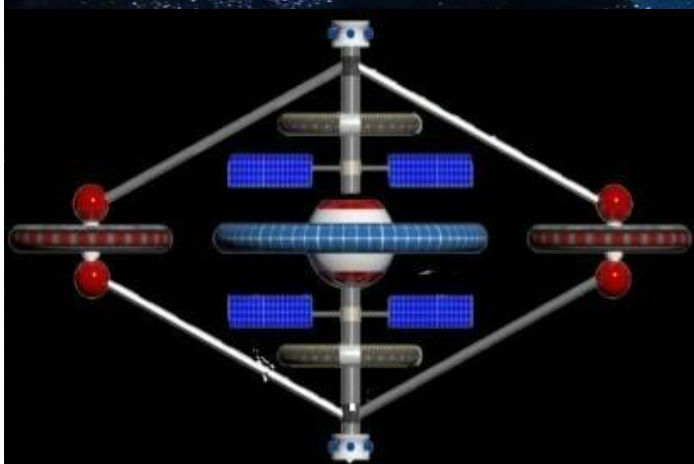


HEXA NEURO



Executive Summary

Imagine you have come to 2080. What changes do you see? You will find that major vegetation is destroyed. Global warming has harmed us in the most significant way. The Earth can't sustain a larger population. What is to be done?

The solution is **Space Colonization**. Space Colonization is the need of the hour. So, we have a fascinating thing to reveal! And that is **HEXA NEURO**. Hexa Neuro is our space colony.

The population of Earth is growing, and there are fewer resources available to support all of us. That's why we're moving towards space colonization—to have our own home in the stars! But getting resources in space is not easy initially, so, under phase-1, we'll start by mining an asteroid called 1992-BF. It has extensive resources worth 330 billion.

To capture this asteroid, we'll use the S.H.E.P.H.E.R.D. technique. Along with this, we'll send a HAB with three astronauts that will manage all of this.

After this, we'll start phase 2: proper colonization of space! Initial problems may arise because people have adapted themselves to Earth instead of space, which makes things like breathing difficult initially. Hence, phase-2 (stability phase) will take time. Initially, we'll provide basic needs directly from Earth until we can do so from space as well.

After successful completion of both phase-1 and phase-2, we will move our colony to orbit of Mars, thereby, using extensive resources of Mars. If things go well, then it would be great because Mars has a lot of space for habitation.

Moreover, in our space colony we have made a truly circular waste management. That is, generated waste would be completely used in different ways.

For this, we have 4 Waste management zones in our colony. We will do proper categorization of waste. 1 out of 4 zones would be used for proper segregation of waste. Plastic waste would be transported to Industries to manufacture something new. Thermoplastics would be exposed under high temperature and pressure. Metals would be renewed by Hydraulic cleaning. Robots would be used again by repairing them and if they can't be repaired, then we would get metals out of it. There would be a special area for industrial waste where technical experts will plan what to get out of waste.

In this way, we will use waste in the best possible way.

ACKNOWLEDGEMENT

This is a thanksgiving note so that we can express our obligation to all who helped us during this wonderful journey.

First of all, we would like to thank NASA for providing such a golden opportunity and platform to all of us so that we can come up with ideas and show our creativity.

Then, we would like to thank our professor Ramanna sir, principal mam, Dean sir, physics teacher for giving us information about the contest and giving us knowledge, motivation along with their valuable time.

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CHAPTER-1

INTRODUCTION

NAME OF SETTLEMENT

AND

INSPIRATION FOR IT

Welcome to the colony Hexa Neuro."Hexa" is a Greek word which simply means a structure with six corners. The literal meaning of hexa is sixth side. As per Greek mythology, the hexagonal shape of colonies helps in saving energy and helps in reducing emissions. "Neuro" means the system of nerves. Here, it symbolizes the control and coordination of the colony.

1.2 NEED FOR SPACE COLONISATION

The world is at a stage where it needs to make a shift from traditional living to the futuristic concept of space colonization. People are increasingly finding it difficult to deal with the challenges that are facing them on a daily basis. The increasing pollution levels in the environment, shortage of water resources, increasing population and shortage of food, energy crisis has pushed us towards exploring outer space which is easier to access and provides better quality of life.

The planet earth is not very large in size and hence it cannot be used as a base for human activities unless we increase its size. We need to find alternative ways to expand our living spaces on this planet. There are many people who believe that space colonization can solve all these problems but there are some people who do not agree with this idea at all because they believe that it will lead us towards destruction instead of development.

1.3 What Hexa Neuro Brings

Hexa Neuro will provide you with all the basic facilities. You can live in peace and harmony with others. You will be provided with a good place to live.

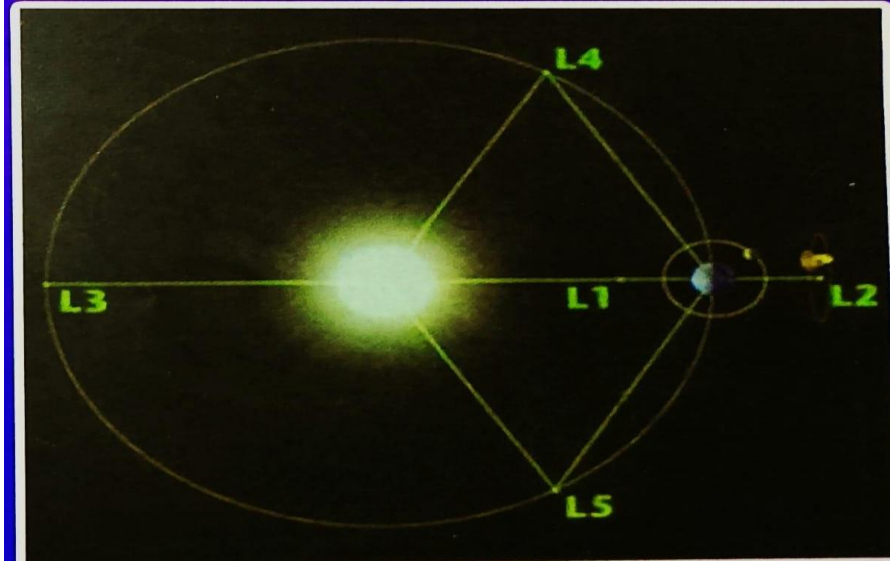
You're going to have everything you need to live comfortably, including a well-stocked grocery store, a tailor shop, and more—all conveniently located within walking distance from your house. And we'll

even throw in some entertainment options, too: there's a cinema where you can watch movies in the comfort of your own home, and a sports stadium where you can hit some balls or throw some discs.

