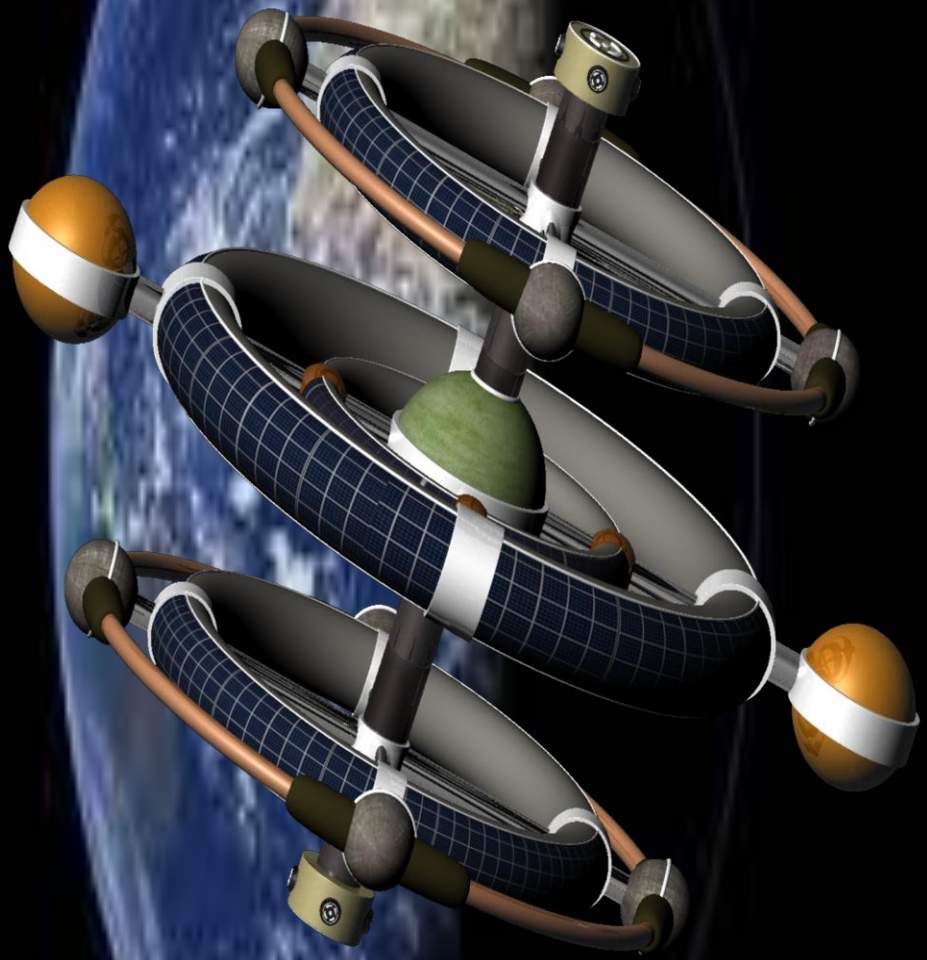
BE_001



BEYOND EARTH-001

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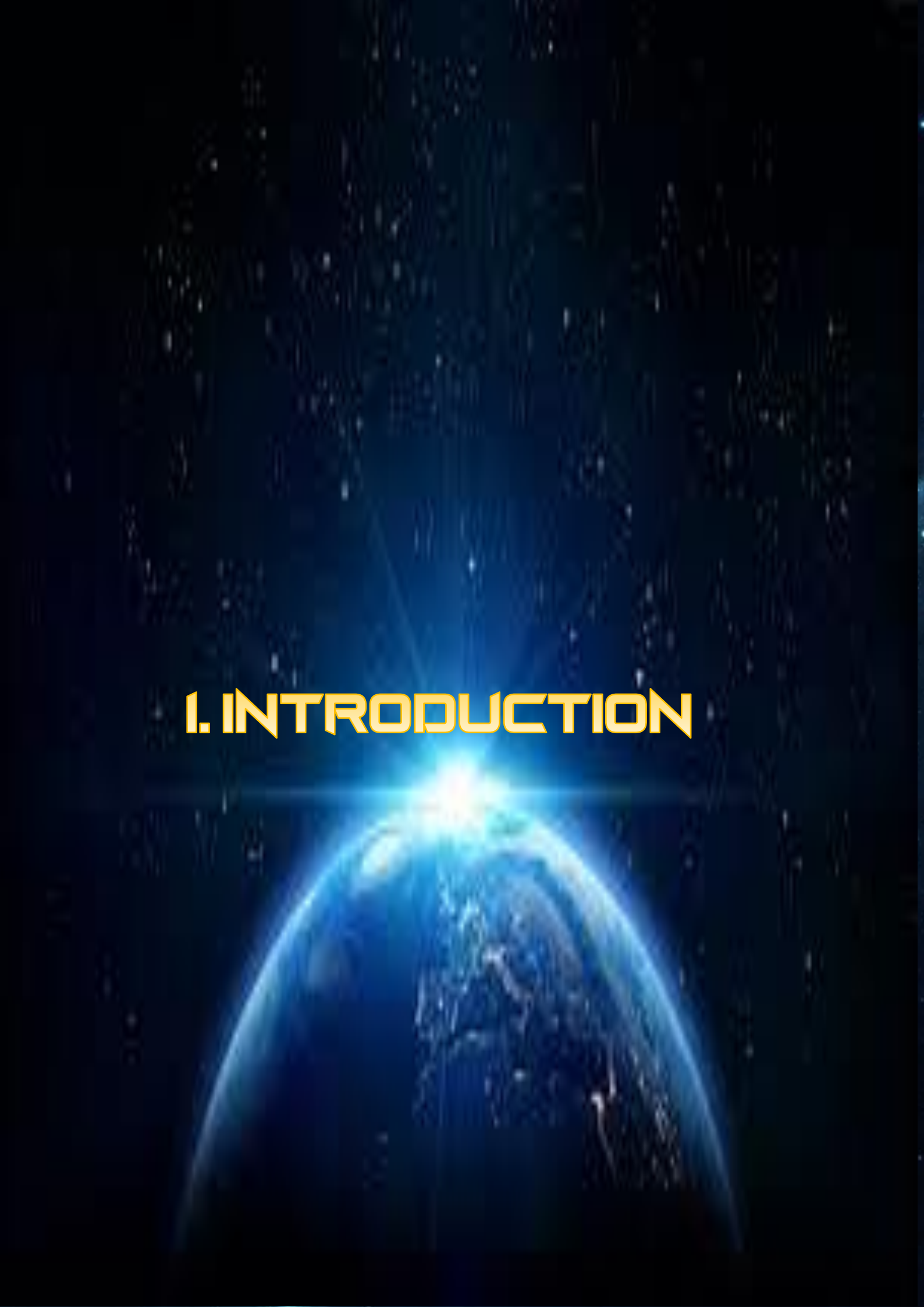


I. INTRODUCTION

1.1 ACKNOWLEDGEMENT

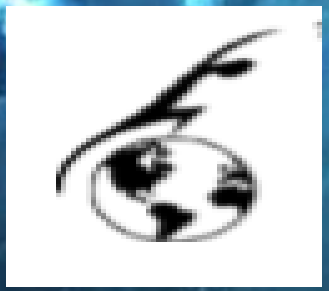
BE-001 is the combination of valuable ideas. We are greatly thankful to our parents for encouraging us to perform in "NASA AMES SPACE SETTLEMENT CONTEST" and show a way and helping us to frame the structure of the BE-001.

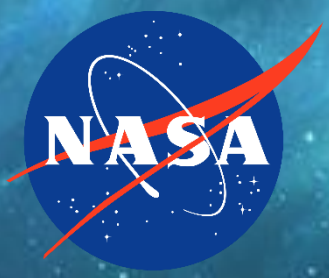
We are thankful to our Principal Mam Mrs HEMALATHA for her enormous support and encouragement. We are also thankful to the overall support from Mr. B. VIJAY, our Physics teacher Ms TAMEZHENEAL, our Chemistry teacher Mr RAVI TEJA and our English teacher Mrs SANGEETHA for their guidance and for giving importance to our project. We are also thankful to all our teachers who have supported and have given excellent ideas which were required in building the BE-001.

"With the guidance of all our teachers we had created BE-001"

We are also thankful to our seniors for their utmost help and their tremendous support. It is they who motivated us to participate in this contest.

Finally, the BE-001 was created by the combination of the wonderful ideas which were given by all our parents, teachers and seniors and also we are thankful to "NASA SPACE SETTLEMENT CONTEST-2018", as they made us to find out the hidden talents in us and be a part of this project.





