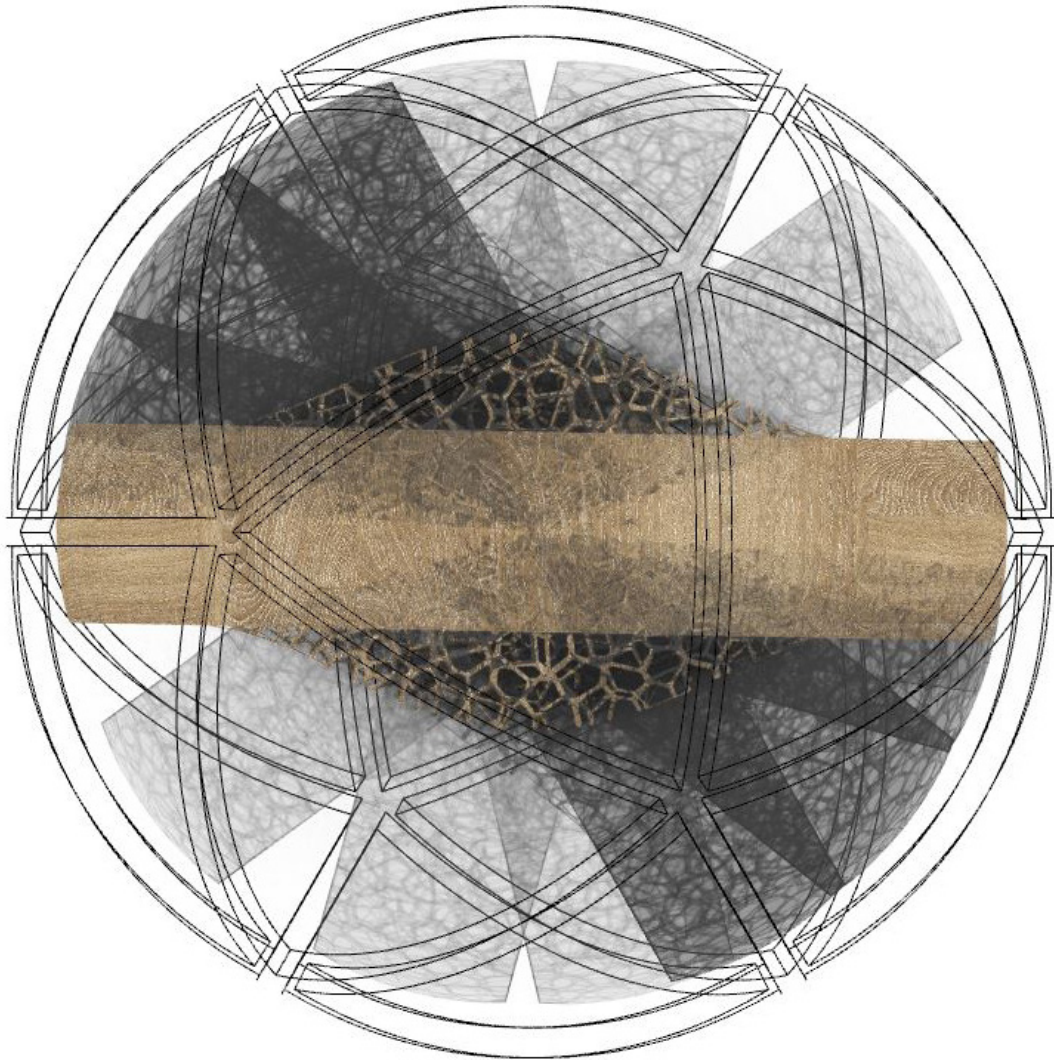
KITCHEN

The kitchen is made out of a singular straight and simple bar. The space under it will be used for a small refrigerator, an oven and storage. The kitchen can be accessed from both sides if all three doors are open.

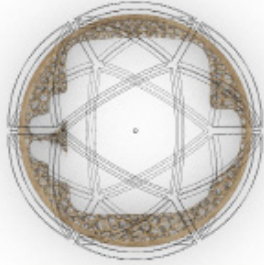
5.9.3 INFRASTRUCTURE

There is no right, top, left or bottom view in the capsule. Every direction is could be the same. Not only that the capsule is flexible as it is mobile but its interior can adjust to every possible scenario.

It is also possible to move the furniture away and have the ground completely free of everything.



TOP VIEW



PERSPECTIVE



SIDE VIEW



FRONT VIEW



TOP VIEW



PERSPECTIVE



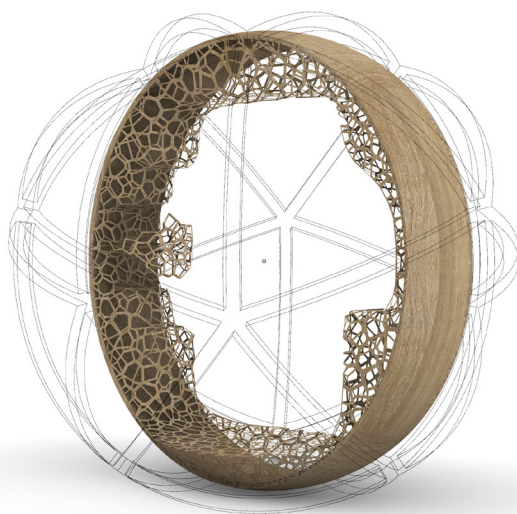
SIDE VIEW



FRONT VIEW



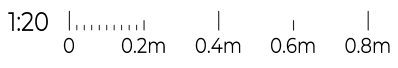
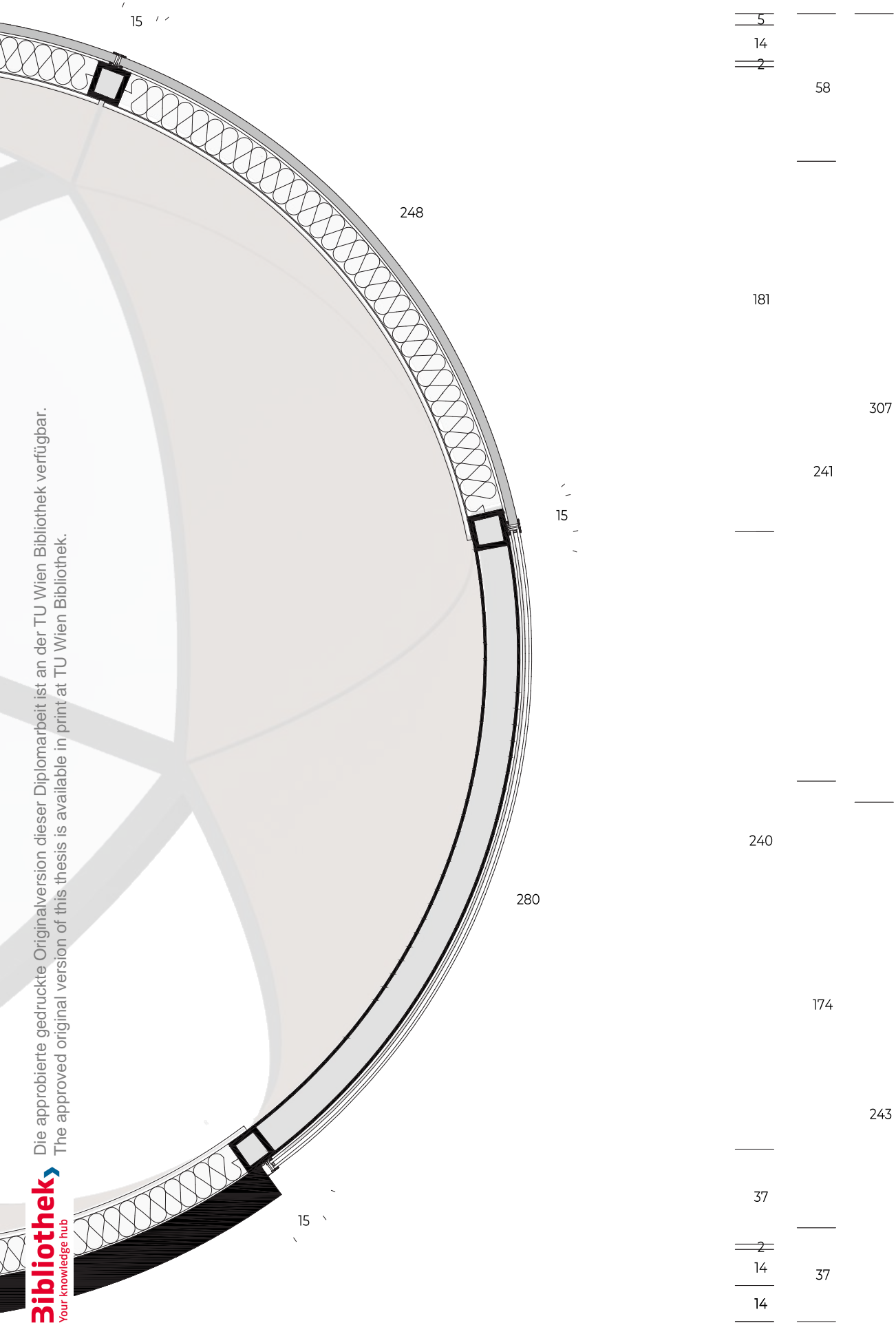