But that's not all! You'll also be able to use our advanced technology to get whatever job you want done right away.

1.4 Location of Our Settlement

The colony would be located in L4 (Lagrangian Point-4). It is the best location for colonization because it is very stable. L4 is equidistant from both celestial bodies. So, transportation would be easy.



1.5 MATERIALS

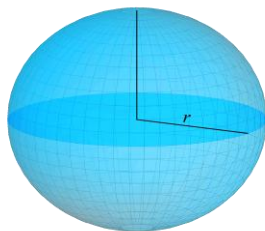
The construction of hexa neuro will be made out of Copper, Tin, Titanium Lattice, Carbon Nanotubes, Regolith, Smart Lunar Glass, Aerogel, Lead, Tough Steel, Bismuth, Polystyrene-Poly dimethyl-Siloxane Di-Block Copolymer Silica, Spider Silk Fibres, Transparent Aluminium Foil, Hard Water and Kapton Cloth.

CHAPTER-2

STRUCTURE

2.1 BASIC SHAPES

- **SPHERE:** -A **sphere** is a three-dimensional object that is round in shape. The points on the surface of the sphere are equidistant from the Centre. Examples of spheres are a ball, a globe, the planets, etc.



Formulas: -

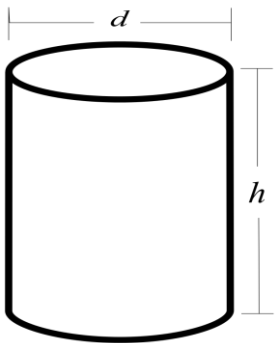
Surface area of sphere

$$SA = 4\pi r^2 \text{ Square units}$$

Volume of sphere

$$V = \frac{4}{3} \pi r^3 \text{ Cubic Units}$$

2. CYLINDER: -A cylinder is a three-dimensional solid that contains two parallel bases connected by a curved surface. The perpendicular distance between the bases is denoted as the height “h” of the cylinder and “r” is the radius of the cylinder.

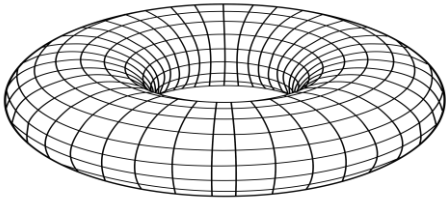


The lateral Surface area of the cylinder = $2\pi rh$ square units

The total surface area of the cylinder, $A = 2\pi r(r+h)$ square units

The volume of the Cylinder, $V = \pi r^2 h$ cubic units.

3. TORUS: -A torus is a three-dimensional shape which is formed when a cylinder is bent in a circular manner and its ends are attached to each other. It looks like a ring or a doughnut. It is the most advantageous basic shape among all basic structures as it provides more space for living with respect to the amount of material used. The pseudo gravity generated by rotation is equally distributed in the interiors.



Formulas: -

Area = $(2\pi r)(2\pi R)$ square units

Volume= $(\pi r^2)(2\pi R)$ cubic units

2.2 DIMENSIONS AND CALCULATIONS

DIMENSIONS: -

Location	Radius	Width	Height Horizon
Habitation cylinder	150m	1000m	770m
Recreation Centre	800m	200m	214m
Entertainment Zone	800m	200m	214m
Agriculture Torus	1098m	250m	214m
Industrial Torus	1098m	250m	214m
Docking port	246m	128.5m	493m
Habitation Torus	1204m	385m	214m

Formatted Table

CALCULATIONS: -

RESIDENTIAL CYLINDER:

TSA= $2\pi r(r+h)$
= 690800m²

VOLUME= πr^2h
= 3140000m³

RECREATIONAL CENTRE:

$$TSA=(2\pi r)(2\pi R)$$

$$=6758705.09m^2$$

$$VOLUME=(\pi r^2)(2\pi R)$$

$$=723181445m^3$$

ENTERTAINMENT ZONE:

$$TSA=(2\pi r)(2\pi R)$$

$$=6,758,705.09m^2$$

$$VOLUME=(\pi r^2)(2\pi R)$$

$$=723,181,445m^3$$

AGRICULTURAL TORUS:

$$TSA=(2\pi r)(2\pi R)$$

$$=9,276,322.74m^2$$

$$VOLUME=(\pi r^2)(2\pi R)$$

$$=992,566,533m^3$$

INDUSTRIAL TORUS:

$$TSA=(2\pi r)(2\pi R)$$

$$=9,276,322.74m^2$$

$$VOLUME=(\pi r^2)(2\pi R)$$

$$=992,566,533m^3$$

DOCKING PORT:

$$TSA=(2\pi r)(2\pi R)$$

$$=190,688.943m^2$$

$$\mathbf{VOLUME} = (\pi r^2)(2\pi R)$$

$$=2,086,944\text{m}^3$$

RESIDENTIAL TORUS:

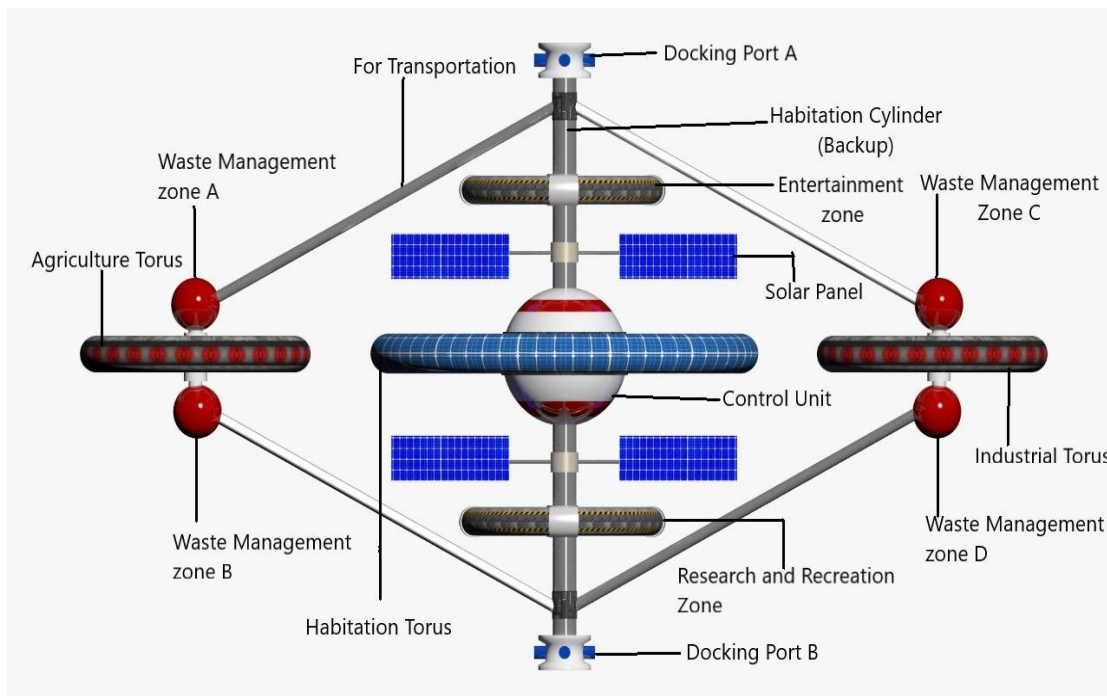
$$\mathbf{TSA} = (2\pi r)(2\pi R)$$

$$=10,171,851.2\text{m}^2$$

$$\mathbf{VOLUME} = (\pi r^2)(2\pi R)$$

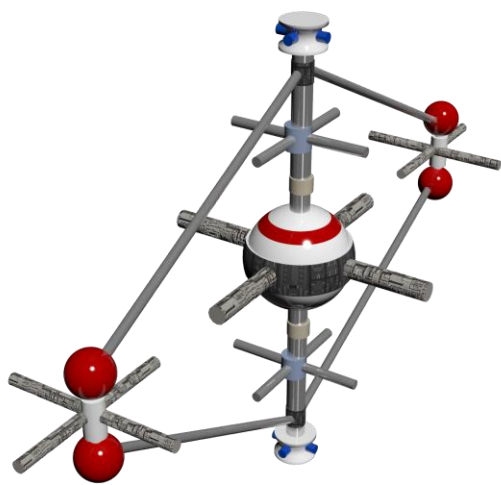
$$=1,088,388,070\text{m}^3$$

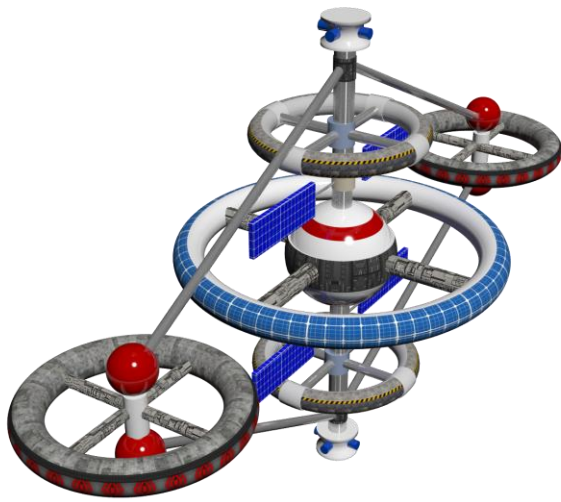
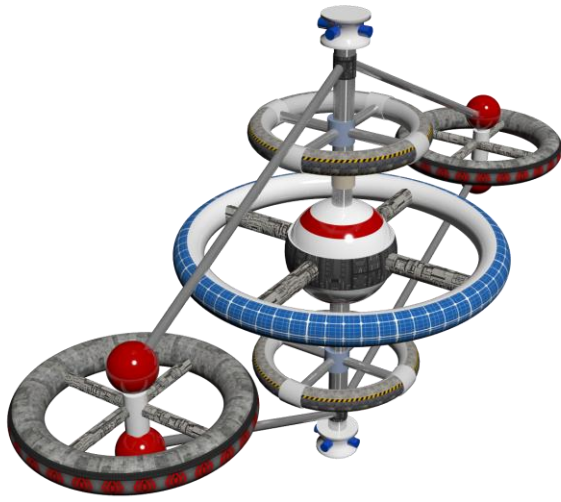
STRUCTURAL OVERVIEW



2.3 CONSTRUCTIONAL SEQUENCE







2.4 DOCKING PORTS

A docking port is a place where all the external activities including transportation and the import-export of goods, industrial machinery and other resources will take place. Hexa Neuro has two docking ports lying at the ends of the central cylinder.

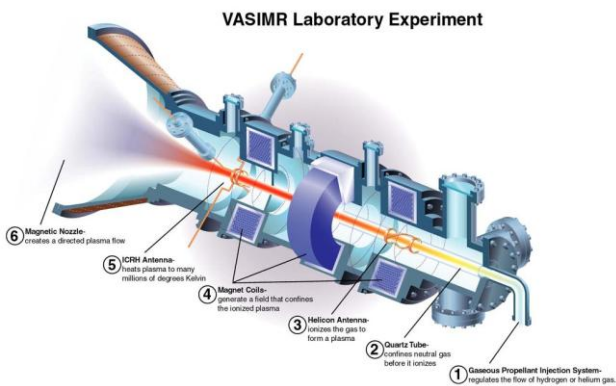
Docking ports will help Hexa Neuro in many ways. First, it greatly improves the efficiency of spacecraft operations by allowing a larger number of missions to be conducted in a short period of time with less fuel used than if they were separated. Second, docking allows new platforms to be integrated into existing stations without having to launch everything at once. Finally, docking can reduce overall spacecraft costs by reducing the number of times that each spacecraft must be launched from Earth.

2.5 THRUSTERS AND BOOSTERS

A thruster is a spacecraft propulsion device used for orbital station-keeping, attitude control, or long-duration, low-thrust acceleration, often as part of a reaction control system. It will allow us to move our colony from our location to other safe places in case of emergency at a high speed.

