LUNAR VILLAGE

Exploring the outer space is one of the most popular issues relating to development of humanity. Private astronautics blossom and government space programs' revival come an occasion to active discussion of life on other planets possibility. The most available option is colony on the Moon. It is a kind of realistic stage on the way to space exploration after ISS and before Mars and more far planets' colonization.

At the same time, idea of creation of such locality seems pretty fantastic and uncertain and raises questions. What are Moon colonization's purposes? Who are potential colonists? How many people will live and work here? Is it possible to adapt to lunar physical conditions? Searching for answers, I had to make a design task for myself and to create the Lunar Village concept. **To solve the issue of community co-living in confined space basing on technological features and possibilities of space base construction in specific conditions.**

There are some reasons to colonize the Moon. First is industrial. There isn't an atmosphere on the Moon, so solar batteries can make much more energy than on the Earth. In addition, there is a huge amount of Helium-3 – one more potential fountainhead of energy. Lunar soil – regolith includes valuable substances such as oxygen, silicon, iron, aluminum. Also vast reserves of titanium have been found, and one can mine precious metals in fallen asteroids.

The second reason is science. Because of lack of the atmosphere and connections to the Earth the other side of the Moon is an ideal place for telescopes' setting.

The third reason is mankind interplanetarity. Settlement of the Moon is the first step to transform humanity into multiplanet species. Due to low gravity it is much easier and cheaper to take off, therefore there is a reason to make the planet a transit point on other worlds' exploration.

The fourth reason is tourism. Moon is the most exotic country to travel. If they create appropriate infrastructure they would develop touristic industry that offers the most unusual kind of holiday.

Lunar exploration starts from launching Soviet satellites and an American "Apollo" program with astronauts' landing on Moon surface. After that lunar exploration programs were rejected. Only remote researches by satellites were realized. Just in the end of 2010's lunar exploration programs were resumed. The best-known project of lunar base were made by "Foster+Partners" with ESA, "Lunar habitat" represents permanent small settlement made consisted of several units. Now lunar colonization is being discussed actively but the time has not yet come for active steps. Existing few lunar settlements are designed either in the scale of a couple of little dwelling spaces or in the form of abstract huge city under the big dome.

The Moon is the place with severe conditions of life. There isn't an atmosphere and a magnetic field. Lunar gravity is six time less than earthly. Relief is represented by a rocky surface pitted with craters. The temperature ranges from very high to very low values. However there are attractive places for settlement. According to a NASA satellite, there are deposits of ice in the Shackleton crater at the South Pole. In addition, there is a large amount of hydrogen stored at the South Pole. There are peaks of eternal light where Sun lights lunar surface without a break on 15-days lunar night. Territory's advantage is that it is situated both and direct and reverse side of the Moon. **Therefore, I chose a point near the Shackleton crater as a location of the Lunar Village.**

Based on existing space legislation and colonization's goals I can suggest the format of lunar settlement. T**his is a kind of a hybrid of ICC and mining town with small population size but with the presence of a certain community.** In addition, **I have developed certain rules of life for the colony, detailing various aspects of life of Lunar Village.** For example, the settlement is not under a single dome, but it is divided into compartments so that in the event of an accident, the module can be closed and repaired.

The next step was to determine the population. According to the simplest calculations, the water resources of Shackleton crater can provide about 250 people, water resources of the entire South Pole can provide for about 10 million people with complete water recycling. But it is too big amount of people. Therefore, I used a project of the industrial lunar base, where 200 people work, by Professor of Moscow state University Vladislav Shevchenko as reference. But in the Lunar Village you will need more employees in other areas of activity. **I decided to suggest that the colony will be designed conditionally for 1000 people**; this is the population of the mining town of Pyramid on Svalbard which has similar in purpose. At the same time, the settlement should be able to grow. **Next I defined the functional zoning: industrial zone, living zone, spaceport and touristic zone.** I made a detailed program for each zone, creating a design task.

Next I designed a scenario of Lunar Village's colonization, where I described step-to-step what actions will be taken in the way of its construction. **Scenario consists of four stages S, M, L, XL.**

First stage S represents the base of the first four settlers, who bring all resources for life with themselves. They build base for stage M – the settlement, where 20 miners, who start the production, live. They build a village with housing and resources for 200 industrial workers, who are provided by the resources of Shackleton crater. This village is stage L. On this stage colony of stage XL is being constructed. XL is almost autonomous settlement for 1000 and more people, which fulfills its purpose in achieving the goals set for colonization.

Then the master plan is formed. **At the point of eternal light there is a solar station.** In the distance on a flat area of terrain the spaceport is located. According to the scenario an axis is formed naturally along the edge of the crater, due to the high level of illumination and proximity to the source of resources. Along this axis towards the bright side of the Moon a settlement is growing, and on the bright side there is a tourist center, where you can observe the view of the Earth. An industrial zone with an observatory is growing towards the dark side of the moon. **It creates a linear city along the main transport route.** Rows of living units and row of gardens adjoin to the highway. These rows are connected by pipes-roads running along the main axis. Modules with social functions appear in a row, deforming this structure due to their large dimensions. Courtyards appear in rows with residential cells, deforming the composition and shifting the roads.

The settlement is a cluster of spherical shells. This shape allows you to maintain optimal pressure inside the sealed dome on the principle of a spacecraft. In the project "Mars city" by BIG there is a selection of optimal forms: domes, dome-fields, tube, torus. They are built from translucent material, under which structures are built on the surface and in the ground thickness. It is optimal option for gardens in my case.In the previously specified project by Norman Foster a layer of lunar soil – **regolith built up over the inflatable dome by a robot-operated 3D printer creates a protective shell.** Between these two layers there is a vacuum gap. I decided to use this technology, **but I use a metal dome, which is constructed from in-situ materials**, as a base layer.

I illustrated organization of space under the domes of administration and entertainment domes, as well as the park and standard living unit. **A little gravity allows to create a multi-level space under the big domes, where one can easily jump from one level to another by stairs with high lunar steps.** The free space of the atriums is permeated by travolators that travel at different levels at different speeds. Under the park's dome the cult place of the Lunar Village is located – a bar where the bartender-android always gives you a philosophical advice.

The main principle of the living unit is the presence of the necessary abundance of personal space in the closed environment of the colony. I offer two-level housing for one person with the possibility of living for two. If desired, cells can be combined with each other if necessary.

Taking into account existing data from scientific sources and cultural analogues, I developed the concept of the Lunar Village. In my work there may be assumptions related to the technological features of space construction. However, the main task before me was to organize the living environment of the Lunar Village community in specific habitat conditions, which turned out to be achievable.

One of the main factors and drivers on the way to create a settlement, in addition to dry scientific facts, was my everyday experience and science-fiction forecast. The result is an illustration of my vision of a brave new world, sealed in a tin can in the middle of a lifeless Lunar desert. In contrast to the harsh environment, I wanted to organize a mechanism of life where every colonist can comfortably do their job, because every day is more likely to be the last.

In many ways I was guided by my wishes and ideas about life when determining the content of the colony, because I am a typical colonist-a woman of young age, relative health and a lust for adventure. And here I am riding a scooter to the science center, cutting through the lunar vacuum headlong. And I also want to have fun and see people. In addition, the organization of space is based on something earth-like in addition to the multi-level lunar one, for example main street or shopping mall. Y**ou can take a girl out of Earth, but not Earth out of a girl.** The method of getting used to the role in many ways helped to create a lyrical lunar world in certain physical conditions and populate it with ambitious colonists,

exploring deep space

preparing to fly to Mars

mending spacesuits

shooting reality shows

bringing tourists to the surface of the moon

producing helium-3

conducting a thermonuclear reaction

building spaceships

exploring lunar rocks

working at a solar station

producing oxygen

2020 JACQUES ROUGERIE FOUNDATION AWARDS - Jules Verne Year

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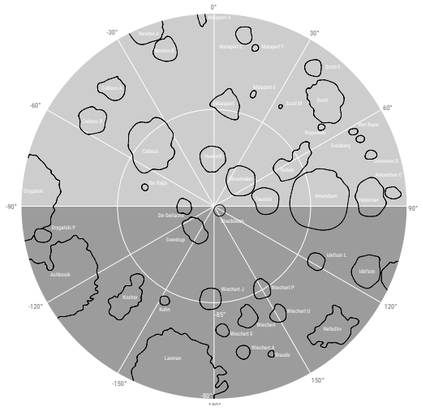
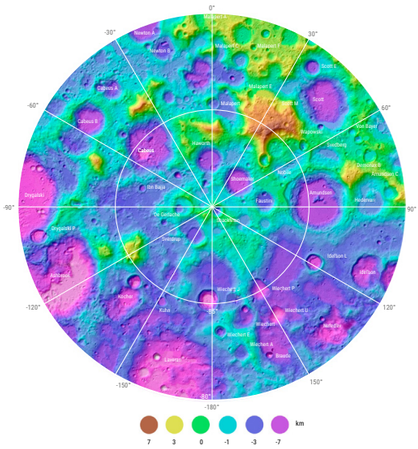
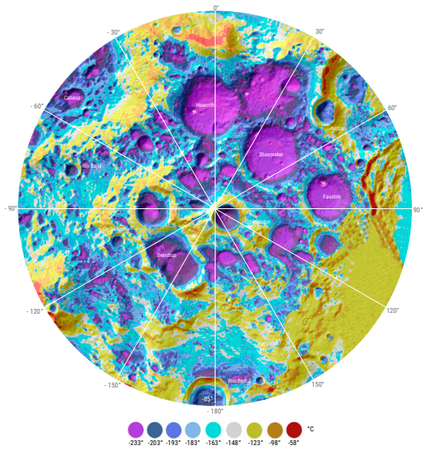