5.10 DETAILED SECTION M 1:20



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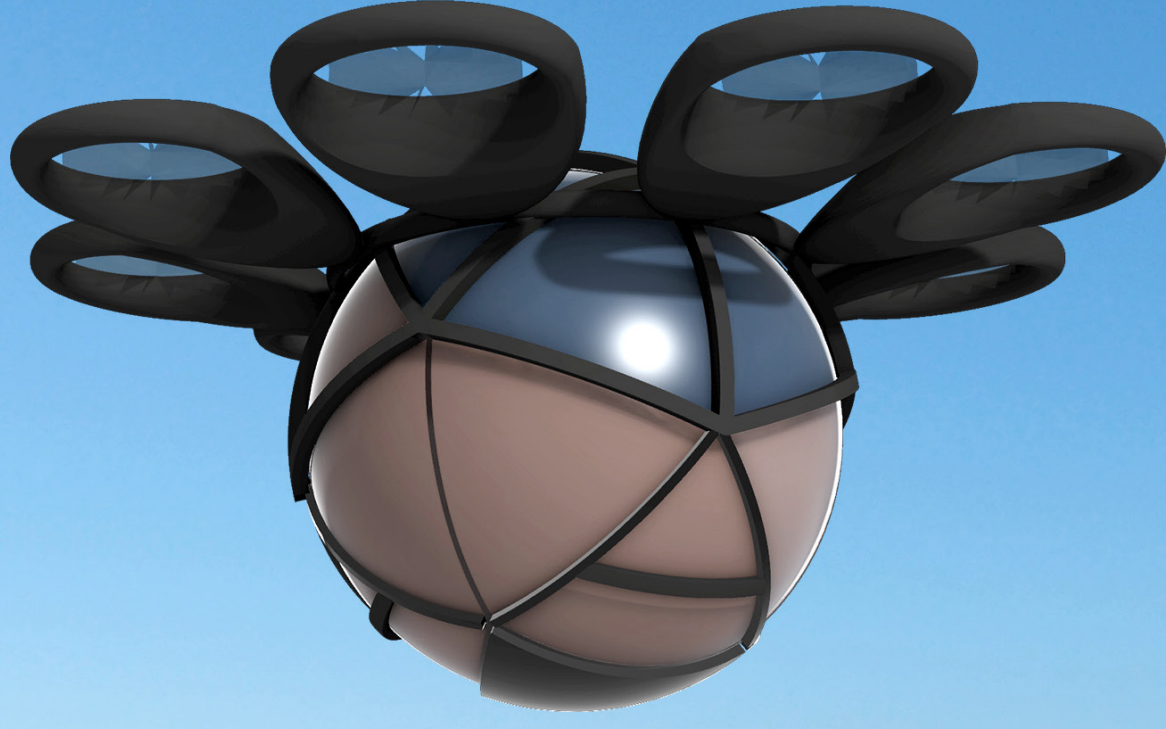
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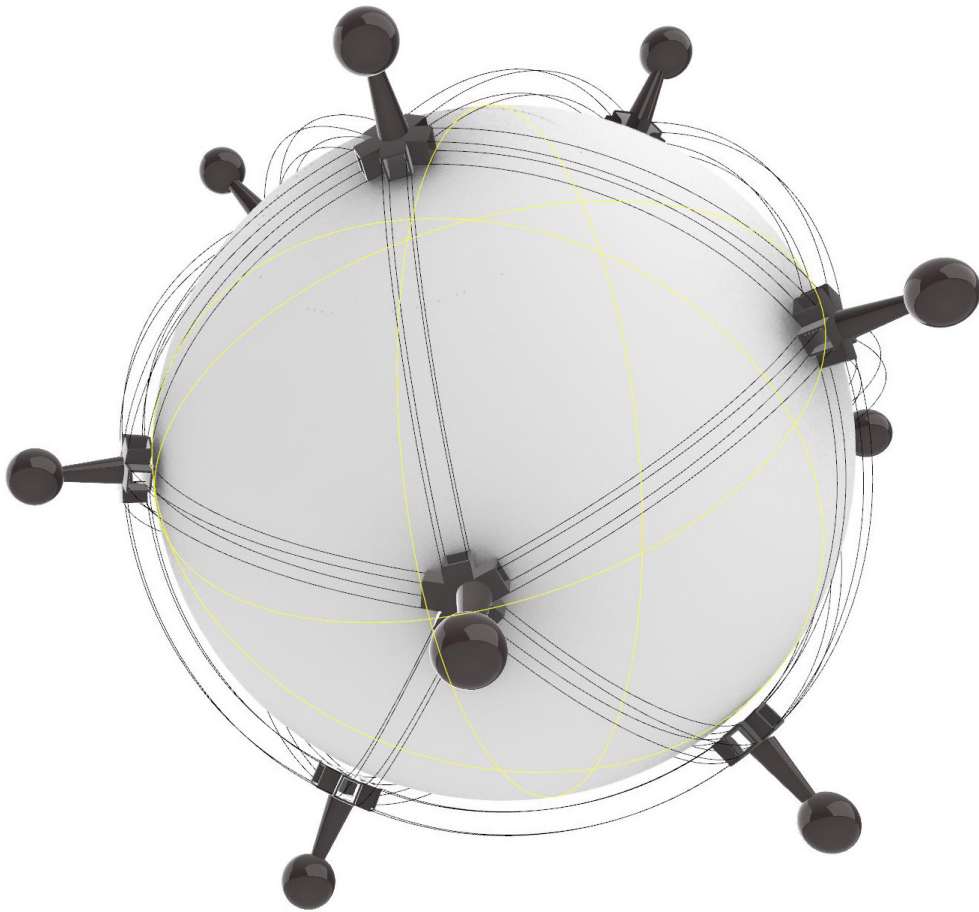


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Capsule 002 was created in an unrealistic moment, during the spread of COVID-19 all over the world. While humanity is destroying Earth, the consequences are obvious. Since “Lonely Architecture” was born out of the dream of a better future for humanity and Earth, I created the completely surrealistic version of the capsule aiming to provoke some meaningful debate on how architects perceive the future.

5.2 Pandemic

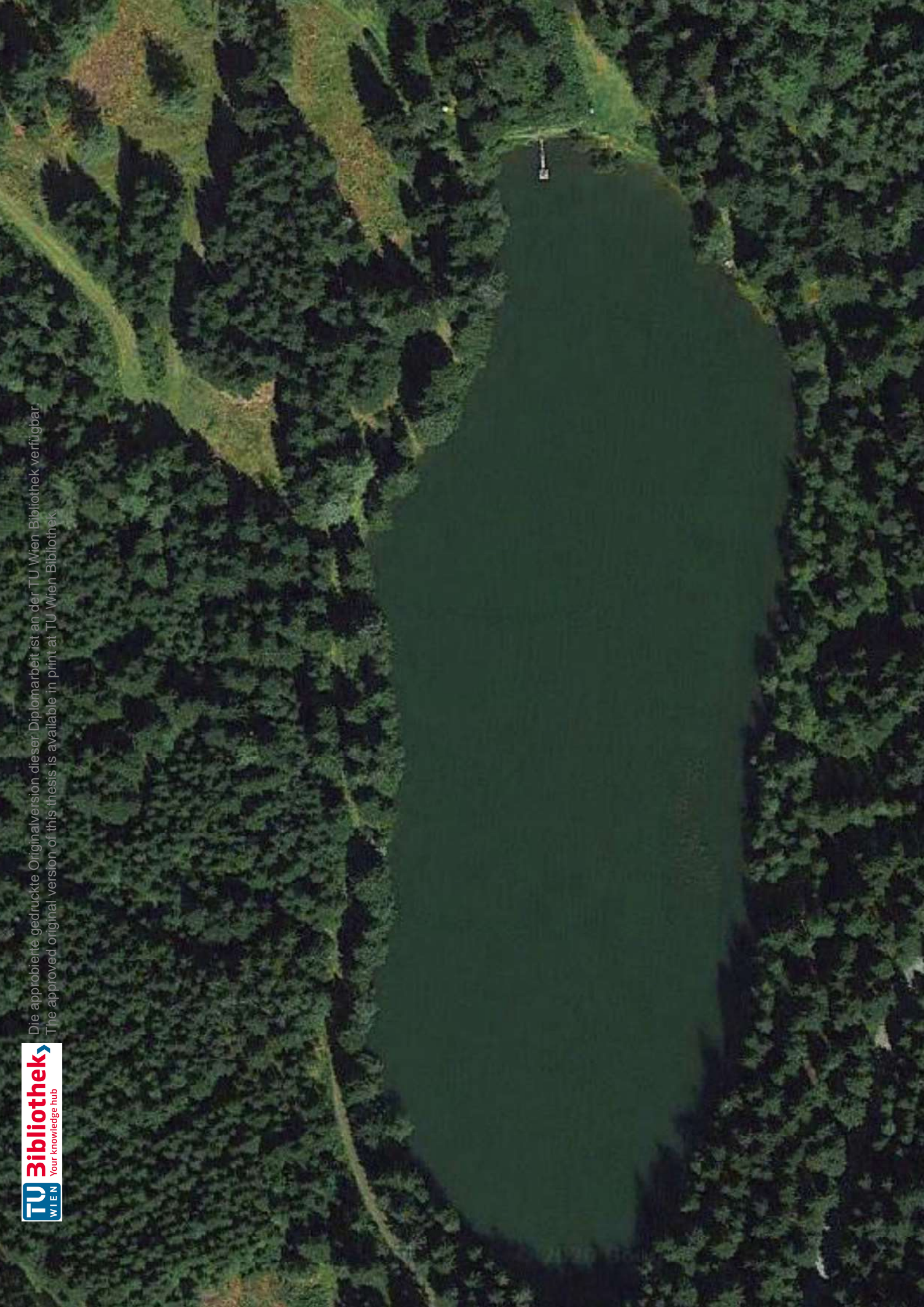
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5.1 SITE PLAN M 1:500