TYPES: -

- BI-PROPELLANT PROPULSION SYSTEM
- MONO-PROPELLANT PROPULSION SYSTEM
- ION PROPULSION SYSTEM
- SOLAR ELECTRIC PROPULSION SYSTEM



BOOSTERS: -

A **booster** rocket (or engine) is either the first stage of a multistage launch vehicle, or else a shorter-burning rocket used in parallel with longer-burning sustainer rockets to augment the space vehicle's takeoff thrust and payload capability. Boosters are traditionally necessary to launch spacecraft into low Earth orbit (absent a single-stage-to-orbit beyond Earth orbit, core or upper-stage engines).



CHAPTER-3

HUMAN NEEDS IN SPACE

3.1 GRAVITY

Gravity is the force of attraction between two massive bodies. Everybody in the universe has a fixed gravitational pull according to its mass.

IMPORTANCE OF GRAVITY:

Gravity ensures that the blood in our body maintains an optimum blood pressure level. While standing, the blood pressure in our feet is as high as 200 mm Hg (millimeters of mercury). In the brain however, the pressure is only 60 to 80 mmHg.

A living cell exchanges nutrients and waste from its watery environment through the process of diffusion which is effective only over a specific distance. This limitation impacts the size of the cell. Nutrient absorption is therefore much more effective in smaller sized cells. Also, without gravity, we can't walk.

A person in the absence of gravity undergoes many disliked changes and sooner dies. To avoid these changes, we will ensure provision of gravity in our colony by a force called

centrifugal force. The speed of rotating the torus per minute is called rpm. The following is the formula to find the number of rotations per minute.

The RPM of a rotating body is the speed at which it rotates per minute.

The formula to find the RPM is:

$$\text{RPM} = (m) \times (Vs^2/2\pi r)$$

Where:

- m is the mass of the body
- Vs is its velocity at each instant in time

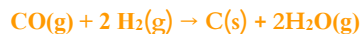
- r is its radius, which is equal to half of its length.

3.2 WATER PRODUCTION

Water is a part of human basic need. Without that we can't survive. Water is a vital resource for people to survive and thrive. Unfortunately, it's not always easy to get your hands on enough of it. Water is not just a liquid—it's a complex compound with many different properties and uses. Some water is produced naturally by plants, animals, or humans; some comes from evaporating or condensing water vapour in the atmosphere; and some can be found in underground aquifers—basically, any place where water is present.

OTHER METHODS FOR WATER PRODUCTION

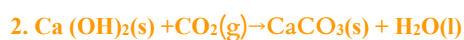
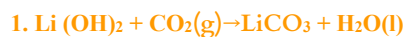
1. Bosch Reaction- Bosch Reaction is a chemical reaction to convert carbon dioxide and hydrogen into water at high temperature. The reaction is as follows



2. Sabatier Reaction- It is a reaction between hydrogen and carbon dioxide to produce methane (which can be used as a fuel) and water. It is a very efficient way to produce water and methane both.



Using acids and bases- Water can be produced by using Li(OH)_2 , Ca(OH)_2 and HCl .



3.3 AIR PRODUCTION

Air is the basic need of life. Air is not alone oxygen. It is a mixture of gases. Hence it is necessary for us to have an atmosphere in our colony just like Earth.

Oxygen Extraction Methods

Mars contains 95% of CO₂ in its atmosphere and using molecular sieve with membrane pore of size 0.4nm O₂ will be separated. It can also be separated by adding 4H₂ to CO₂ from which methane and water will be produced.



Ultrasonic Electrolysis

- 1.) After that electrolysis of water will be done which will produce oxygen and hydrogen. Thus, it is essential for the governments to direct investments towards the field of power generation. On the other hand, hydrogen and electricity together represent one of the most promising ways to realize sustainable energy, while fuel cells provide the most efficient conversion device for converting hydrogen into electricity.
- 2.) Moreover, purified hydrogen and oxygen can be used in fuel cells (to produce direct current electricity) and catalytic burners (for heating and cooking) without poisoning or damaging the noble metal catalyst materials.
- 3.) It can be used as a fuel in internal combustion engines either pure or mixed with ordered hydrocarbon fuels.

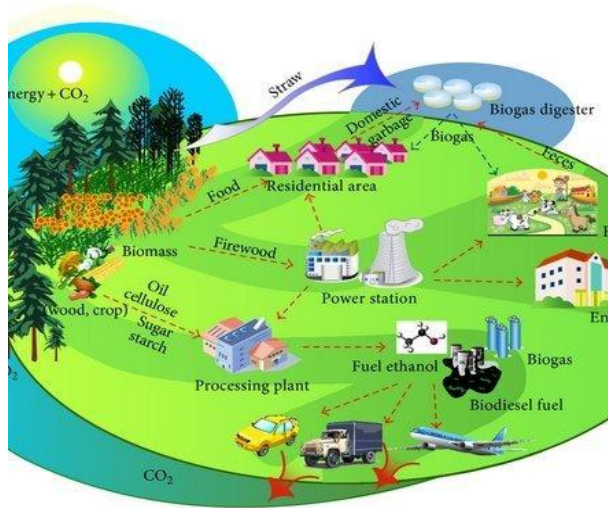
Nitrogen extracting methods

Nitrogen on Mars is mostly in the atmosphere, that will be extracted using a molecular sieve of pore size 0.3nm. Nitrogen is also present in Mars soil in the form of nitrate salts and ammonia.

Extraction of carbon dioxide, argon and ammonia from Mars.

Carbon dioxide is present in plenty along with argon and ammonia in

the atmosphere of Mars. All these gases will be extracted by passing them through molecular sieves of



different sizes.

3.4 ELECTRICITY

Energy is important for the smooth functioning of our colony. Energy is required to provide all the basic to advanced facilities of our colony to people. The following are the ways by which we are going to produce electricity in our colony.

ELECTRICITY GENERATION METHOD

In our colony we have solar panels which are going to provide a major portion of energy requirements.

1. Hyper E. X. Solar cells- These cells will be inserted on the outermost boundary of the residential torus. These cells contain quantum dots which can capture 48% of solar light rays falling on it and convert it into electricity. As radiation is more in space, they are 40 times more efficient when used on Earth.

2. Copper Sulphide Nanoparticle Hybrid cells- These cells are made up of copper sulphide nanoparticles and will be inserted on the outer boundary of the docking station. These cells have an efficiency up to 50% but are 40 times more efficient.

ANTI SOLAR CELLS OR THERMOELECTRIC GENERATOR

It is a device that converts heat flux into electrical energy in case of temperature difference. Waste heat can be utilized by this method and can be converted into electricity.