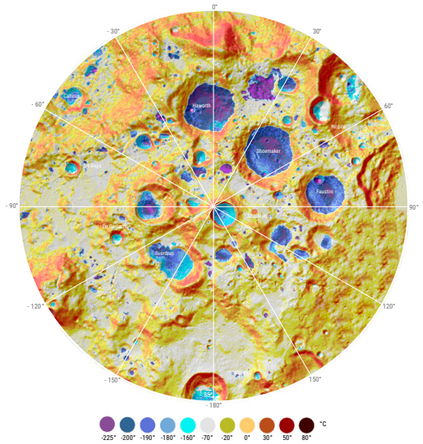
South Pole.
The scheme of the craters



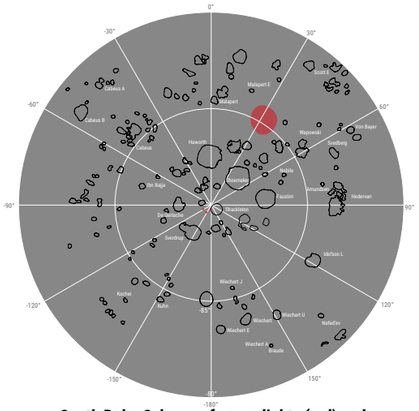
South Pole. Terrain map
Data by Lunar Reconnaissance Orbiter



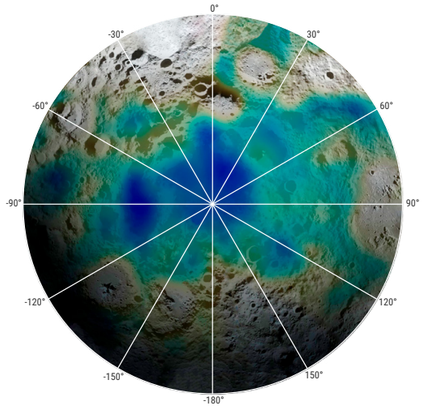
South Pole. Temperature on a lunar night. *Data by Lunar Reconnaissance Orbiter*



South Pole. Temperature on a lunar day. *Data by Lunar Reconnaissance Orbiter*

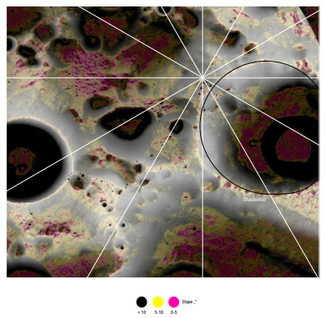


South Pole. Scheme of «ever-light» (red) and «ever-dark» (black) sections. *Data by Lunar Reconnaissance Orbiter*



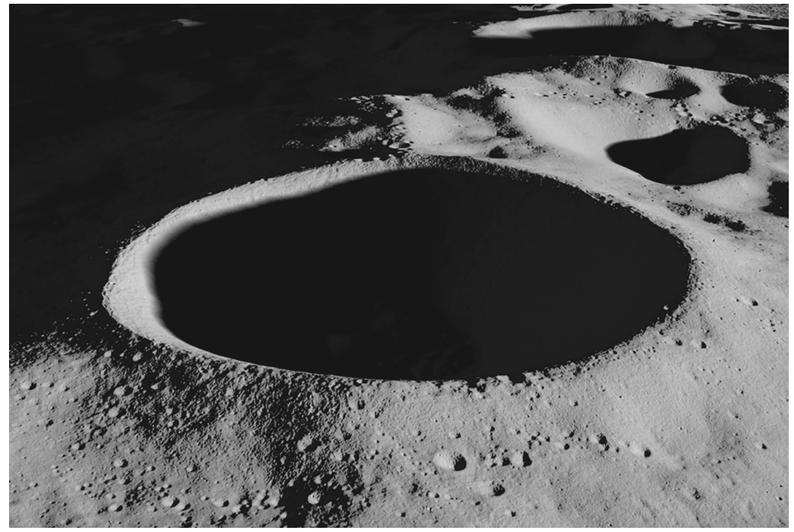
South Pole. Diagram of the presence of hydrogen (blue)
Data by Lunar Prospector

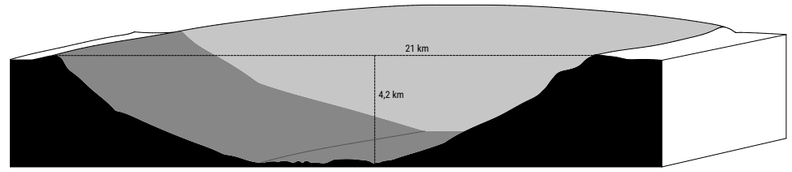
Photo of the moon with deposits of titanium (blue) and iron (brown)
Data by Lunar Reconnaissance Orbiter



South Pole. Slope diagram. The level of illumination (white)
Data by Lunar Reconnaissance Orbiter

LOCATION: SOUTH POLE. SHACKLETON CRATER





+

+ There is ice in the crater
+ There is ice on the territory of the South pole
+ There is hydrogen at the South pole
+ There are areas with flat terrain near the crater
+ There are peaks of eternal light near the crater
+ Not far from Earth
+ The lunar regolith contains oxygen, aluminum, and silicon
+ The territory has both the « light «side of the moon and the «dark» side»
+ The lack of atmosphere makes it possible to effectively build spaceships
+ Beautiful view of the crater
+ Cinematic and romantic landscape of the lunar surface
+ Low gravity creates new opportunities for people to move and new sensations

-

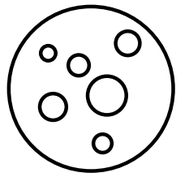
- Lack of atmosphere
- The absence of magnetic field
- The impossibility of terraforming a planet
- You can only live in closed airtight rooms
- To the deposits of titanium and iron they need to go 3 hours on a hyperloop to the Mare Tranquillitatis
- Dangerous and harsh environment
- Temperature drop
- Radiation activity
- Low gravity makes it inconvenient for people to be physically active

CALCULATION OF POPULATION

Ice in Shackleton crater:

=76 000 litres of water (NASA Lunar Reconnaissance Orbiter)

Water on South Pole:

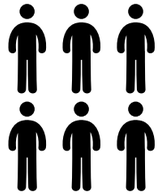


=3,3 million tons of WATER in the form of hydrogen and ice (NASA Lunar Prospector)

Water is required per day:

=120 liters/day

=190 liters/day



=10 m with

=1000 without

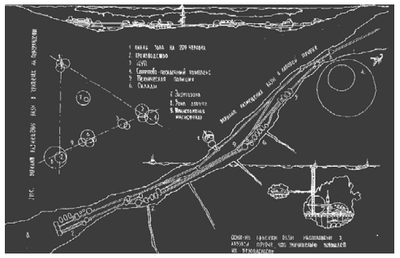
(29 years)

=245 with

Total:

=1000

References:



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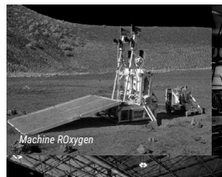
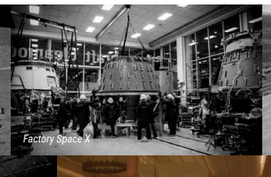
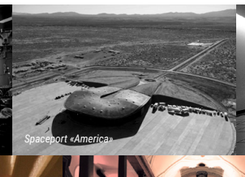


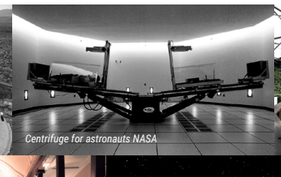
Machine ROxygen



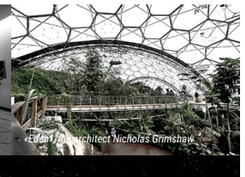
Factory Space X



Spaceport «America»



Centrifuge for astronauts NASA



Eden Project architect Nicholas Grimshaw

The Movie «The Shining» of

The Movie «The S

Church Bar in Dublin

Luna-park in the Lunokhod-1 rover

FUNCTIONAL PROGRAM

1. INDUSTRIAL ZONE

1.1. Water treatment station
1.2. A plant for the processing of regolith
1.3. Plant for the production of metal structures
1.4. Plant for the production of glass structures
1.5. Plant for the production of space rockets and ships
1.6. A research center with an observatory on the dark side of the Moon

2. SPACEPORT

2.1. The terminal of the spaceport with the mission control center
2.2. Launching pad
2.3. Maintenance hangars
2.4. Warehouses of rocket fuel, exported and imported products

3. LIVING ZONE

3.1. Living cells

sections for technical purposes
3.2. Warehouse
3.3. Garages for storing personal transport
3.4. Gardens
3.5. Sluices

3. LIVING ZONE

the compartments for the servicing purpose
3.6. Eatery
3.7. School
3.8. Sports centre
3.9. Medical center
3.10. Beauty salon
3.11. Laundry with dry cleaning
3.12. Atelier

3. LIVING ZONE

administrative and business section
3.13. Administration
3.14. Central square
3.15. Sections for rent
3.16. Film studio

3. LIVING ZONE

entertainment section
3.17. A large Park under glass domes with entertainment objects scattered around it
3.18. Entertainment center
3.19. Cinema
3.20. Pub. Carries the function of a community center, «temple», where a wise bartender-android will always give you a philosophical advice