1:500
0 5m 10m 15m 20m

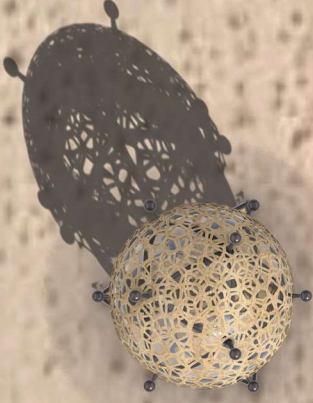
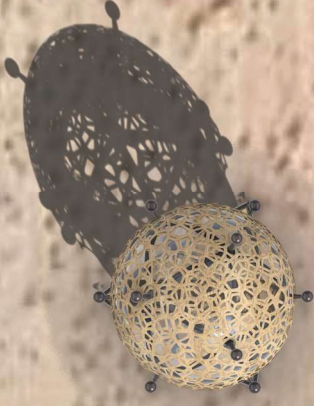
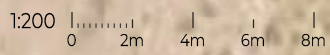




5.2 SITE PLAN M 1:200

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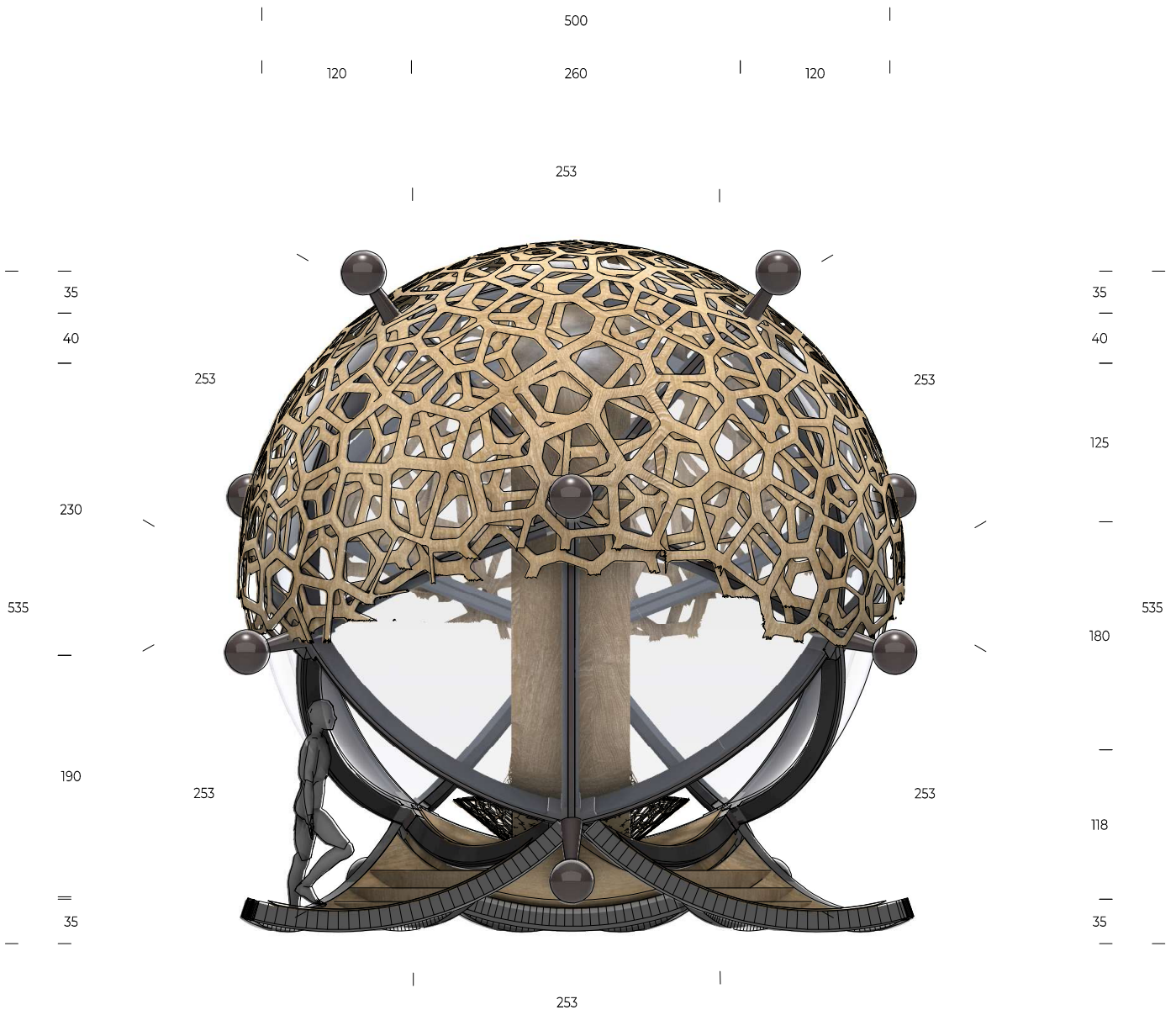
5.2.1 FRONT VIEW / FLYING