1.2 TEAM MEMBERS

1.	AADITYA RAJA.R	14
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3.	BHARATH.R	14
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2. ROCKET

2.1 ROCKET ALLOY

Rocket alloy:

Alloy used in rockets should be best, cheap, and easy to prepare. Their qualities are:

- ❖ High specific strength
- ❖ High specific modulus
- ❖ Fabrication
- ❖ Easy availability
- ❖ Critical requirement
- ❖ Service condition
- ❖ Light weight

Special requirements:

1. High pressure
2. High temperature
3. Thermo-structural needs
4. Soft magnets
5. HED permanent magnets
6. Bi-metallic
7. Opto-electronics
8. Electro optics

Alloys:

15CDV6- Low carbon steel used in rocket motors.

M250 - Merging steel with high strength and high toughness used in booster solid rocket case.

Titanium alloy- (TI-6AL-4V) used in high pressure bottles.

Aluminium alloys- used in liquid propellant tanks, engine components, airframe in reusable launch vehicle. (AA2219), (AA2014), (AA606), magnesium/mg-li alloy is used in upper stage of rocket payload, avionic decks, equipment bay structure

They can bear high temperature, high pressure and they are weightless.

2.2 ROCKET FUEL

The fuel used in rocket is liquid hydrogen. This is the most efficient and useful propellant. The hydrogen will

react with oxidizer to form energy which will move the rocket from the earth surface. Reaction

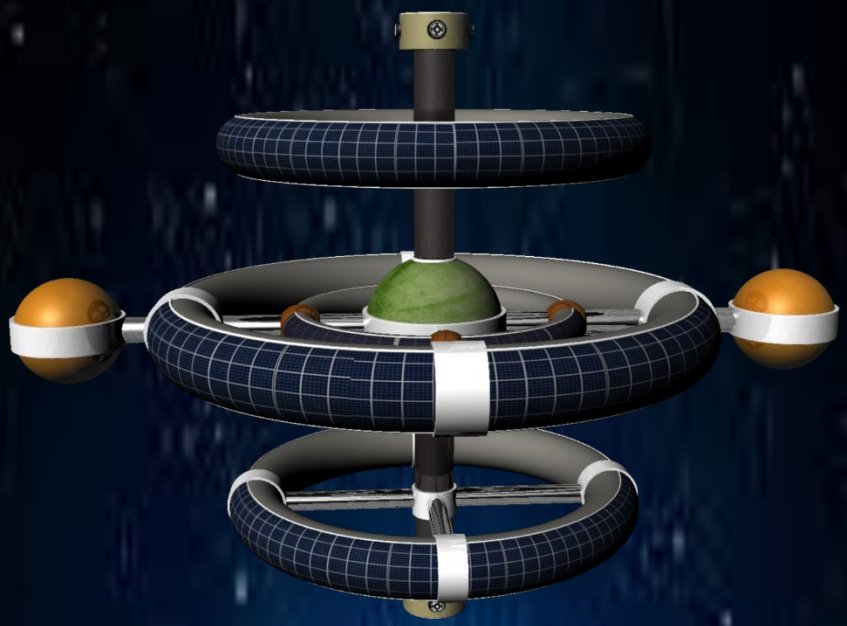
$H_2N + o_2 \longrightarrow H_2 + N$

In this the nitrogen combusts. It burns causing fire. Which provides thrust.