4. TOURISTIC CENTER

4.1. Hotel
4.2. Luna-park

RULES OF LIFE OF THE COLONY

1. Name of the settlement is Lunar Village.
2. Settlement population: about 1000 people estimated.
3. Location: near the crater Shackleton, near the peak of eternal light, on the border of the light and dark sides of the Moon.
4. Most of the resources used to build the base are extracted in-situ: water, oxygen, and metals from regolith.
5. The lunar day and night last for half a month.
6. Food is grown in greenhouses.
7. A closed cycle of life activity is arranged. Water is recycled and reused. Carbon dioxide from human breath is collected and delivered to greenhouses.
8. Life goes on earth time for convenience, although the lunar day lasts half a month.
9. The station is international, so all people speak English to each other.
10. The colony is built exclusively for peaceful purposes by good good people.
11. People are subject to the internal Charter, as well as the laws of their country. In case of gross violation of the law, a person is punished by deportation to Earth.
12. Everyone has a job, everyone is provided with a decent salary that allows them to provide for themselves and their children. Therefore, no one is short of food, services, and entertainment. Medical care is free, since the man on the moon is insured.
13. There can't be any unemployed people on the moon; otherwise, he goes back to Earth.
14. Any job, even the most low-skilled, is well paid.
15. Everyone is guaranteed the right to oxygen.
16. Everyone is guaranteed the right to return to Earth.
17. Everyone is guaranteed the right to rehabilitation for gravitational illness upon return.
18. In the colony, there are commodity-money relations in the absence of wild capitalism and the control of the economy by the administration. The priority is to take care of people.
19. The settlement is not under a single dome, but is divided into sections, so that in the event of a fire or a meteorite fall, the section can be closed.
20. Colonists are adults of both genders.
21. Colonists have the right to bring grown-up children (there is a certain age threshold)
22. A person can live alone in the module, two people can live together. If a couple has several children, they can combine several modules into one.
23. There aren't pregnant women, seriously ill people, or the dead on the Moon.
24. There is a constant connection with the Earth. Including the delivery of goods. For example, you can order something on Amazon, and it will be delivered to you, even if not for a couple of days, but for, for example, a week. This is an obvious advantage of the moon over Mars.
25. The colony seeks to develop autonomy in terms of goods. For example, to sew your own spacesuits. Develop the fashion industry in a small lunar atelier. They put experiments on the production of drugs.
26. The colony is managed by the local administration. As a administraror there is a hired mayor, an ambitious and hard-working figure.
27. The colony is built on a certain number of colonists. But it should be possible to add new sections.
28. Physically, it is a space Shuttle, metaphorically – a settlement with streets and squares.

Lunar Village near Shackleton crater, South Pole. Top view

[The way to deposits of titanium in the Mare Tranquillitatis.]

crater Shackleton

Lunar Village near Shackleton crater, South Pole. Top view

01 Living zone

02 Solar station
(At the peak of the eternal light)

03 Industrial zone

04 Spaceport's terminal and launching pad

05 Touristic zone

[On the bright side there is a tourist center, where you can observe the view of the Earth.]

05

[According to the scenario an axis grows naturally along the edge of the crater, due to the high level of illumination and proximity to the source of resources. Along this axis and the main transport route towards the bright side of the Moon a linear city is growing.]

02

crater Shackleton

04 *[In the distance on a flat area of terrain the spaceport is located.]*

01 *[At the point of eternal light there is a solar station.]*

03 *[An industrial zone with an observatory is growing towards the dark side of the moon.]*

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JACQUES ROUGERIE FOUNDATION
SPACE AND SEA GENERATION
INSTITUT DE FRANCE

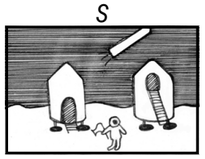
A SCENARIO OF LUNAR VILLAGE'S COLONOZATION

THE COLONY IS BUILT AND SETTLED ON THE PRINCIPLE S-M-L-XL

S – the base of the first four settlers, who bring all resources for life with themselves
M – the settlement, where 20 miners who start the production
L – a village with housing and resources for 200 industrial workers, who are provided by the resources of Shackleton crater
XL – almost autonomous settlement for 1000 and more people, which fulfills its purpose in achieving the goals set for colonization

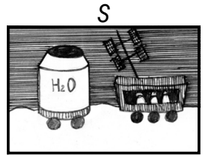
S =4 M =20 L =200 XL =1000

S



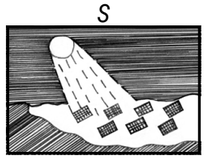
1. Arrival of the ship with the crew, cargo modules, life support systems. They land in the lowland near the crater.

S



2. Sending all modules by lunar rovers to the peak of eternal light. People are traveling in a passenger sealed lunar rover.

S



3. Unfolding of solar panels.

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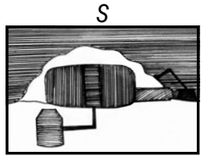
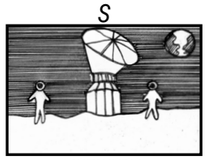


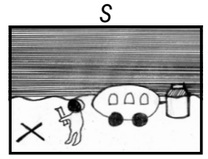
4. People inflate and deploy the housing module made of kevlar. After settling in, the robot with a 3D printer begins to pour a regolith shell around it.

S



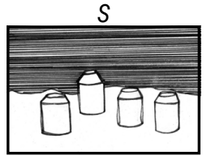
5. Installing a satellite to communicate with the Earth on the visible side of the moon.

S



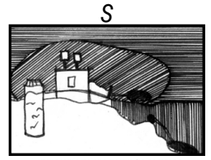
6. Initial surveying of the site. The colonists have the parameters of the distances between the future functional zones. At a certain distance, they prepare the base for the next crew.

S



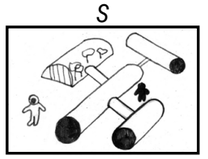
7. Installation of containers for water and oxygen, which are desirable to bury..

S



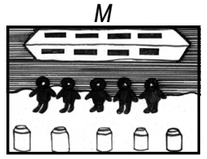
8.They need to install a module for the regolith processing next to the containers, drain the hydrogen and oxygen into containers, and store the recycled regolith in a separate container for further processing.

S



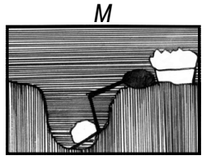
9. They build a dormitory for 20 people from Inflatable modules, with medical and sports units, a small greenhouse, and a mess hall. Pour a regolith shell around it.

M



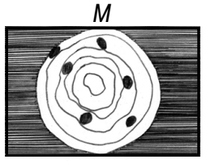
10. Arrival of a new crew of 20 people.

M



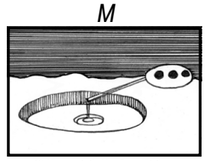
11. Digging holes for containers with water and oxygen supplies.

M



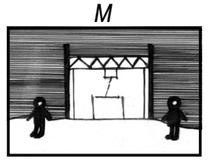
12. Digging holes for containers with water and oxygen supplies.

M



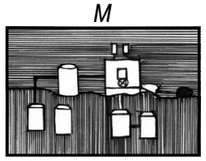
13. Miners go to the Mare Tranquillitatis on a lunar rover to check for ilmenite, and they find a really large amount of iron and titanium in the ground. Iron and titanium powder are extracted from regolith.

M



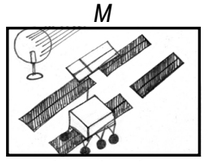
14. Construction of a leaky hangar for the production of metal structures. Structures are brought from Earth to experiment with the construction of an industrial building made of metal frames and regolith blocks.

M



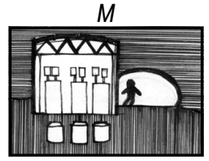
15. The regolith processing unit works hard and fills the new tanks with water and oxygen. Also they found large reserves of hydrogen, which is transported to the ships and refuel them.

M



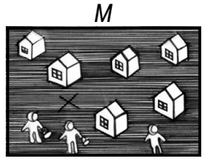
16. They need to increase the energy, the robot rides on the peak of eternal light and prints new batteries.

M



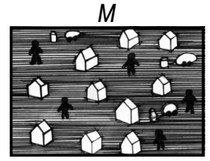
17. Where large regolith processing machines are located, a large hangar is being built. It is attached to the previous one, which can be a sealed control point.

M



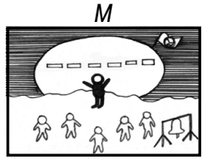
18. Another land survey is being carried out. At a safe distance, the construction of new comfortable homes begins. They are being built with the possibility to make a house garden under the dome.

M



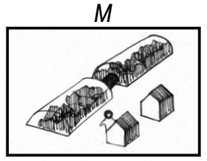
19. People are being moved to new homes from the dormitory. Converting it into a scientific module. New people are beginning to arrive, still with a supply of freeze-dried food.

M



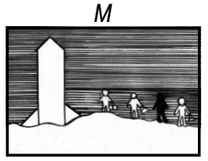
20. The captain of the crew becomes the temporary administrator. His house becomes the headquarters. In front of it there is a large square for meetings of the people.

M



21. Experiments with growing plants are successful. Glass panels are brought from Earth. Construction of greenhouses begins near the settlement next to the houses.

M



22. More and more metal, hydrogen, and silicon are found in the soil. They need to expand production. There is a sharp increase in the number of employees.