1:50 0 0.5m 1m 1.5m 2m



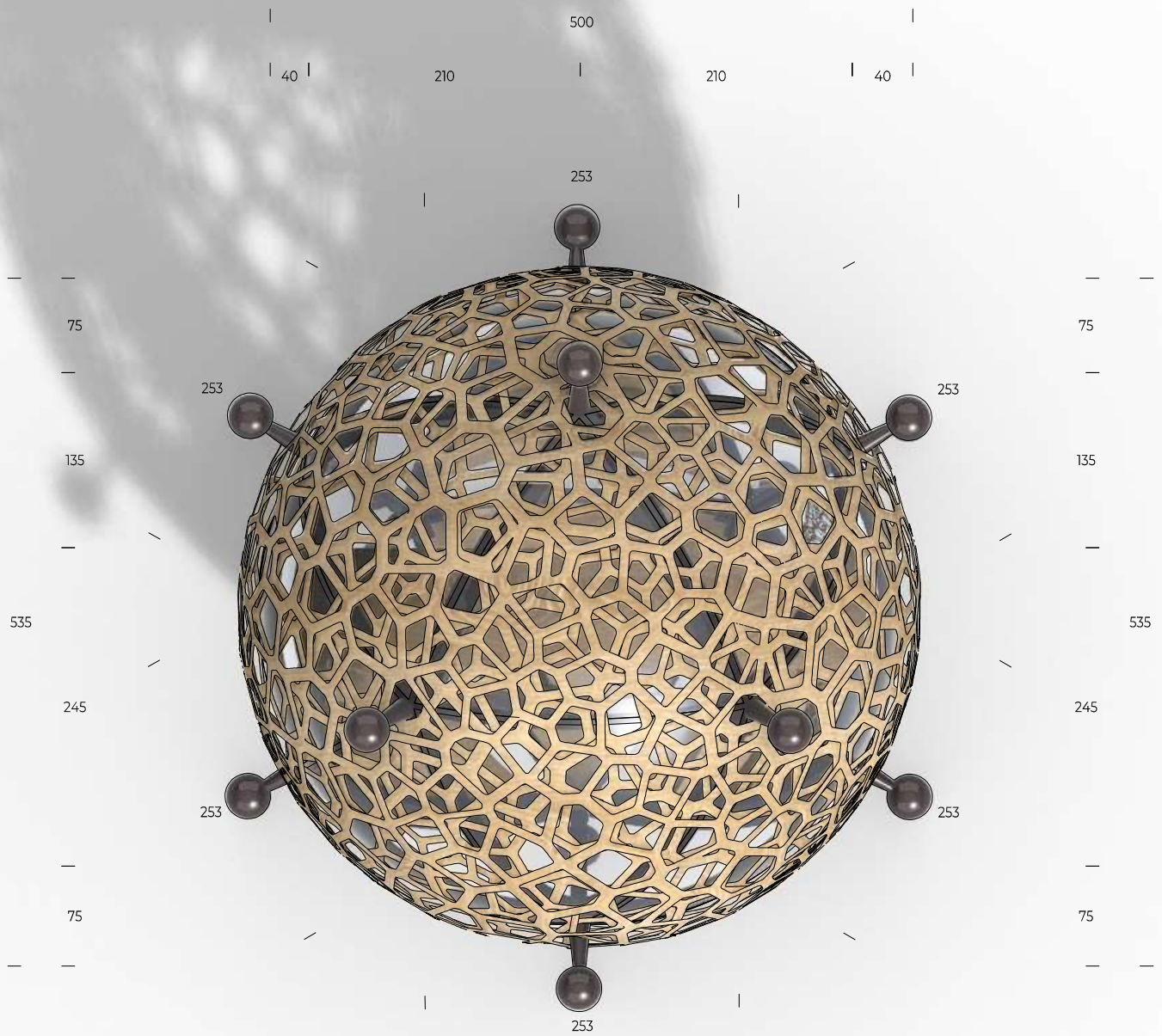
5.2.2 FRONT VIEW



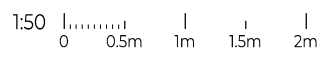
1:50 0 0.5m 1m 1.5m 2m



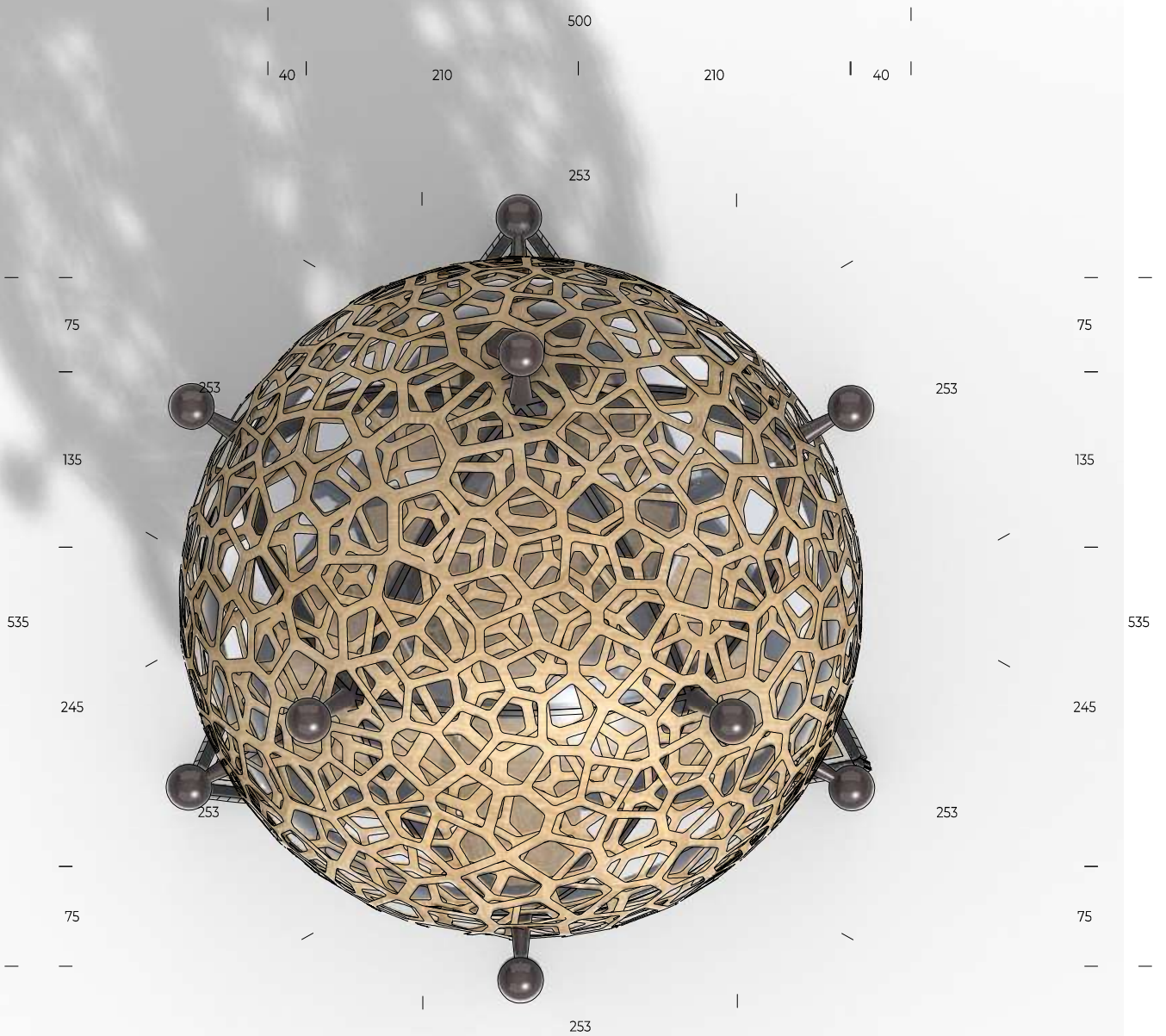
5.2.3 TOP VIEW / FLYING



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5.2.4 TOP VIEW

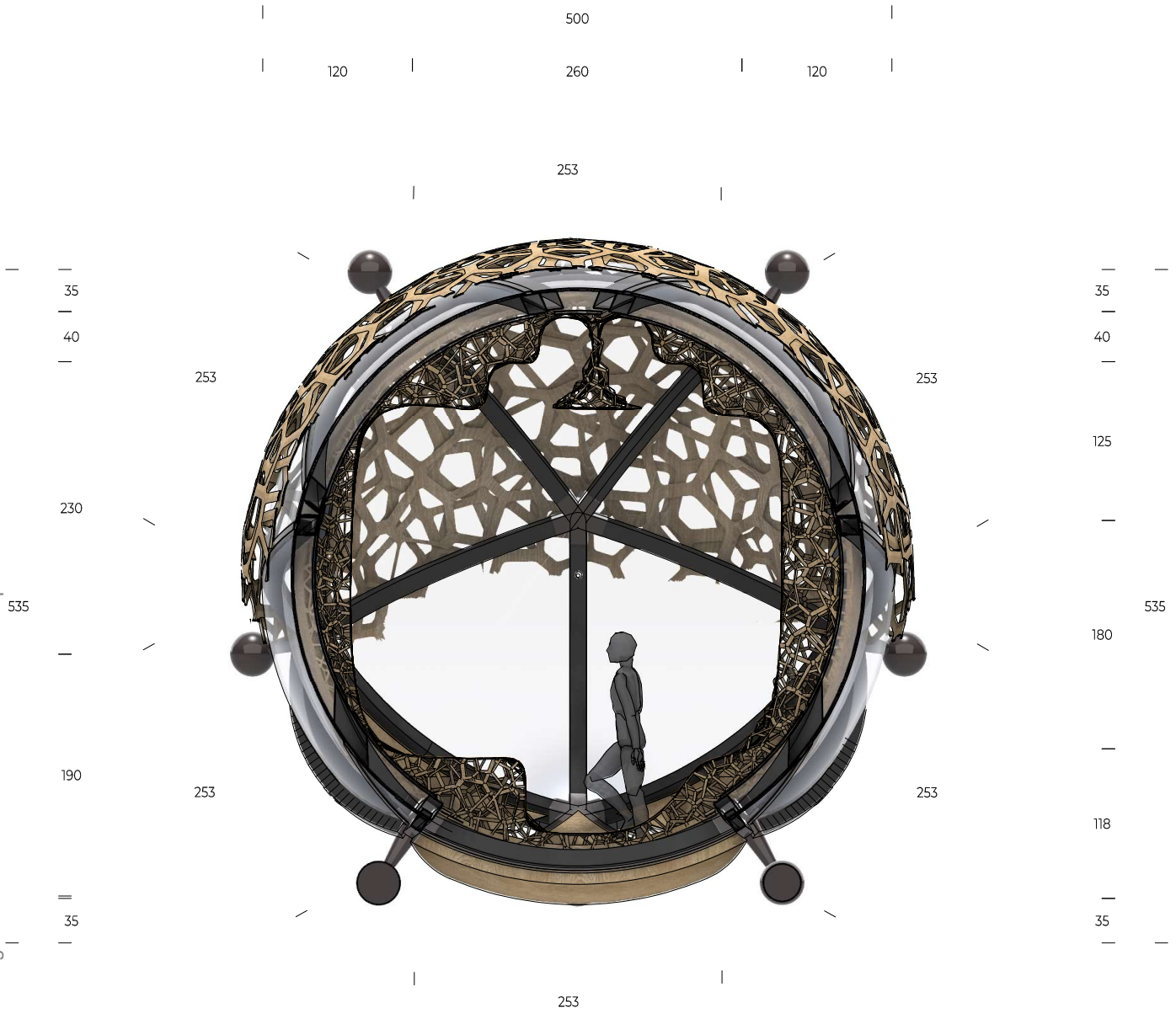


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0 0.5m 1m 1.5m 2m