HEAT TURBINES ON MARTIAN BASE

As storms blow on Mars with a high velocity. This fact can be utilized by inserting turbines on Martian Base. This will generate a huge amount of electricity.

THORIUM BASED GAS TURBINE MODULAR HELIUM REACTOR

Gas Turbine Modular Reactor is a new type of reactor with high efficiency. It uses helium as its coolant. It can generate up to 300×10^3 kw of electric energy. Thorium and Helium are present in excessive amounts on the Moon and Mars surface.

LITHIUM-ION BATTERIES

It is a type of rechargeable battery. Lithium-ion batteries will be used to store electricity for portable electronics.

3.5 WASTE MANAGEMENT

A waste management system is nothing but a recycling system. In our space settlement there is no waste thrown out. All are recycled for each and every thing that consumes some or other waste products. The wastage is divided into the industry. They are:

- **SOLID WASTE**
- **LIQUID WASTE**

SOLID WASTE:

Solid waste will be crushed and formed into liquid and

recreated objects. In space settlement food, cans etc., like this thing is recreated. Food can be used for compost for growing plants. In that food there are so many nutrients which are used by plants. Metals like tin cans etc. are recycled and reused.

LIQUID WASTE:

Liquid wastages are purified and used for agriculture and industries want use for that purposes wastewater

will be used. The chemical industries release chemicals we use for our further needs.

RUSTING OF MATERIALS:

Materials such as paper, clothes, etc. can be used by domestic rather than human beings. This is a reasonable solution to reduce some pollution in our

settlement. Materials such as some kinds of glass, clothes etc.

3.6 AGRICULTURE

Food is the basic need of life. As food is an essential part of our life, it needs to be produced in bulk. But we are in space, not on Earth. The people wouldn't like to feed themselves with food capsules or injections. It has been calculated that a healthy human needs 3.1 kg of food along with 2L water for survival. So, keeping all of this in mind we are going to use the following agricultural techniques to meet the demands of the people of our colony.

HYDROPONICS

Hydroponics is the technique through which cultivation of food is 30% faster in the absence of soil. In this technique, a reservoir, water which contains nutrients, and an air pump is needed. Hydroponics has many techniques involved. Following are the techniques which will be used:

WATER CULTURE: In this method, plant roots are exposed to a solution of nutrient rich, oxygenated water. The plants float on the water in the reservoir. The air pump pushes the air which increases its growth. It is one of the most common hydroponics techniques.

N.F.T.: It is a very effective method but needs high maintenance. In this technique, the reservoir contains

oxygenated nutrients. The pump transfers the water regularly to the root nodules of the crop present in the grow tray which is slightly tilted. The water flows through the tray and at the end there is a hole which drains the water back to the reservoir.

AERONOPICS

It is the most common technique of hydroponics in the system of aeroponics like the NFT root of the crop is exposed to air and the nutrient pump sprinkles the water to the root of the plant. These techniques will be practiced commercially on a large scale.

AQUAPONICS

Aquaponics is the combined mixture of aeroponics and aquaculture. In this system, aquatic animals would be kept in the reservoir which contains water. Aquatic food is an important part of the food.

3.7 TEMPERATURE AND PRESSURE

TEMPERATURE MAINTENANCE

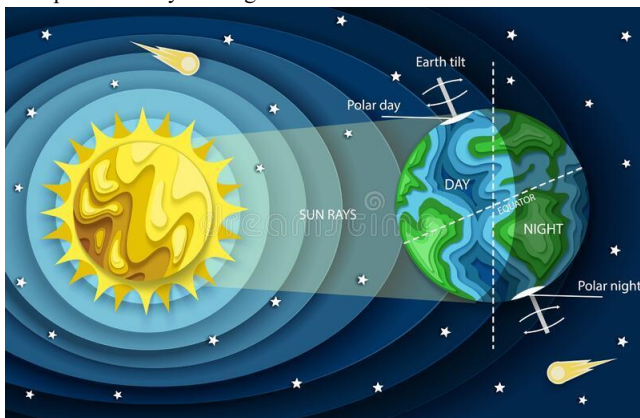
Temperature will be maintained in our colony by using thermal inductors, resistors, thermo-acoustic refrigerator and AC duct which will be inserted on the inner surfaces. Thermal sensors will be inserted at certain distances which will be used to detect any change in temperature (as air will become hot because of friction). These sensors will have a hot air suction facility that absorbs hot air, condenses it and releases it back into the atmosphere.

PRESSURE MAINTENANCE

Pressure is also a very important aspect. The settlement would be provided by the same pressures on the Earth as in case if the pressure increases or decreases the people will die. Pressure gauges and pressure vessels will be inserted beneath the pipelines which will automatically expand, or contract will increase or decrease in pressure.

3.8 DAY AND NIGHT CYCLE

Smart glasses will be attached to the illuminated areas which will not allow all the heat energy to enter. Reflectors will be located at the above docking stations. These reflectors will be rotated at an angle so that the solar rays will enter the illuminated areas and that time would be considered as day. At night these reflectors will be rotated again so as to create a night scene. Gradually the temperature will start increasing with day time and start decreasing with night time. The following table shows the time period of day and night in different seasons:



3.9 SEASON CYCLE

SUMMER SEASON

For creating a feel of summer season thermal inductors will be used to increase the temperature. If the temperature increases more than required temperature, thermal sensors will absorb the hot air, condense it and send the cool air to us again.

WINTER SEASON

For winter season cool air will be released using AC ducts. Thermoacoustic refrigerators will maintain the cool temperature in the colony. If the temperature decreases more than the required temperature, thermo-acoustic refrigerators will stop releasing cold temperatures.