M

23. There is a shortage of service infrastructure. Due to the first successful harvest, a canteen is being built.

M

24. Nearby, a small laundry is arranged, where people can wash their clothes inexpensively.

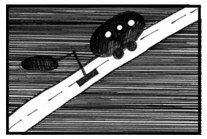
M

25. Several more domes for greenhouses are being built. Seeds and seedlings are brought from earth along with the best farmers.

L

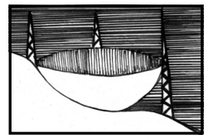
26.There are not enough glass panels, silicon in the regolith allows them to organize their own production. A module for the production of glass structures is being built.

L



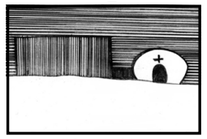
27. Roads are being built to facilitate traffic from mines and residential modules to industrial zone.

L



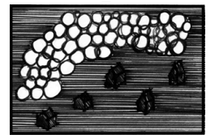
28. New employees are coming to install the observatory. Constructions are ordered from local factories.

L



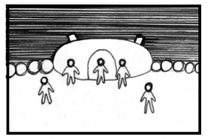
29. Construction of a large research center with a medical unit.

L



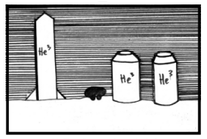
30. Meanwhile, new greenhouse modules are being built along with the new residential modules.

L



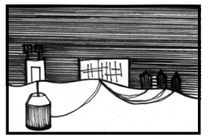
31. The administration is moving from the captain's headquarters to a larger module, new administrators with experience managing a large number of people are coming from Earth.

L



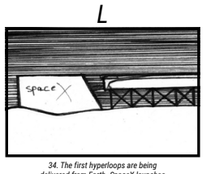
32. They discovered a method of thermonuclear reaction involving helium-3 on Earth. There was a great demand for its delivery.

L



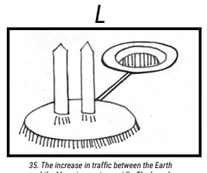
33. It becomes appropriate to connect homes to a universal water supply system. A central collector that connects to the water treatment plant is being built. Oxygen is also delivered via the gas pipeline.

L



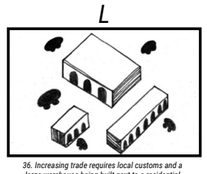
34. The first hyperloops are being delivered from Earth. SpaceX launches its own production on the moon. Rails are being laid.

L



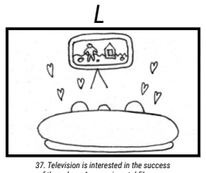
35. The increase in traffic between the Earth and the Moon is growing rapidly. The launch pad of the spaceport with docks for ships is being built. A spaceport terminal for passenger and cargo registration is being built.

L



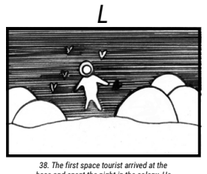
36. Increasing trade requires local customs and a large warehouse being built next to a residential settlement. Garages are being built for various transport vehicles. People get their own transport.

L



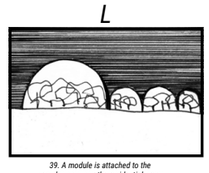
37. Television is interested in the success of the colony. An experimental film crew is coming. The possibility of creating a permanent film crew and shooting a reality show about the life of the colonists is being discussed.

L



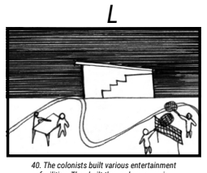
38. The first space tourist arrived at the base and spent the night in the colony. He hopped around in the space suit, watered the flowers in the greenhouse, and ate local food. He was delighted. The beginning of space tourism.

L



39. A module is attached to the greenhouses near the residential areas where the best earth gardeners plant the most beautiful plants. A large Park is being built.

L



40. The colonists built various entertainment facilities. They built themselves a movie theater. Various sponsors send them all sorts of gadgets like bowling lanes or big screens.

L

41.Local technicians and engineers practice their architectural creativity and use local robots to build various pavilions in this Park.

L

42. A large number of precious stones and metals are found In meteorites falling on the moon. A corporation is established to dig them out and send them to Earth.

L

43. The medical center from the scientific station is moving closer to housing, as after a long stay colonists are increasingly in need of medical assistance.

L

44. A sports section is being built next to it to keep the colonists fit as their muscles weaken, and people also want another place with pools and baths to socialize.

L

45. People start to miss their children and bring them with them. To keep them busy, enthusiasts take turns collecting them and teaching them various sciences, taking them to greenhouses and a science center.

L

46. The idea to build some kind of cult building, like in any normal city, has been hatched for a long time. A bar was built in the Park, where bartender-philosopher can give philosophical advice to any colonist.

L

47. The number of colonists is approaching a thousand. Colonists who live here for a long time are beginning to lack earth service. Restaurants where the best chefs work are being built. A variety of professionals in the industry of beauty come.

L

48. Since it has become possible to come with children, there is a very decent number of them. So they built a small school for them, where local scientists teach children various space sciences.

XL

49. Lunar hairdressers, make-up artists and other employees of the beauty sphere got tired of walking around the apartments and they opened their own beauty salon.

XL

50. The world's first space hotel is being built. Thanks to the creation of reusable missiles, tourist transportation has become relatively inexpensive.

XL

51. Meanwhile SpaceX is actively engaged in the development of vehicles. In the lunar vacuum, the process is much more precise and easier.

XL

52. Employees of the reality show opened their own film studio. Filmmakers can rent it and make films about space.

XL

53. The first mission to Mars is being sent. Participants in the program are well prepared for life in harsh conditions on a new planet, and lunar transport is stronger and more reliable.

XL

54. Other ships go on various space expeditions in search of extraterrestrial life and other wonders. The colony becomes a global spaceport – a transit point between worlds.

XL

55. The possibility of creating artificial gravity using antimatter is being studied, the possibility is large, but the prospects are dim. If the scientists succeed, it will be a breakthrough in the world of space exploration. But this is an other story.

2020 JACQUES ROUGERIE FOUNDATION AWARDS - Jules Verne Year

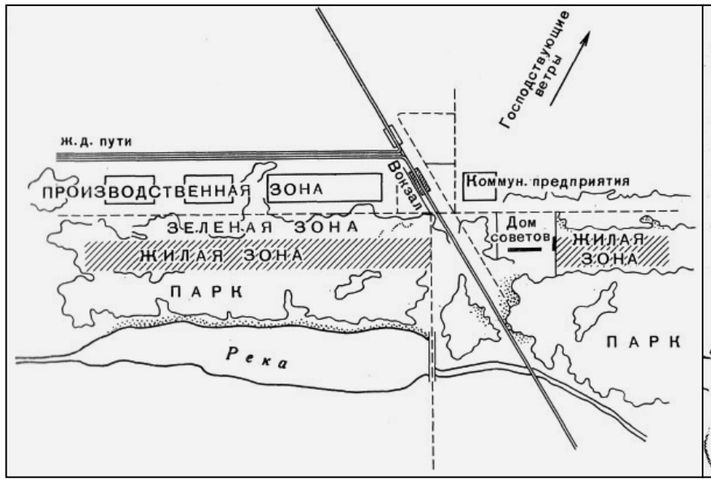
Award's category : « Innovation and Architecture for Space » A «Focus» Award «The Lunar Village»

Project's Name LUNAR VILLAGE

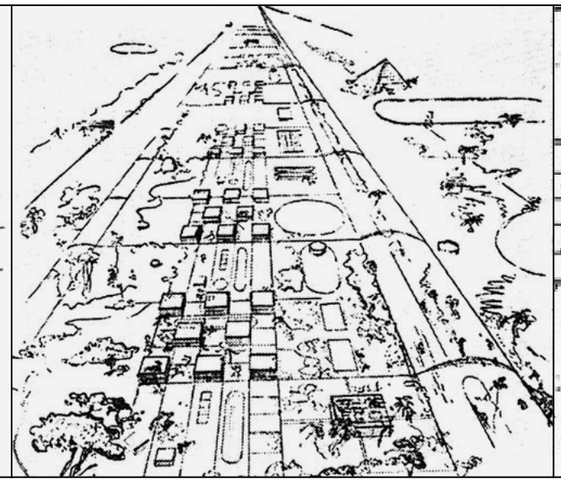
Description Lunar Village is a small town, which has all facilities for spacemen's comfort life and work.