5.2.5 FRONT SECTION / FLYING

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5.2.6 SIDE SECTION



5.2.7 BACK VIEW / FLYING



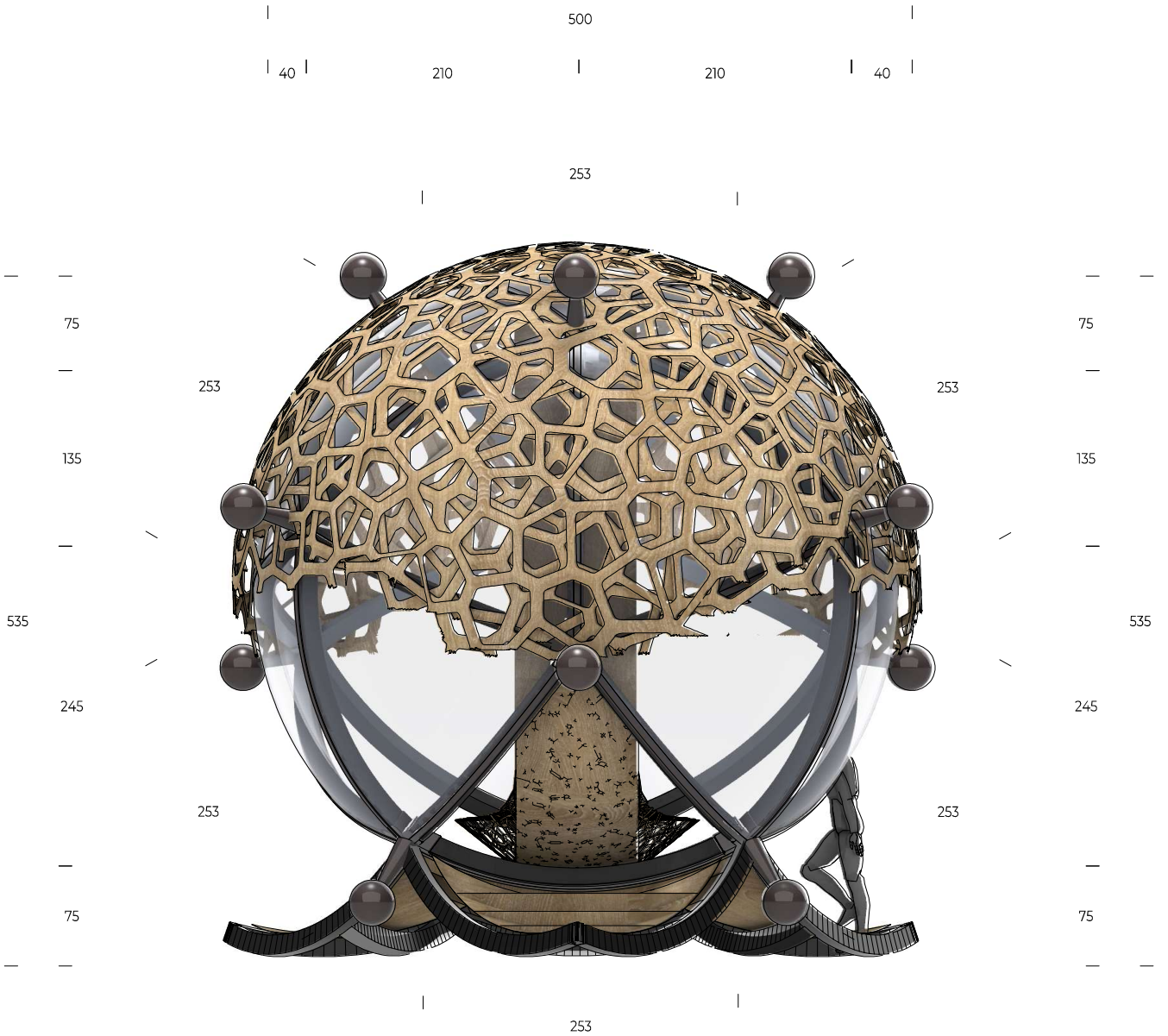
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5.2.8 BACK VIEW / FLYING

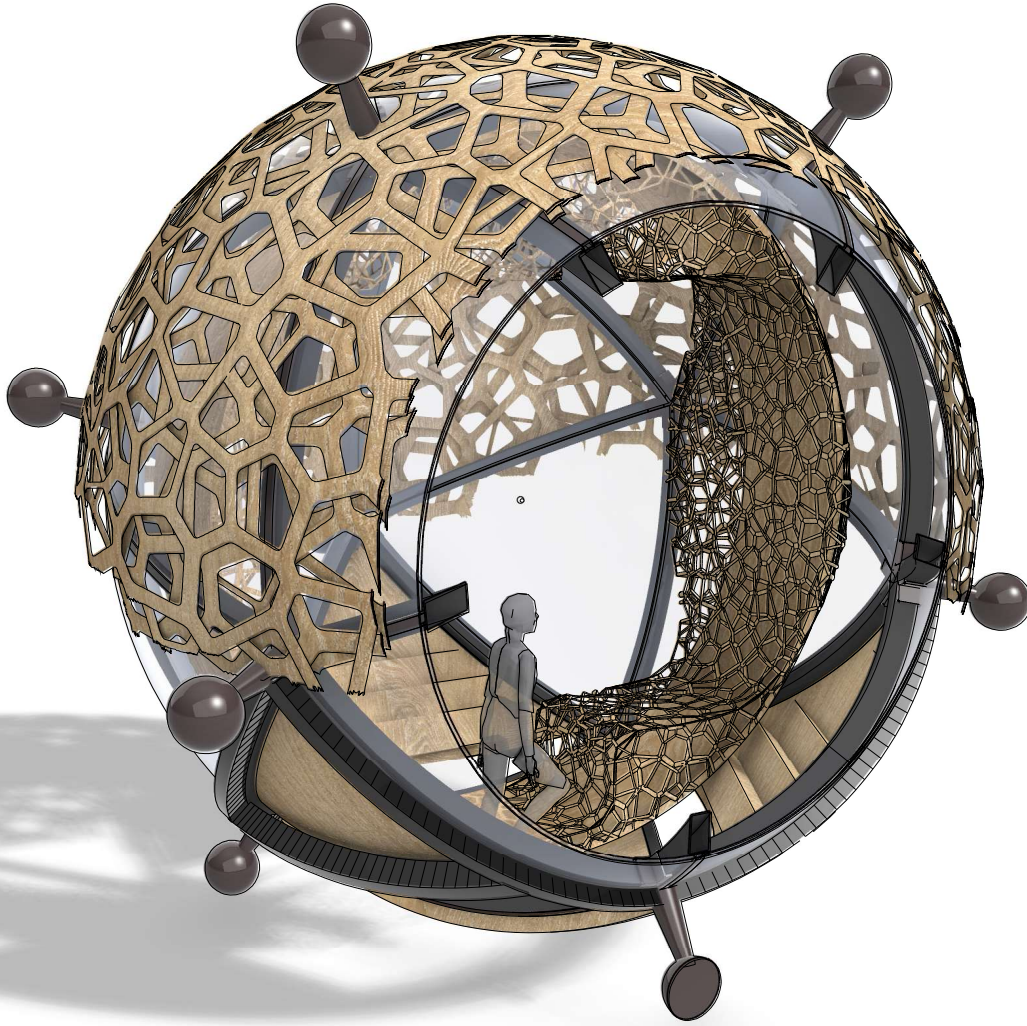
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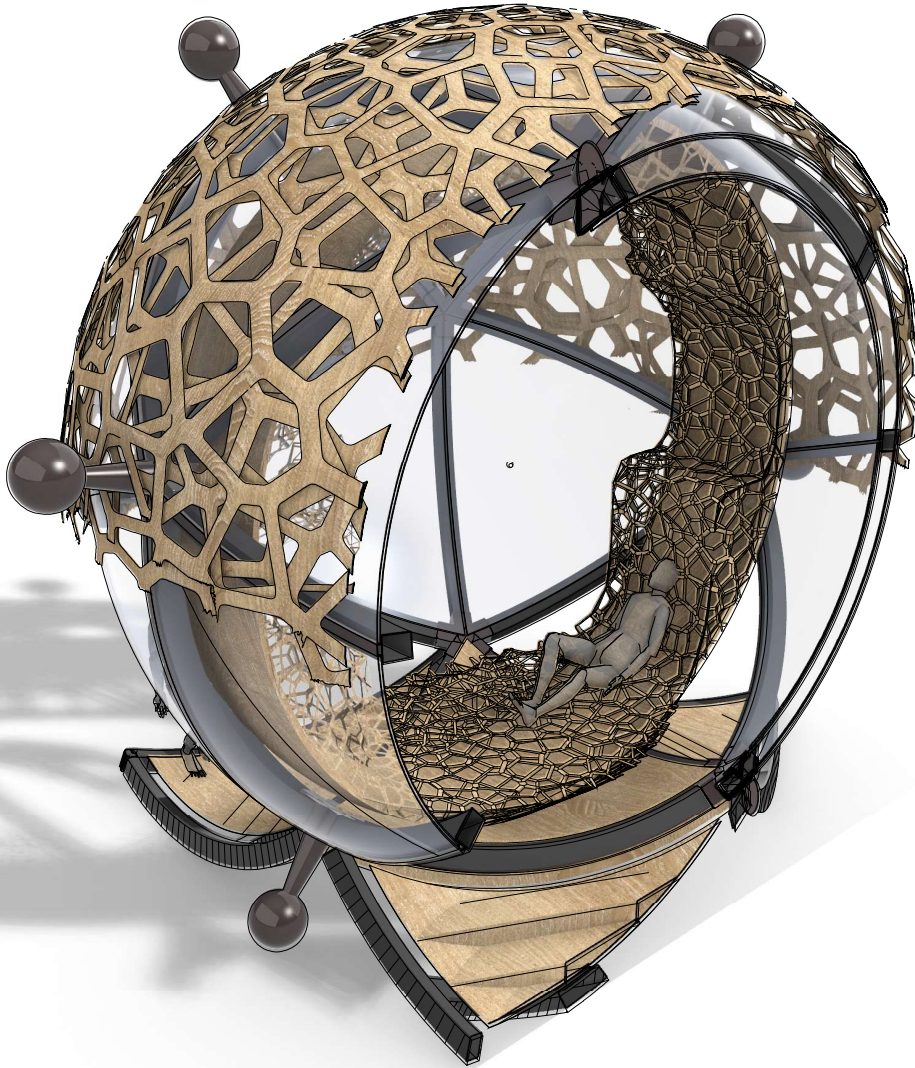
5.2.9 3D SECTION