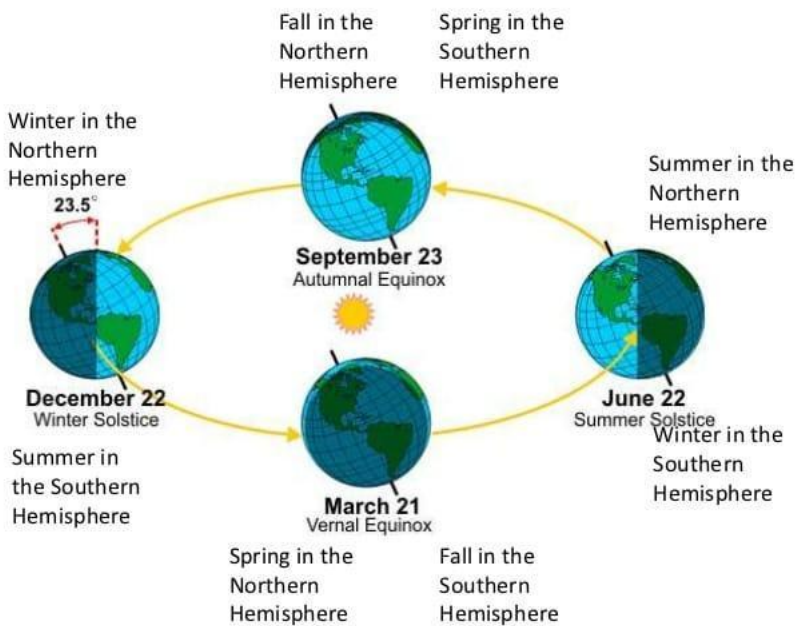
MONSOON SEASON

In the monsoon season, cloud seeding method will be used. In this method, silver iodine will be dispersed in the air which leads to cloud formation and causes rain.

CONTROLLING HUMIDITY

1.) **DEHUMIDIFIERS**-Dehumidifiers are an electrical appliance which reduces and maintains the level of humidity in air.

2.) **ULTRASONIC HUMIDIFIERS**-Ultrasonic humidifiers work on the principle of “ultrasonic atomization”. It produces an ultrasonic sonic sound that cannot be heard by the human ears which results in formation of water droplets.



<http://www.srh.noaa.gov><http://www.srh.noaa.gov>

CHAPTER-4

OPERATIONS AND AUTOMATIONS

4.1 RADIATION

Radiation is a type of heat which comes from the sun. Earth is protected from this radiation because of a layer of ozone which is present 50 Km above the earth's surface. But in space we do not have such a layer to protect our space colony and this radiation is also very warm and dangerous for humans. Our colony can be protected by these types of radiation:

Neutron radiation: It is a kind of ionizing radiation which consists of free neutrons.

Cosmic Radiation: These kinds of radiations involve high energy of protons and move with the speed of light.

X-Ray and Gamma Radiation: It is a type of high energy electromagnetic radiation. This radiation is very harmful for the human body.

Illuminated Areas: In illuminated areas for protection from radiation are Mixture of smart glass and regolith, Carbon nanotubes, Spider silk fabric, Transparent aluminium foil, Lead glass, Aerogel, Bismuth.

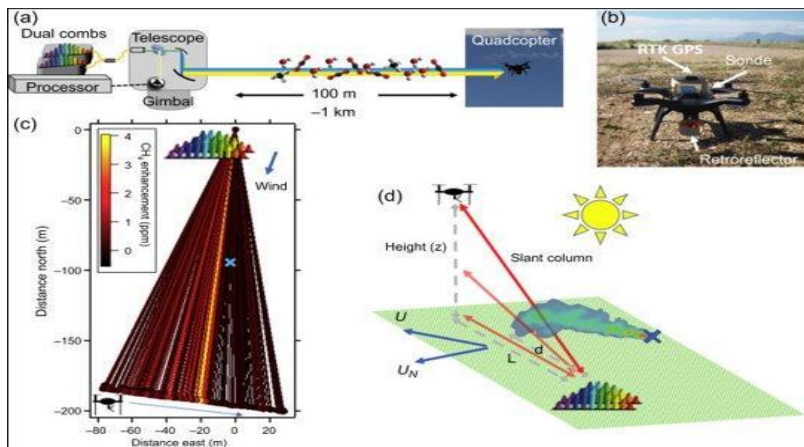
4.2 ILLUMINATION

Think of the earth without an ozone layer and magnetic field. Nobody can live because radiation can touch the earth's surface and life is then not possible on earth, so illumination is nothing but the surfaces around our colony which reflect back the radiation to make life possible in hexa neuro. For this we need the reflector that will reflect back the radiation.

Retroreflector: -

A retroreflector is a device or a surface which has the ability to reflect back the radiation towards its medium with very little scattering. This works at a wide range of angles of incidence, unlike a planar mirror, which does this only if the mirror is exactly perpendicular to the wave front, having a zero angle of incidence. being directed, the retroreflector's reflection is brighter than that of a diffuse reflector.

WORKING OF RETROREFLECTORS



4.3 TRANSPORTATION

Transportation is very important for colony:

We can do two types of transportation

- 1) Inner transportation
- 2) Outer transportation

In the inner transportation we are transporting crops from the agriculture zone, machines to docking ports, goods from industries, wastes of the colony to waste management and chemicals for the research Centre. etc...

Vehicles for transportation

- 1) metros – goods transport
- 2) trucks - goods transport
- 3) three wheelers – government transport
- 4) mini buses – government transport
- 5) flying cars – private transport
- 6) hoverboard – private transport

All vehicles are eco-friendly to nature because this moves from energy generated by solar panels.

- We will manage mini-flying buses, flying cars, flying three wheelers with satellites. so, we can get control of accidents.
- In the colony all vehicles are controlled by AI or robots.
- In the living area we divide the area by 500m for minibus stations.
- For three wheelers, you have an app in your phone to call the nearest empty three-wheeler. After calling it will pick you up in 10 mins then you put the drop location and it will drop you.
- For metros and trucks, we have tracks in the whole colony, and it is only used for goods supply and waste supply.

Outer transportation

In outer transportation we will use spaceships as a vehicle. With spaceships we will explore the world.

4.4 INDUSTRIES

Industrial activities are the important work by which we can generate the products and goods for the people of the hexa neuro. Suppose we set up the space colony and there are no products and goods. How funny it would be. There are three types of jobs and types in the industrial zone. The first is production industries, second research industries and head department of industries.

Production Industries

Agricultural Industries (for preparing and making the goods by agricultural area).

Medical Industries (for preparing the medicines).

Research Industries

Agricultural Labs (for agricultural development).

Medical Labs (for medical development).

Physical Labs (for development of recreational activities and non-zero gravity equipment).

Biological Labs (for human study and development).

Chemistry Labs (for chemistry field and discovering the new method for water production).