JACQUES ROUGERIE FOUNDATION
SPACE AND SEA GENERATION
INSTITUT DE FRANCE

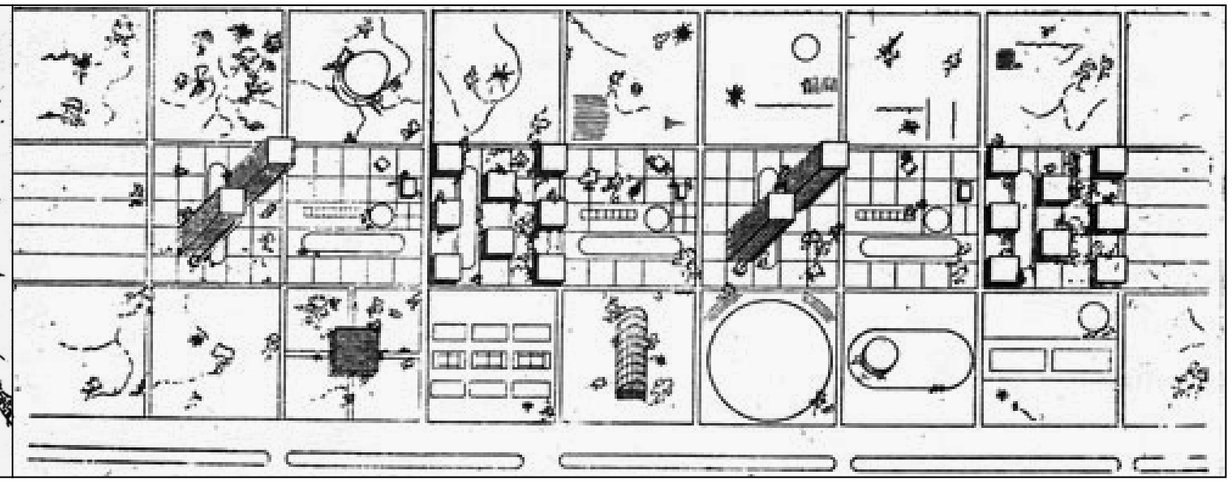
FORMING A LINEAR CITY



Linear city, N. A. Milutin

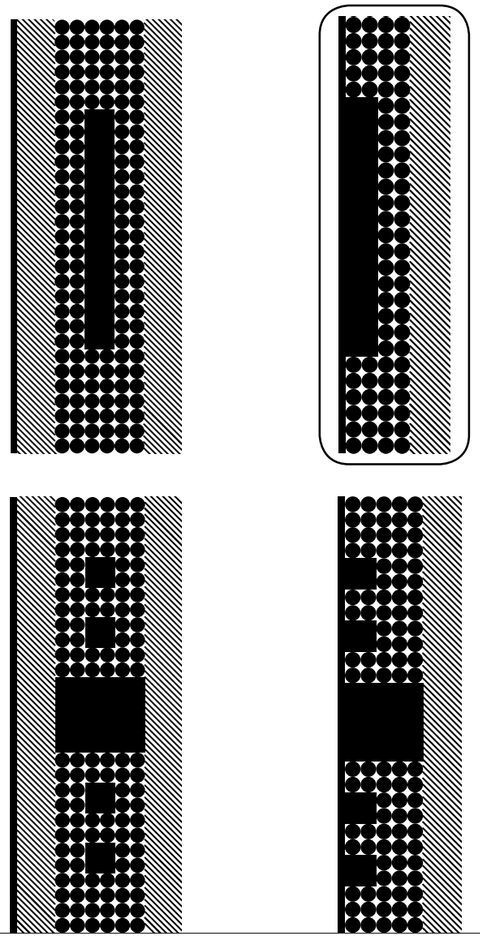


Linear city, N. A. Milutin, I. Leonidov



Linear city, N. A. Milutin, I. Leonidov

4 variants of the concept of a linear city. The second option is optimal. A kind of coastal city is being formed, with Shackleton crater as the ocean.



Highway

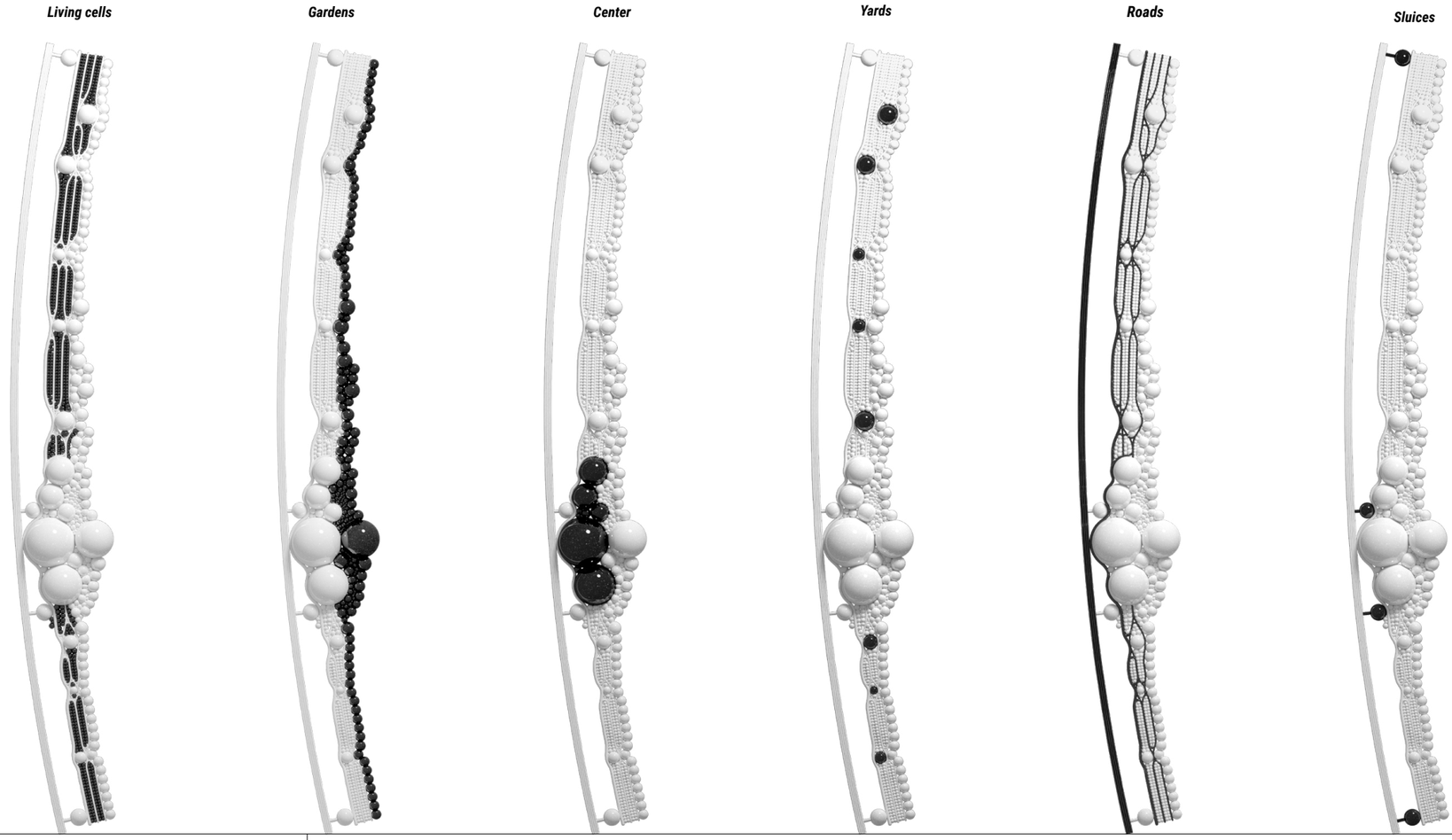
Gardens

Living cells

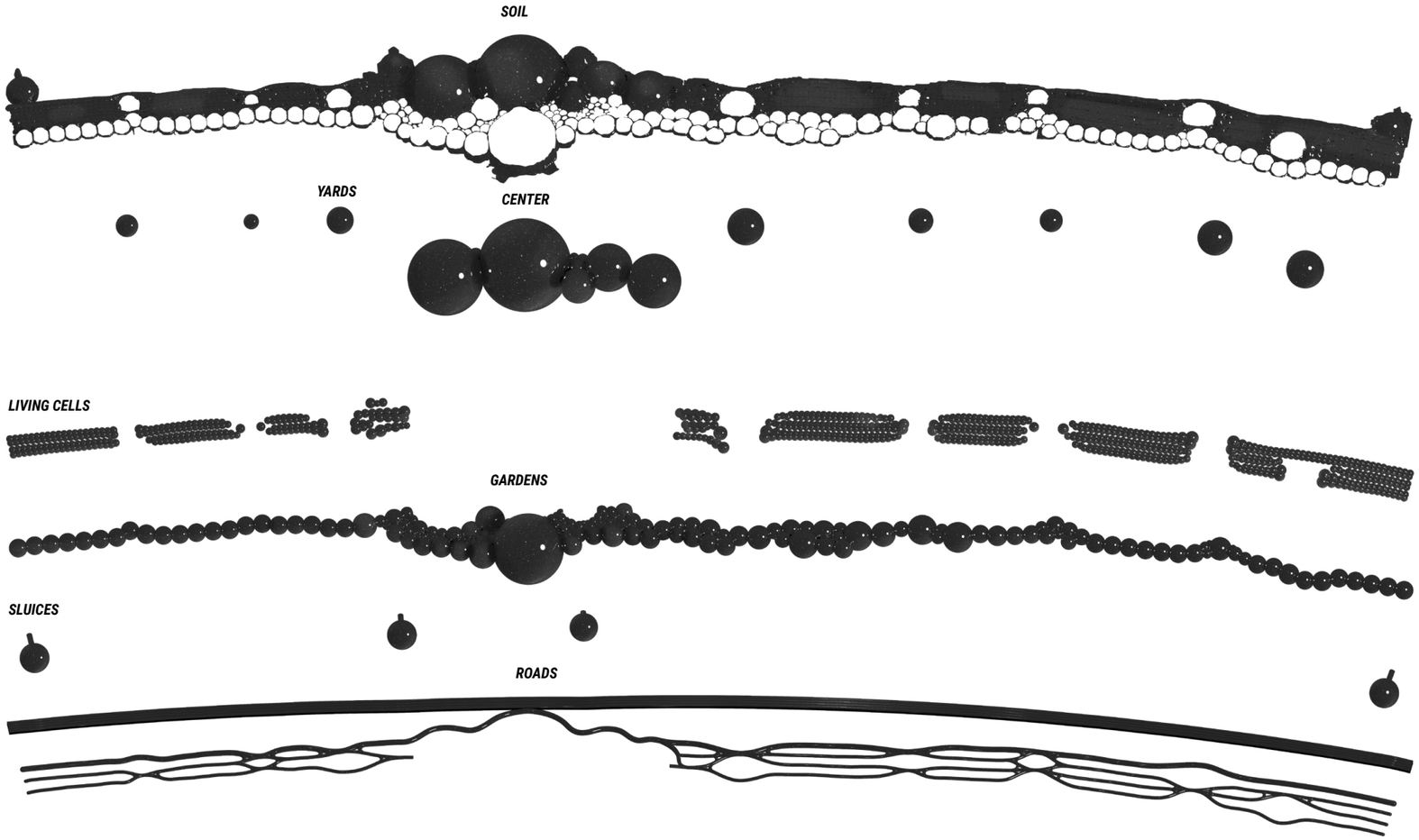
Center

[Rows of living units and row of gardens adjoin to the highway. These rows are connected by pipes-roads running along the main axis. Modules with social functions appear in a row, deforming this structure due to their large dimensions. Courtyards appear in rows with residential cells, deforming the composition and shifting the roads.]