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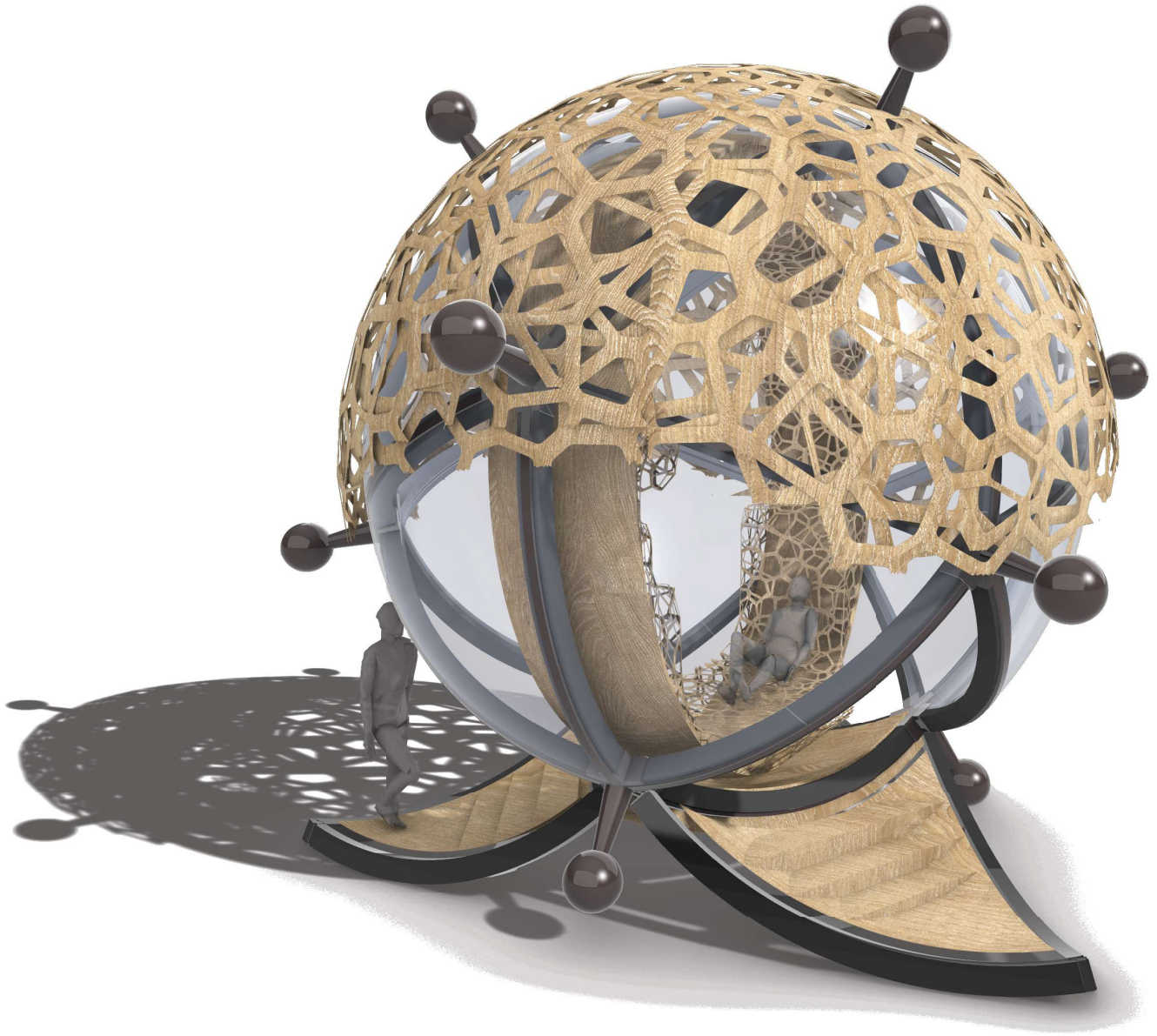
5.2.10 3D SECTION



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5.2.11 3D



5.2.12 3D





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The displayed design is a 3D model. The original version of this thesis is available in print at TU Wien Bibliothek.



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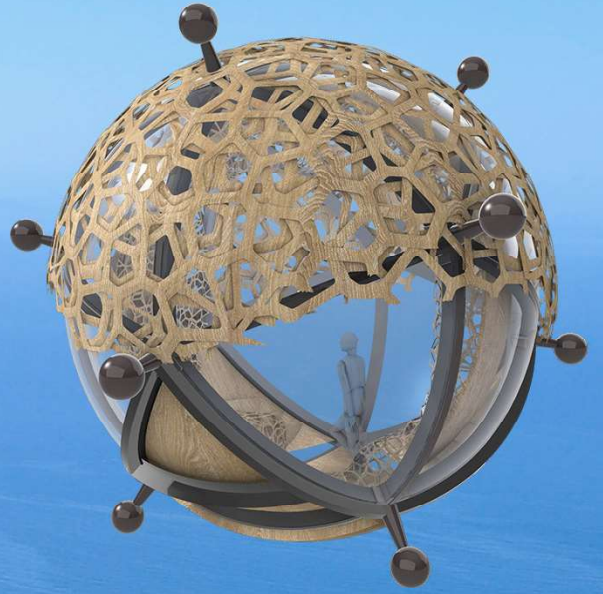
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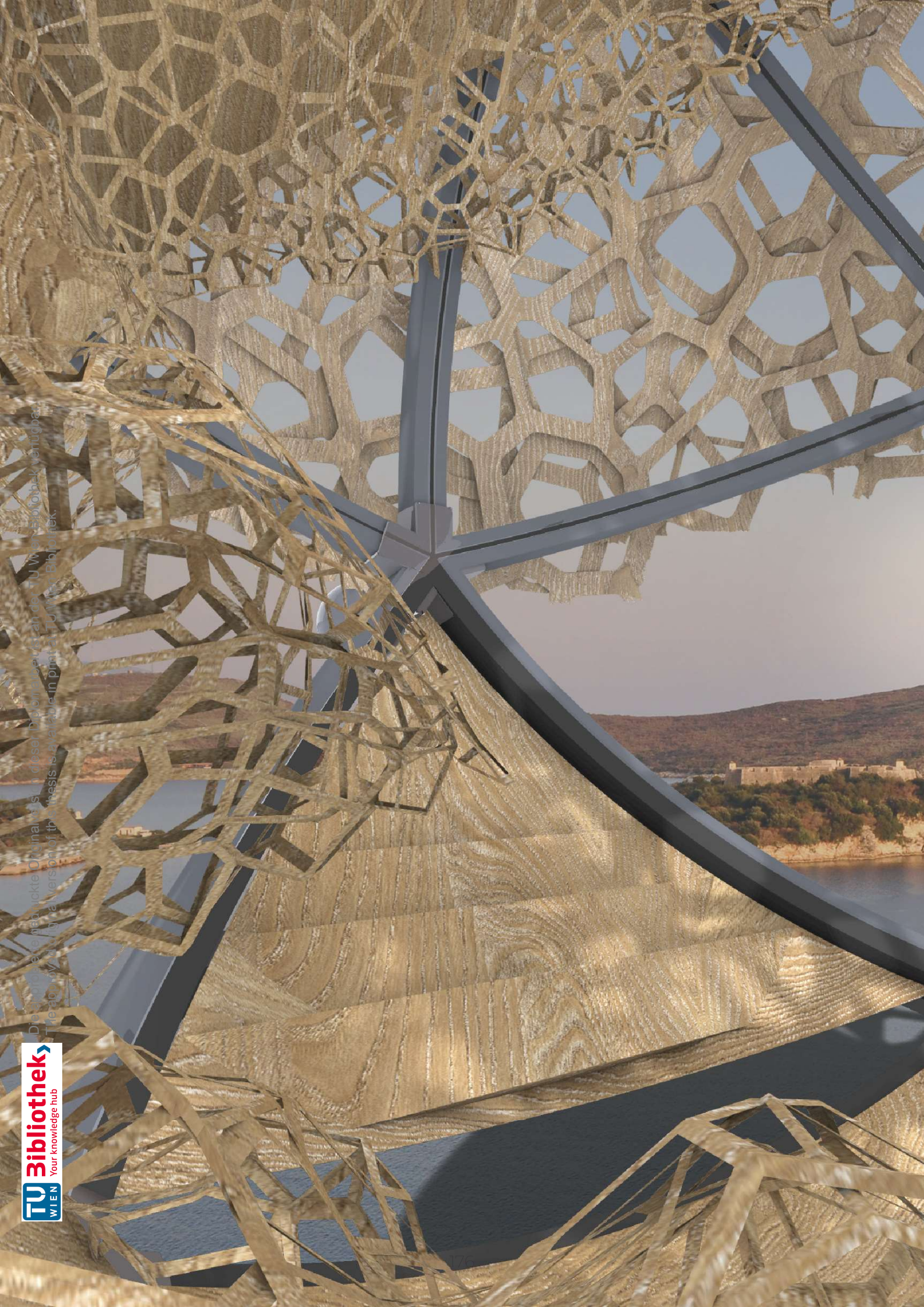