Radiation Labs (monitoring the radiation in hexa neuro).

Head Industry Unit: -

The head industry unit is like a headquarter of industries. This unit is managing the all budget, program (new medicine, disease, way of production of water and food), to grant the permission for new production of good and all and last but not the least to make the pre-planned chart for the goods and other production so that the waste is completely used.

Industries will be there only in the industrial tours. Works like manufacturing, refining or processing of

materials, treatment and disposal, separation, recycling, extraction, electricity generation all these works would be done in the industrial tours.

CATEGORISATION OF INDUSTRIES: -

Industries in HEXA NEURO would be in the following way: -

- SPACECRAFT INDUSTRIES
- ROBOTICS INDUSTRIES
- WASTE MANAGEMENT INDUSTRIES
- MEDICAL INDUSTRIES



- ELECTRIC INDUSTRIES

4.5 DEFENCE

Defense is a very important thing that we have to do in our colony. we all want to live safe live there, From whom do we have to be safe?

Asteroids, as we all know that in the space there is so many asteroids. If one day any asteroid passes through our colony we have to that asteroids and protect ourselves so, how we save our colony.

There are two methods from that we save us:

1)laser method

2) Robotic satellite method

- If an asteroid is small then we use a laser, if it is big then we use a satellite method.
- With the help of a laser system, we can destroy asteroids.
- If it is bigger then, we change direction with the help of a satellite.

4.6 ROBOTICS

It is very hard to work in space for humans. That's why we are making machines that can help and assist humans.



Fields in which robots are used :

- 1) Transportation
- 2) As Servant
- 3) Industries And Agriculture
- 4) In Outer Colony
- 5) Education, Security and Medical
- 6) Many More Personal Works

In This Robots We Are Using Ai for Control

Robots Make Work Easy in Space Colony and in Space Also.

Robots Will Be Used as Driver, Farmer, Worker, Assistant and So On...

4.7 COMMUNICATION

Communication in space colonies is very important because if communication is not there how people can talk to friends, relatives and others. So, it will be towards the relationship between people and their environment and day activities so people can communicate. And it takes according to environment activities. So, we have two categories of communication: -

1-INTERNAL COMMUNICATION-In this type of communication, both the sender and receiver will be present in HEXA NEURO. 2-EXTERNAL COMMUNICATION- In this type of communication, either the sender or the receiver would be present at HEXA NEURO.

INTERNAL COMMUNICATION- Transmitter and receiver method: This method consists of a transmitter which encodes a message into an optical signal and then reaches its destination i.e., receiver. Wi-Fi And Li-Fi techniques: Wi-Fi and Li-Fi techniques will be adopted for

communication. Wi-Fi (WIRELESS FIDELITY) is a communication technique in which a device is connected to another device through wireless network connection. Li-Fi (LIGHT FIDELITY) Is a Wireless communication technology that utilizes light to transmit data and position between two devices.

EXTERNAL COMMUNICATION-

Transmitter and receiver: External communication will be done using transmitter and receiver. Messages will be transferred and received using a transmitter and a receiver which will work on the basis of radio waves.

Digital OTP: OTP (One Time Pad) is a technique to be cracked and requires the use of a one-time pre-shared key the same size or longer than the message. In the technique, a plaintext is paired with a random secret key and then each bit of character of the plaintext is encrypted, combining it with the corresponding bit or character from the pad using modular addition.



4.8 RECREATIONAL ACTIVITIES

Recreation activities are the most important thing which we do every day. Recreational activity enhances our physical strength, concentration, self-confidence and self-awareness. For recreational activity we are also doing some recreational work for the people who are living in our colony. There will be one recreational Centre. One tori is used for recreational center.

Virtuix Omni:-The Virtuix omni is an omnidirectional treadmill simulator for virtual reality games and other applications. It uses a platform to simulate locomotion i.e., the motion of walking, requiring both special shoes or shoe covers and a surface that reduces friction. It works in conjunction with the HTC Vive and allows a vive user to walk within a limited number of games.

ZERO GRAVITY VOLLEYBALL: -

By name only we can judge this game is played in zero gravity. In this game, you have to wear some special gears and equipment. Teams will pass the ball to other teams and the ball should not touch the ground.

ZERO GRAVITY FOOTBALL:-

This game is also played in zero gravity like the previous one. In this game the same equipment is used but with some little differences. Players will play football in zero gravity.

ZERO GRAVITY BASKETBALL:-

In this, players are equipped with the same gears and equipment. Players will play basketball in zero gravity.

These games and recreational activities improve the skill of humans to play or do work in zero gravity.

ZERO GRAVITY CRICKET:-

Last but not least, zero gravity cricket. In this game also players are equipped with the same gears and equipment. Players will play cricket in zero gravity.

CHAPTER-5

HUMAN LIFE DESIGN

5.1 PARLIAMENT

- In our colony, we need parliament to make our colony good.
- The parliamentary system of government was considered best by the constitution makers keeping in view the historical background.
- It is a system of stability and responsibilities and satisfies the needs of the people in democracy.
- The speaker presides over the meeting of the colony.
- The main work of parliament is to make rules, laws and order. You can study it in the next chapter.

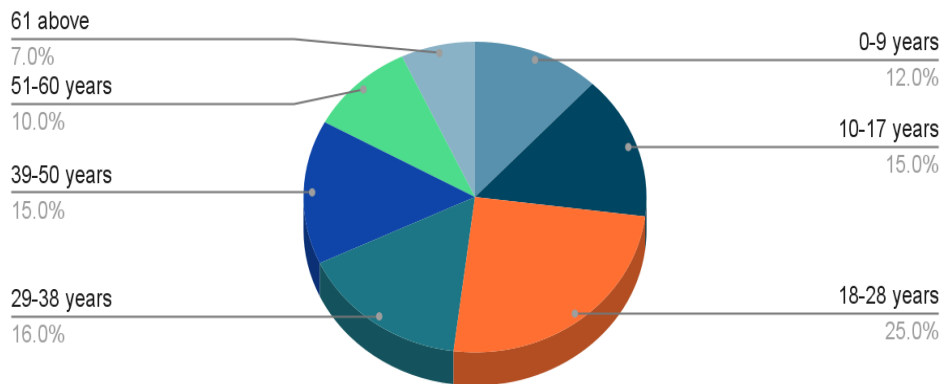
5.2 LAW AND ORDER

- No smoking and taking alcohol were not allowed
- All children who had completed their studies had to attend an interview. The interviewer has to ask some questions or type of test, if he qualifies then he gets a job.
- No children should be working in between 10 years it means except studies or some things no child was work for: asteroid mining, hotel server, etc.
- Total torus or total part of Hexa neuro should be clean. If anybody does not follow these rules they should be fined or punished.
- All people should use only cards to get money as a technological system like a credit system.
- These are the major laws of the colony. They we can control laws by strictly following
- If anyone breaks any law, they will be caught by police, and these are big offences.
- This is not strictly punishable under adults (below 18 years), if they can do any dangerous crime like murder, they are boycotted from that region and sent to earth.
- Every person must work after 30 years.