FORMATION OF THE LUNAR VILLAGE'S MASTER PLAN



CREATING A THREE-DIMENSIONAL COMPOSITION OF A SETTLEMENT



Living zone. Top view

01 Administration
Central square
Eatery
Laundry

02 Entertainment center
Restaurant
Beauty salon
School
Film studio

03 Park

04 Storage
Product distribution center

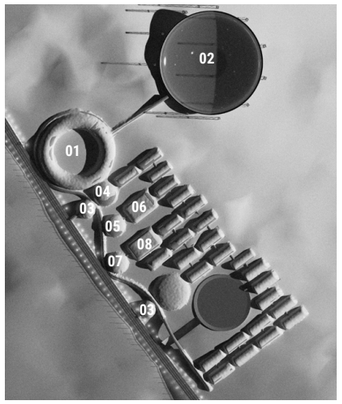
05 Garage
Service center

06 Sports centre
Medcenter

07 Yards

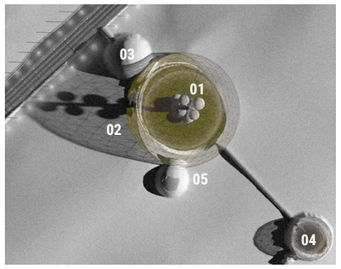
08 Sluices

[The settlement is a cluster of spherical shells. This shape allows you to maintain optimal pressure inside the sealed dome on the principle of a spacecraft. In the project "Mars city" by BIG there is a selection of optimal forms: domes, dome-fields, tube, torus. They are built from translucent material, under which structures are built on the surface and in the ground thickness. It is optimal option for gardens in my case.]



Industrial zone. Top view

01 Research center
02 Observatory
03 Sluices
04 Water utility
05 Command post of the plant for the production of metal structures
06 Shop of the plant for the production of metal structures
07 Command post of the factory for the production of glass structures
08 Shop of the plant for the production of glass structures
09 Plant for the production of spacecraft
10 The test area of the spacecraft
11 Hangars for the production of regolith



Touristic zone. Top view

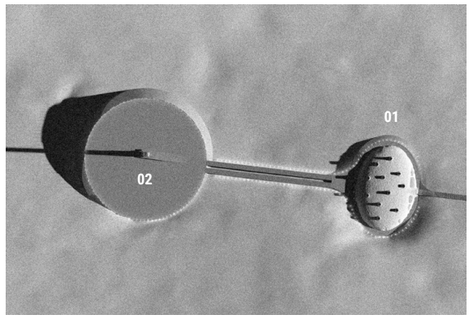
01 Hotel

02 Park

03 Sluice

04 Observation deck

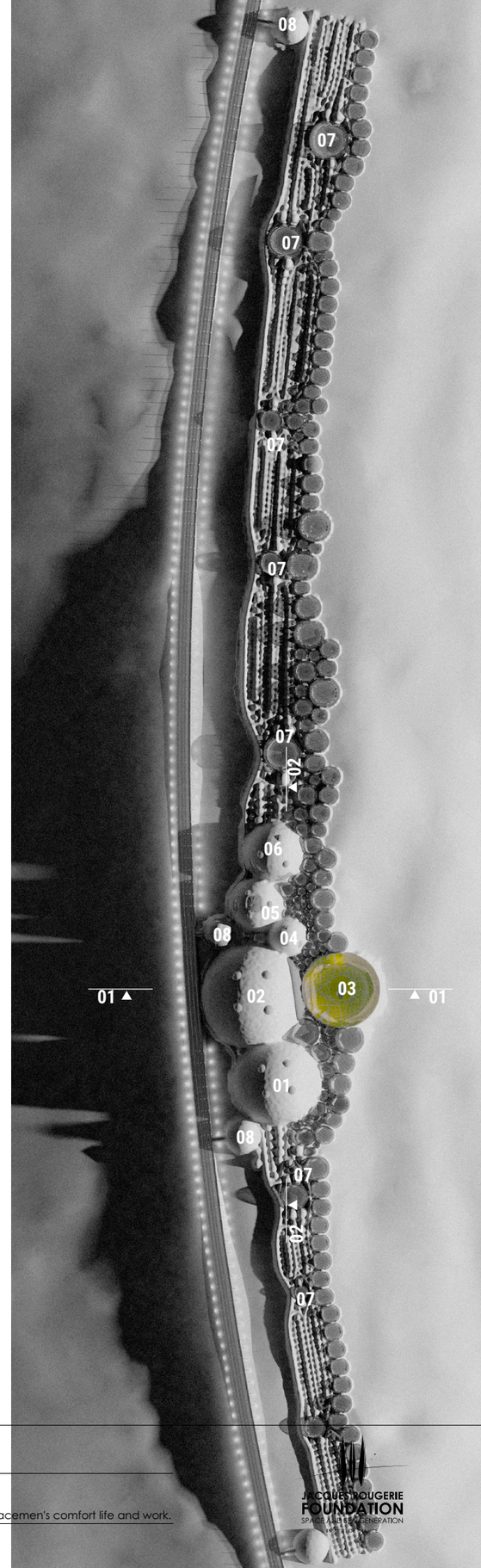
05 Service unit



Spaceport. Top view

01 Spaceport's terminal

02 Launching pad



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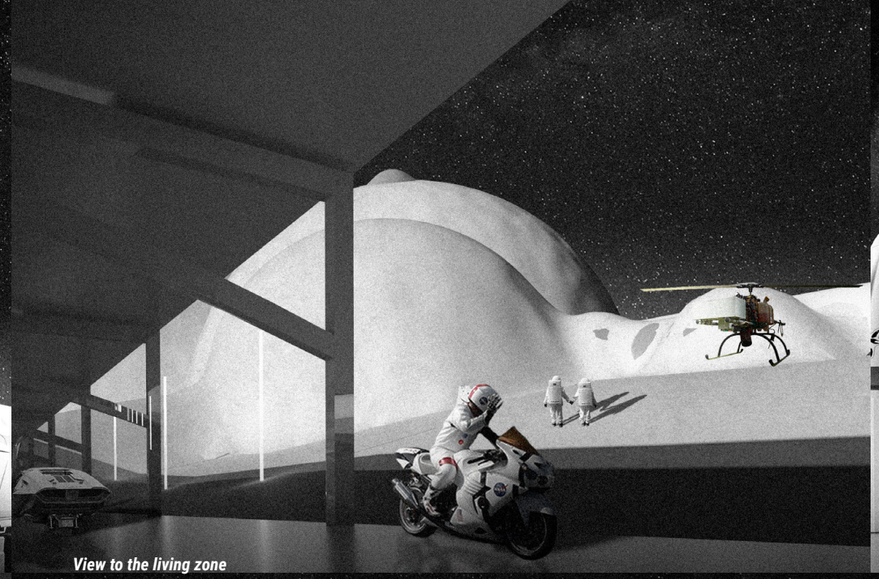
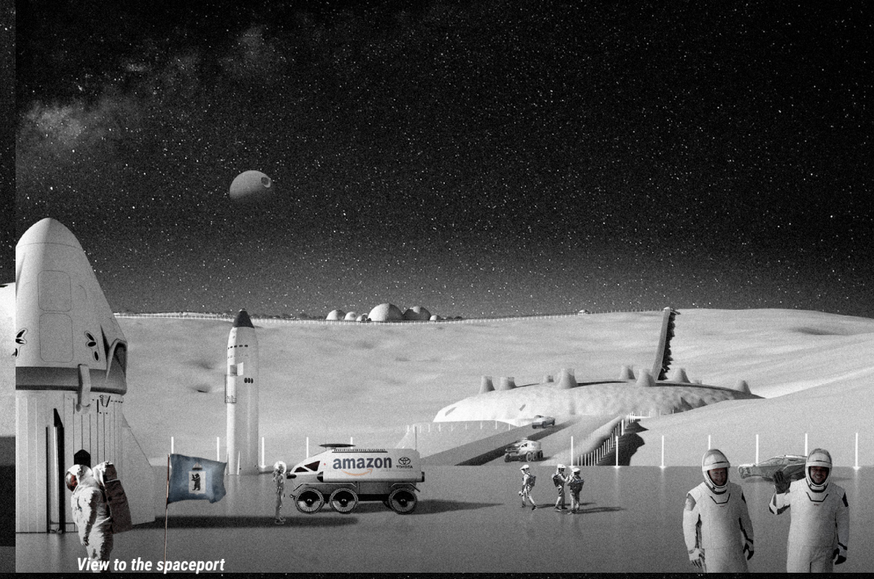
JACQUES ROUGERIE FOUNDATION
SPACE ARTS & GENERATION