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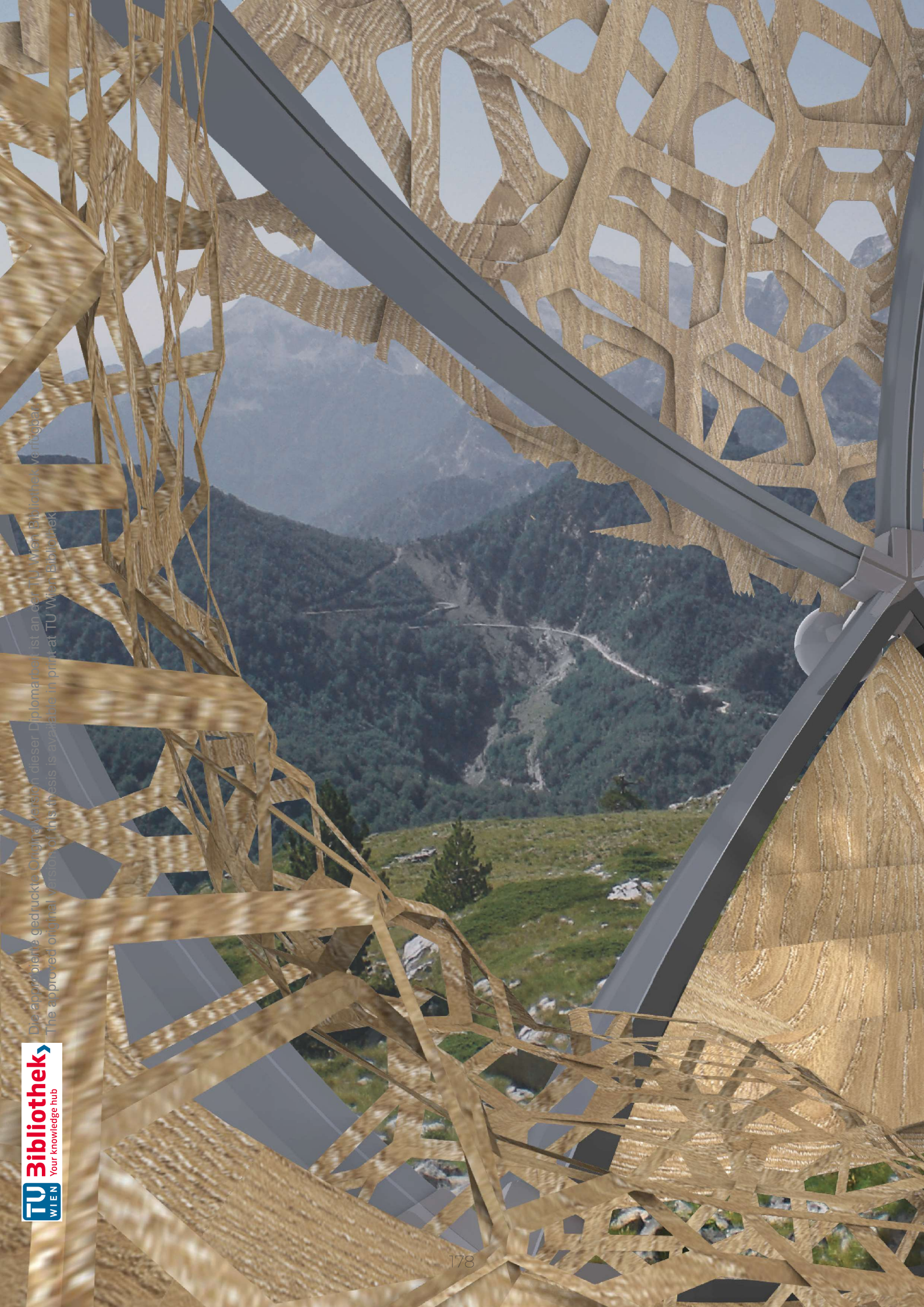






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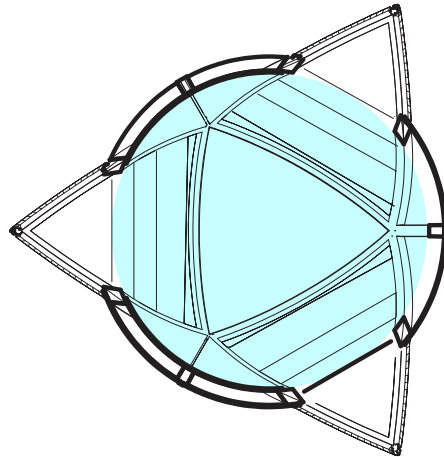
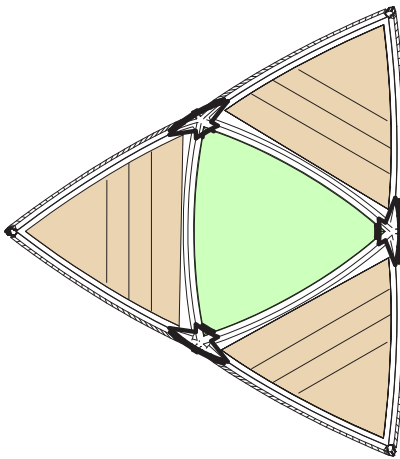
6. Ratings

How are the results of the project compared to other s in the
field of architecture?

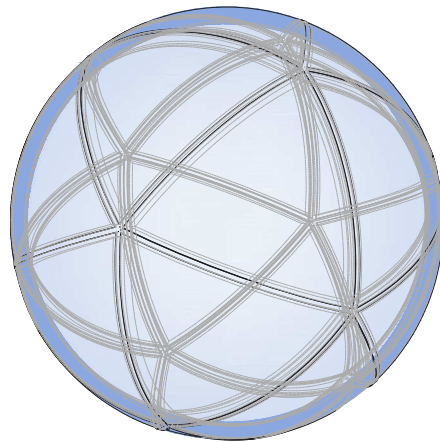
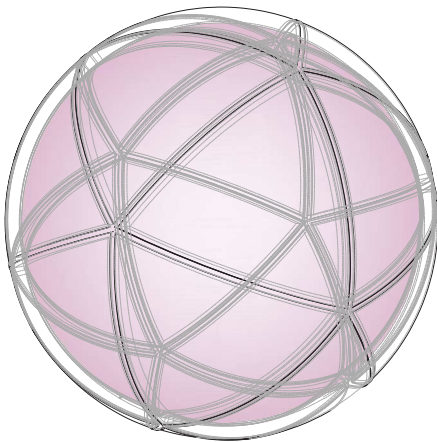
6.1 AREA PROOF AND CALCULATION

FBC	Parzelle	= $\infty \text{ m}^2$
FF	Freifläche	= $\infty \text{ m}^2$
BGF	Buttgrundfläche	= 9.5 m^2
NF	Nutzfläche	= 3.1 m^2

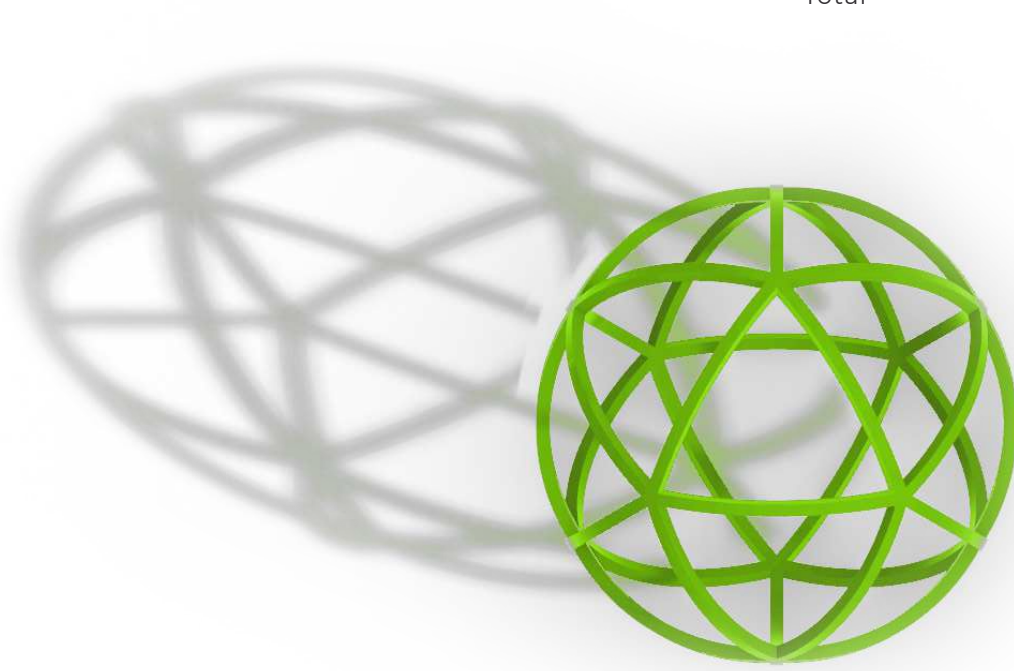
VF	Verkehrsfläche	= 6.4 m^2
TF	Technische funktionsfläche	= 0 m^2
KF	Konstruktionsfläche	= 5.7 m^2