5.3 POPULATION SYSTEM

DEMOGRAPHY CHART

Demography



5.4 BASIC AMENITIES

EDUCATION

As we all know, education provides stability in life, and it's something that no one can ever take away from you. The

children of HEXA NEURO will be the future of our colony. Top class schools would be provided in the colony for education. The children will be prepared for their future. Highly qualified teachers will be employed for the education of children. Teachers would be employed as humans and the rest of the staff would be employed as robots. Each school will be provided with many facilities.

HEALTH CARE

Hospitals matter to people and often mark central points in their lives. Hospitals play an important role in HEXA NEURO. Five hospitals would be constructed in our colony. Hospitals will be provided

with high quality medicines and many other facilities so that patients don't feel any type of discomfort. Both humans and robots will be appointed as doctors, nurses and other staff members.

SECURITY

It looks after the safety of the neighborhood and prevents crime by patrolling the colony. Five police stations will be constructed in our colony. Police station will provide tight security so no member of the colony can get a harmful feeling in his mind. Both humans and robots will secure our colony.

RESIDENTIAL FACILITIES

HEXA NEURO will have top-class residential facilities. The facilities provided in HEXA NEURO are as follows: -

VILLAS

Their houses will be owned by job class people or respected persons. These houses will have 2 floors on each floor.

BUNGLOWS

These houses will be owned by job class people or respected persons. These houses will have 2 floors with 3 floors on each floor.

REFERENCE FLATS

These flats will have 4 floors and will have the same structures. The flats will be classified on the basis of the number of rooms.

HOUSES	CAPACITY	AREA
1BHK	3 PEOPLE	900 Sq Meter
2BHK	4-5 PEOPLE	1100 Sq Meter
3BHK	5-6 PEOPLE	1300 Sq Meter
4BHK	7-9 PEOPLE	1600 Sq Meter

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5.5 OBSERVATORY

In our colony, Hexa Neuro, you will have the opportunity to observe space from a state-of-the-art observatory. Advanced technology will be there along with AI and VR support. You will get the feel of space in this top-of-the-line facility! The colony is built on the principle of exploration and discovery, where we strive to create a space that is filled with knowledge and beauty.

Our observatory is an advanced technology that will allow you to experience space as it really is. You can see planets, asteroids, and even other planets passing by (if they are in our solar system). With this type of technology, you'll get a feel for what it's like being in space without actually going there.

5.6 CONNECTION

CONTROL UNIT: -

The control unit of Hexa Neuro would be there at the center of the residential cylinder. All the operations that are going to be conducted in space colony are going to be managed from here. There are some guards that check the camera and all other machines in the main control room; if any asteroid is coming their way, they will know about it immediately by the HN's telescope. It is having ability to discover and characterize most of the potentially hazardous asteroids and comets that come within 30 million miles of Earth's orbit. Regular checking of resources would be carried out here. The colony would have 24-hour CCTV security surveillance. For transportation we will be using shuttles, colony location system (CLS) this is designed to provide locations of all vehicles to control unit by worldwide three-dimensional position and navigation information.

CHAPTER-6

BUSINESS

REVENUE MAKING

AND

BUSINESS MODEL

Business is an important thing in our colony hexa neuro for trade and recover the funds that is used the construction of hexa neuro.

Request for the funds: -

Request for the funds is the first step for making our colony. Funds are invested by private companies and the government. So that the price of the construction of the hexa neuro is reduced.

Contract for the homes: -

The people who are coming in our colony have to sign a contract of money for buying houses or to take them on rent.

Moon mining: -

Moon mining also can be done for some minerals like chromium, titanium, helium, aluminium, magnesium, krypton, xenon, silicon.

Revenue making: -

Revenue will be collected to drive out the loan which is taken for the construction of hexa neuro and to gain some profit. It will be collected for proper administration, for public projects and in improvement in hexa neuro.

For collecting the revenue some methods are: -

Inheritance taxes: -these taxes will be paid by the people who inherits the property of another person.

Federal Excise Tax: -these taxes will mainly pay by manufacturers and distributors of goods.

Corporate Income Tax: -these taxes will be imposed on the income or capital of corporations, analogous legal entities and companies.

Individual Income Tax: -these taxes are mainly applied on wages, dividends, salaries, interest and other income a person earns throughout the year.

There are some more methods by which we can generate revenue. prominent among these are receipts in the form of dividends from public sector enterprises.

CHAPTER-7

COSTING AND SCHEDULE

COSTING

 The following table shows capital requirements: -

Purpose	Expenditure (in USD)
Habitation Cylinder	26742 million
Defence	22424 million
Recreation Center	15765 million
Entertainment Zone	12443 million
Agricultural Torus	27652 million
Industrial Torus	39750 million
Docking port and boosters	20653 million
Habitation Torus	34943 million
Robotics	10764 million
Machinery	8973 million
Transportation	7889 million
Other Expenses	55000 million

Salary of Employees	12500 million
Total	295.5 billion

SCHEDULE: -

Determining The Schedule or The Timetable Is a Very Important Task in Order to Pre-Plan Our Construction. The Following Is an Approximate Illustration for The Timetable of The Construction Process of the Settlement.

The Approximate Time for Construction of Our Colony Would Be 40 Years.

The Thing Which Justifies Such Timing Is That We Will Use Quality Materials And Will Form the Structure in the Best Possible Way.

Another Reason for Long Time Duration Is the Complexity of Our Structure.

Construction Would Start In 2043 And After

Formation of Basic Structure, it would be Sent into Space for Development.

THANK

YOU!

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