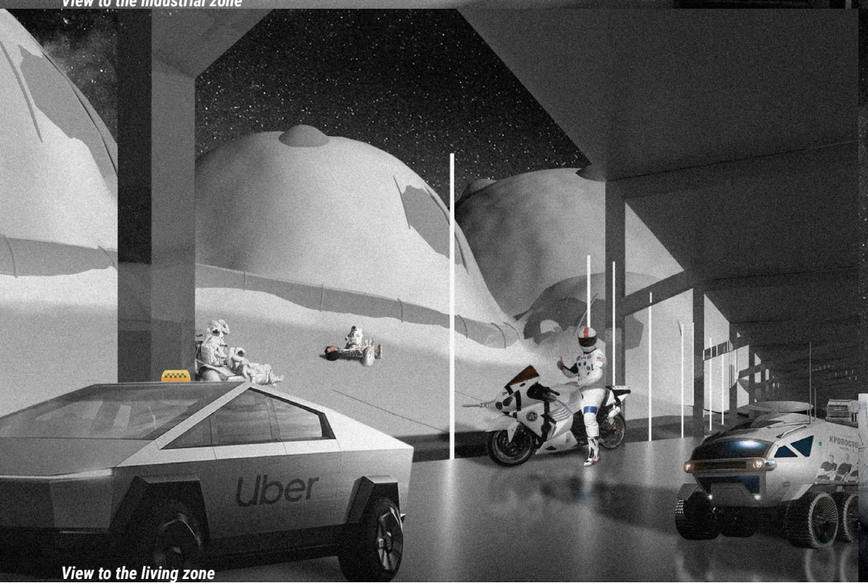
View to the industrial zone



View to the living zone



View to the spaceport

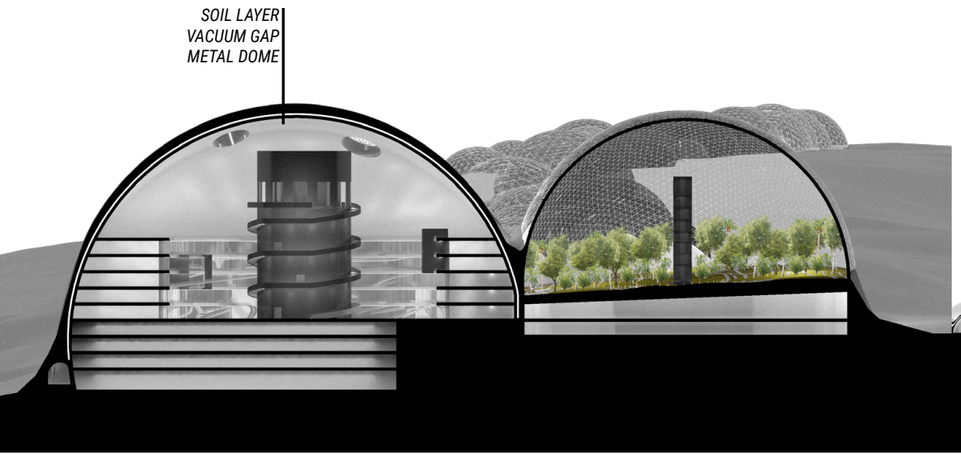


View to the living zone

View to the touristic center

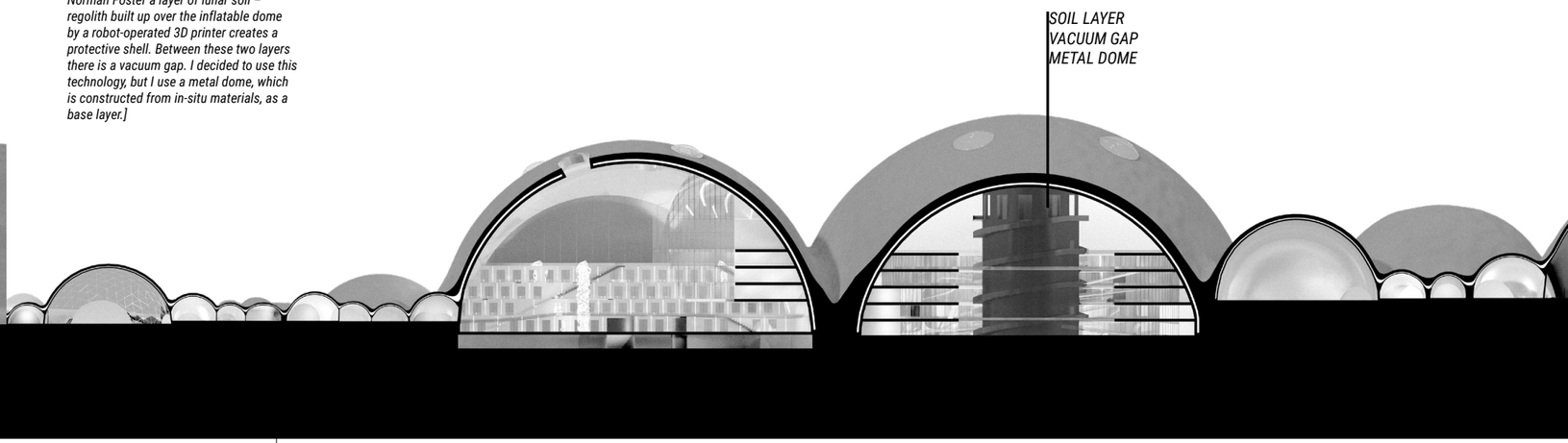
View to the living zone

Section 1-1



[In the previously specified project by Norman Foster a layer of lunar soil – regolith built up over the inflatable dome by a robot-operated 3D printer creates a protective shell. Between these two layers there is a vacuum gap. I decided to use this technology, but I use a metal dome, which is constructed from in-situ materials, as a base layer.]

Section 2-2



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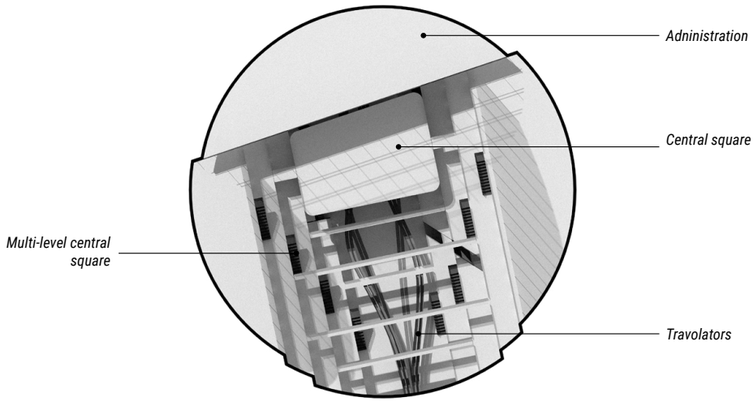
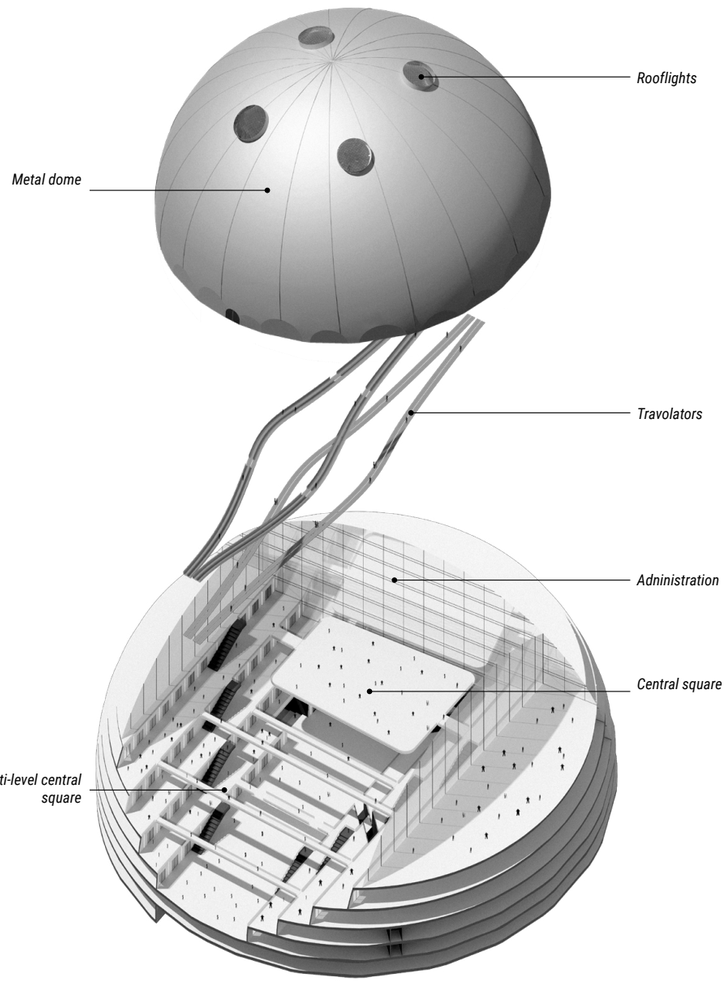
Administrative section