BRI	Brutto - Rauminhalt	= 65.4 m^3
NRI	Netto - Rauminhalt	= 51 m^3
KRI	Konstruktions-Rauminhalt	= 4.4 m^3
KRIT	Konstruktions-Rauminhalt T	= 1.7 m^3
KRIN	Konstruktions-Rauminhalt NT	= 2.7 m^3



Konstruktion aus AL Profil 0,15mx0,15m und 0,03m Stärke	= $0.62 \text{ m}^3 \times 2710 \text{ kg/m}^3$	= 1680 kg
WD glasswolle	= $2,7\text{m}^3 \times 0,7$ (80% von KRIN) $\times 50 \text{ kg/m}^3$	= 94 kg
Holz panele Eiche	= $2.7\text{m}^3 \times 0.2$ (20% der KRIN) $\times 670 \text{ kg/m}^3$	= 361 kg
Glas panele	= $2.7\text{m}^3 \times 0.1$ (10% der KRIN) $\times 6260 \text{ kg/m}^3$	= 1690kg
Innenraum/ Möbel		= _____
	Total	= 3825 kg



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7. Summary

Conclusions and remarks for future development

7.1 CONCLUSION

Working on Lonely Architecture required an intensive analysis of Albania while its qualities and potentials inspired the its development. The first crucial moment was during the first presentation where Prof Arch DI Dr Manfred Berthold suggested that I developed an idea which I had sketched just for fun. At that time the idea of a flying module seemed completely unrealistic to me but as the last project at the TUWIEN I decided that I give it a try.

During the early design phase, while I was looking for a meaningful structure for the sphere, I encountered the work of Buckminster Fuller. After researching his work, I realized once again that the idea of flying architecture has been developed by many architects in the past. The only difference is that nowadays it is not much of a utopia anymore.

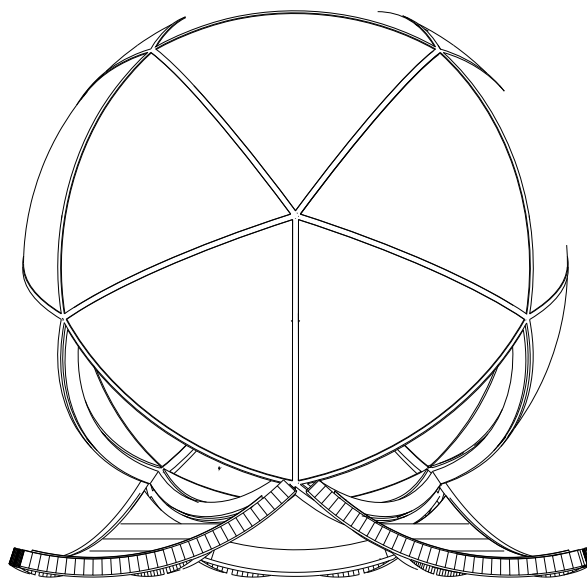
Implementing the Geodesic structure to the spherical shape helped me better

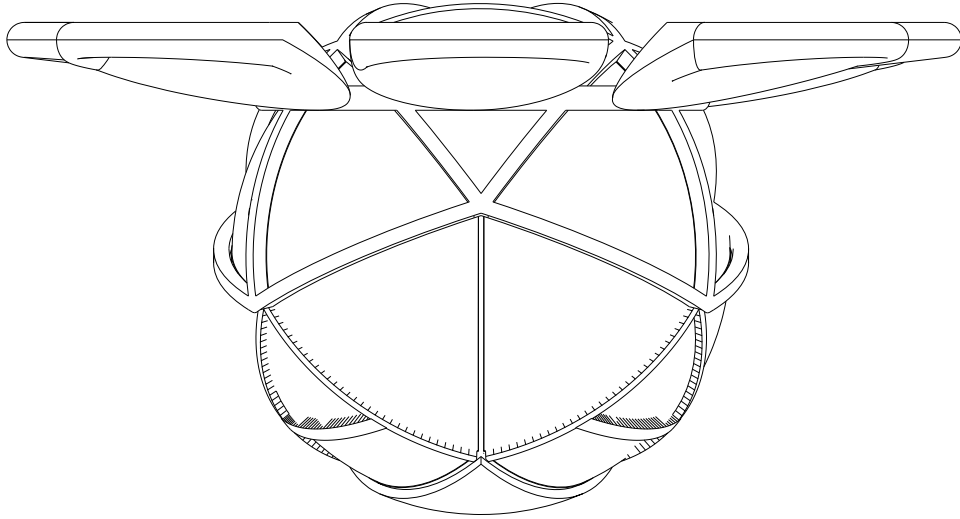
understand the genius behind Fullers work. The sphere started to reveal its advantages as a basic geometrical shape but the full extent of that remained unclear until the day before the deadline when I worked on the calculations and conclusions.

Solving the façade of the capsule was difficult only because of the geometry. The same façade would be a standard one if it was flat. The technology at the moment can anyway easily manufacture the elements used for it.

Because both the structure as well as the façade are made out of a few identical elements, the cost of production of the spherical and arced parts is reduced to a minimum. This is happened naturally because of the spherical geometry and the Geodesic structure.

It has been very difficult for me to separate the façade from the furniture one the inside.





Looking back to the process I should have taken that step much earlier. I was looking to create an interior that was a logical extension of the façade and the structure but late in the design phase realized that these are completely different from one another and that the interior needed to be seen as a separate concept.

Working with the sphere was extremely difficult because of the very strong three dimensional symmetries that characterize the sphere, as well as its arced form. Most of the CAD Software are built to work with straight lines. Lately, the development of CAD software made to work with three dimensional free form, has rapidly advanced, but the sphere is not just a free form. It is arced and perfectly symmetrical at the same time...

Even though it was challenging to adapt to the completely new CAD Software I used, the biggest challenge I had during my thesis was in perceiving the spherical space

from the inside out while Prof Arch DI Dr Manfred Berthold made it clear that he doesn't want to see any planar surfaces, or even straight lines in my project.

The end phase of the project was crucial for most of the decisions taken during my thesis. Through the unique guidance and supervision of Prof Arch DI Dr Manfred Berthold I was able to finally conclude the project with a selection of the best ideas from the whole design period.

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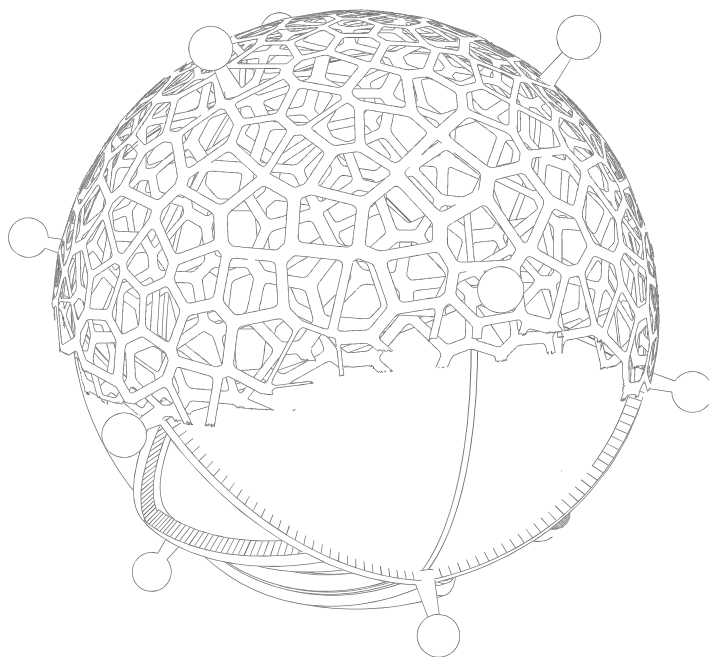
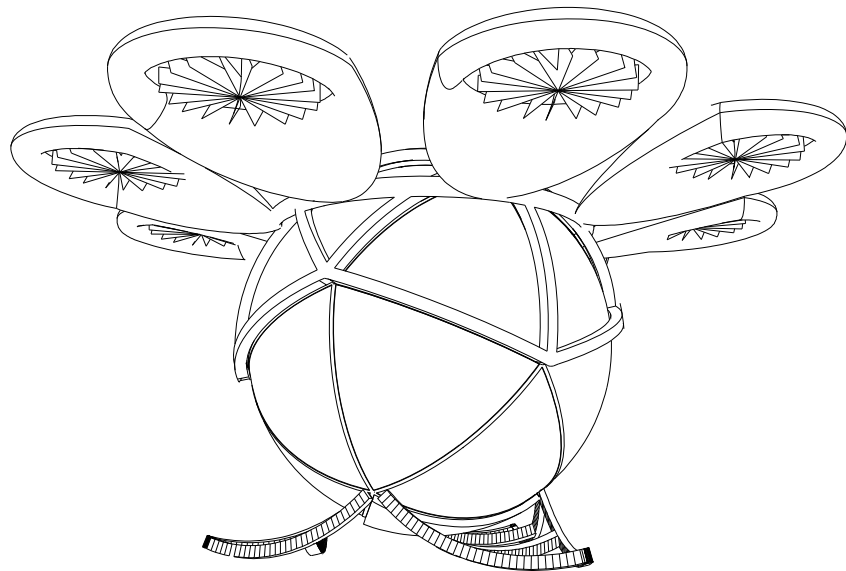
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