Plan scheme

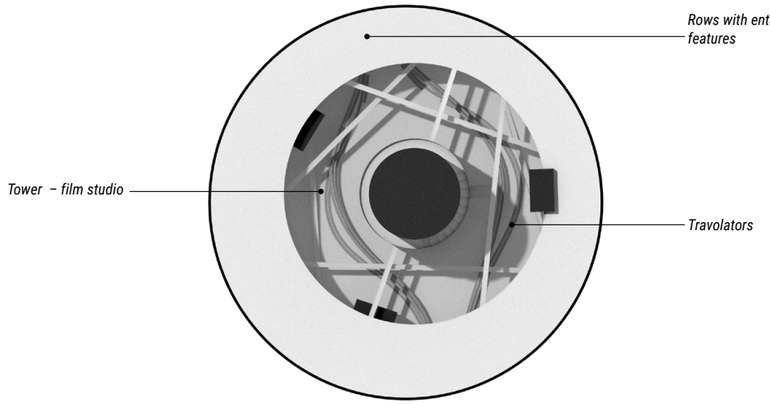


The scheme of organization of the internal space

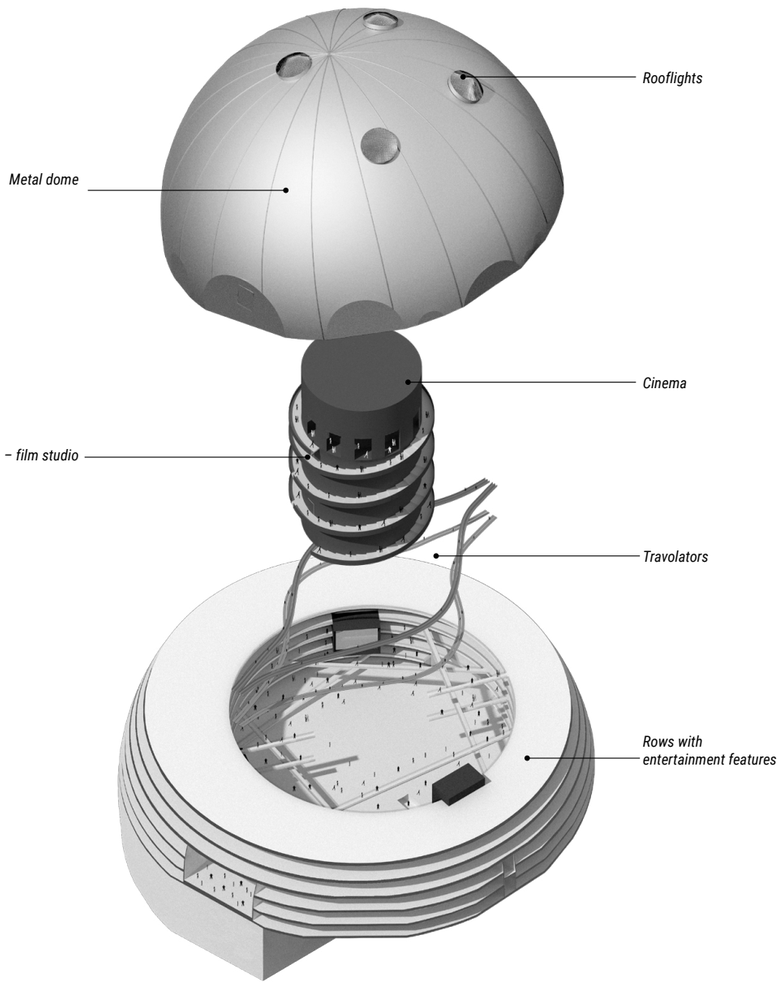


Entertainment section

Plan scheme

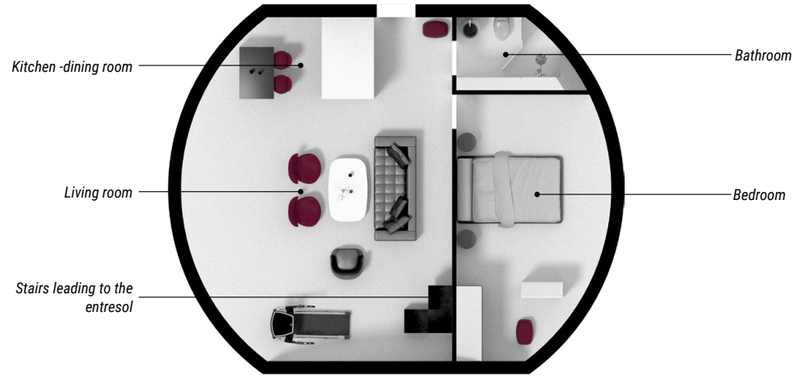


The scheme of organization of the internal space



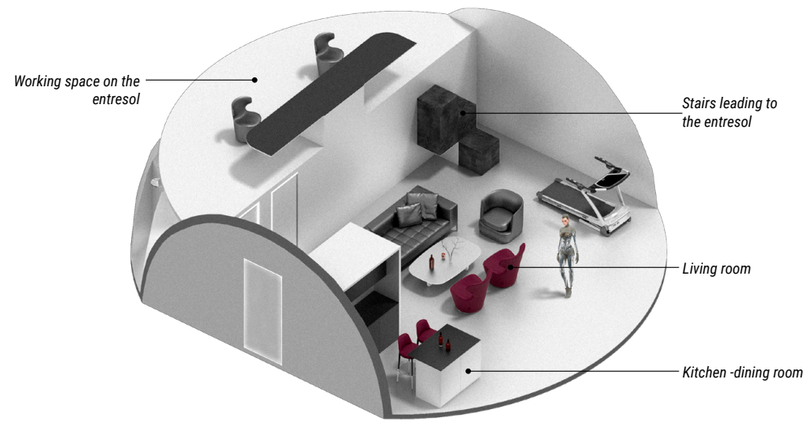
Living cell

Plan scheme



The scheme of organization of the internal space

The scheme of organization of the internal space (with the second level)



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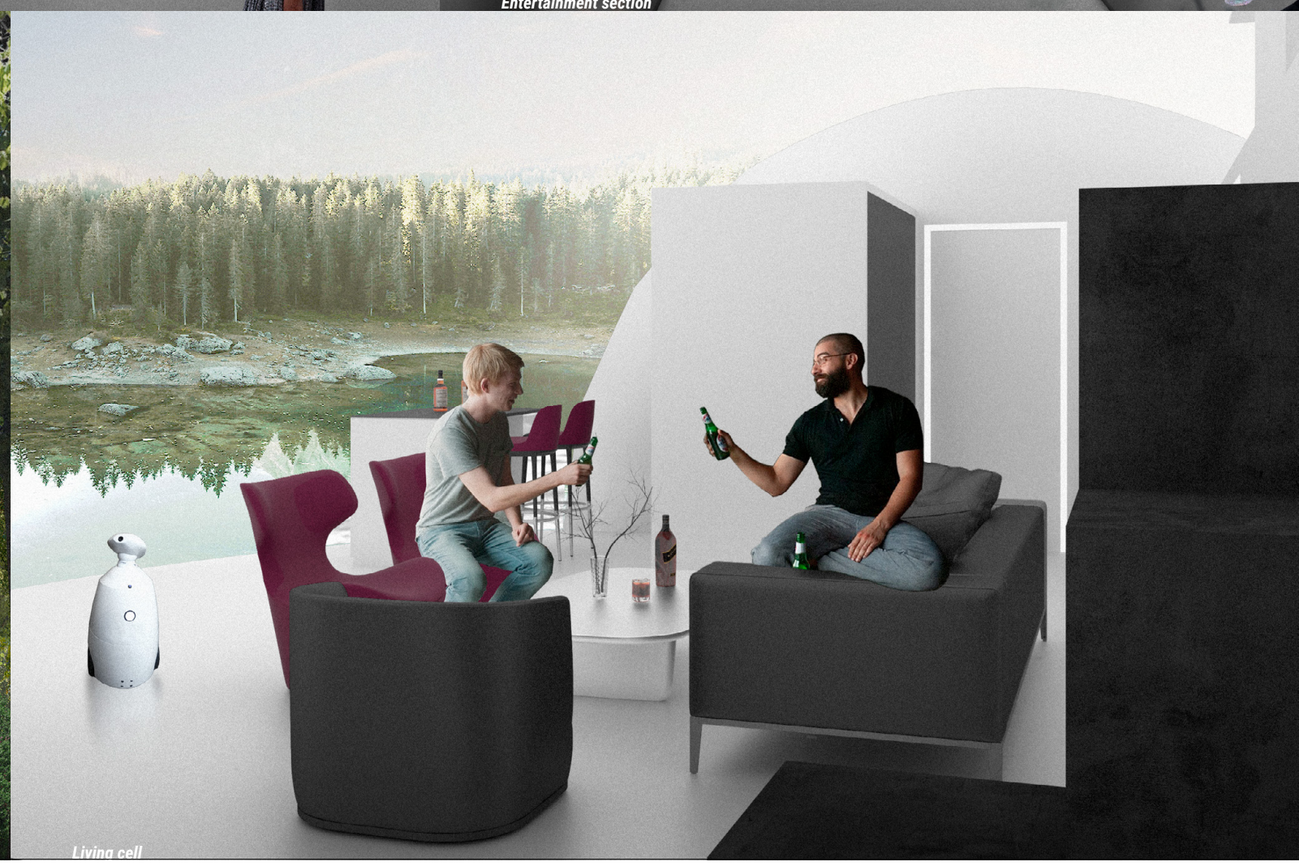
Administration section

Administration section

Entertainment section

Park and bar, where the android-bartender will always give you a philosophical advice



Living cell

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