2.3 ROCKET LAUNCH

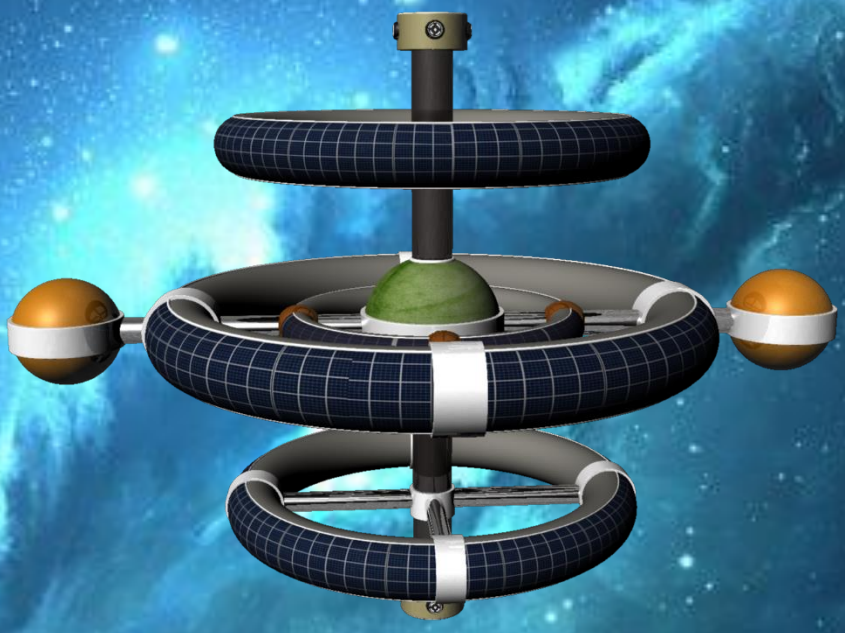
The parts of the settlement will be taken to the space using rockets. Thus the rockets need to be launched. These rockets will be launched from earth. The rocket is launched it reaches the location L2. There will be 4 rockets launched like this. In the first quarter part of the year, in this the central hub and the small torus will be built. The second part of the year the building of the larger torus will be completed. Like this, in the next five years, one fourth of the complete shuttle will be complete. This continues till the complete settlement is built. Thus rocket launch has an important part in the creation of the settlement. The settlement will be sent up in space by a rocket launch. There will be ten rockets launched. The first rocket launch will carry $1/6^{th}$ of the larger torus. Six launches will be done like this to completely take one larger torus into the space.

There will be another launch made to completely take the other two torus to space. One smaller torus will be taken to space by using two launchers. There will be two launches made like this.



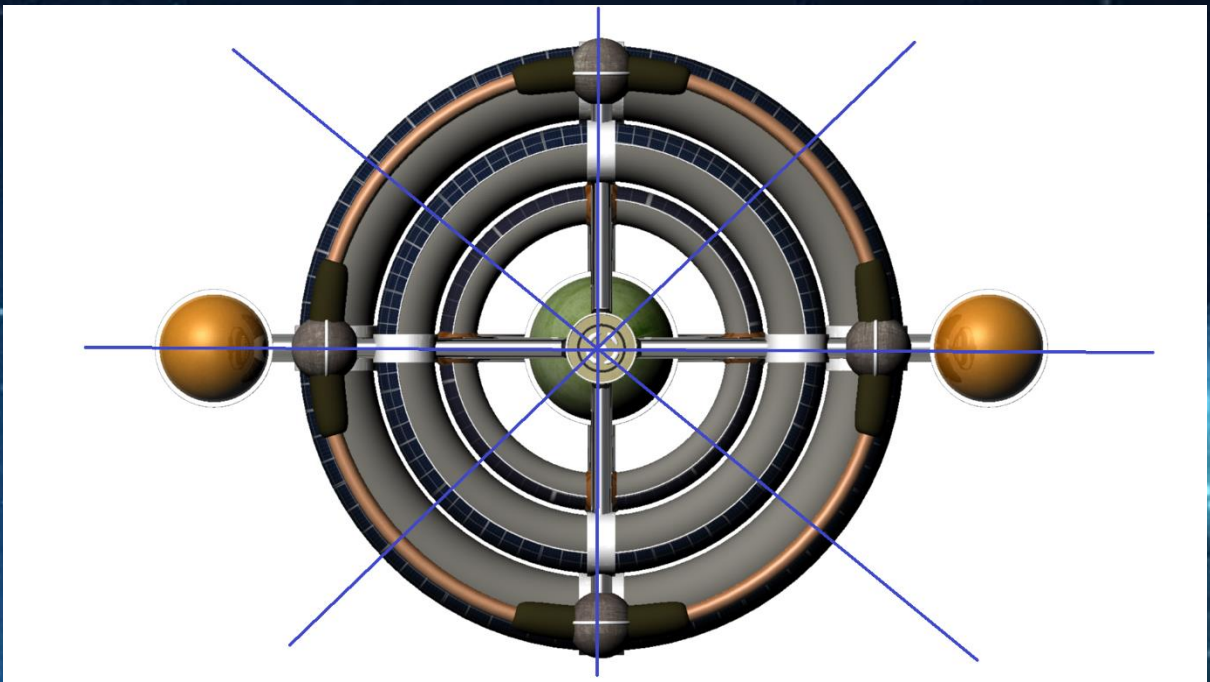
3. Settlement

3.1 STRUCTURE OF THE SETTLEMENT



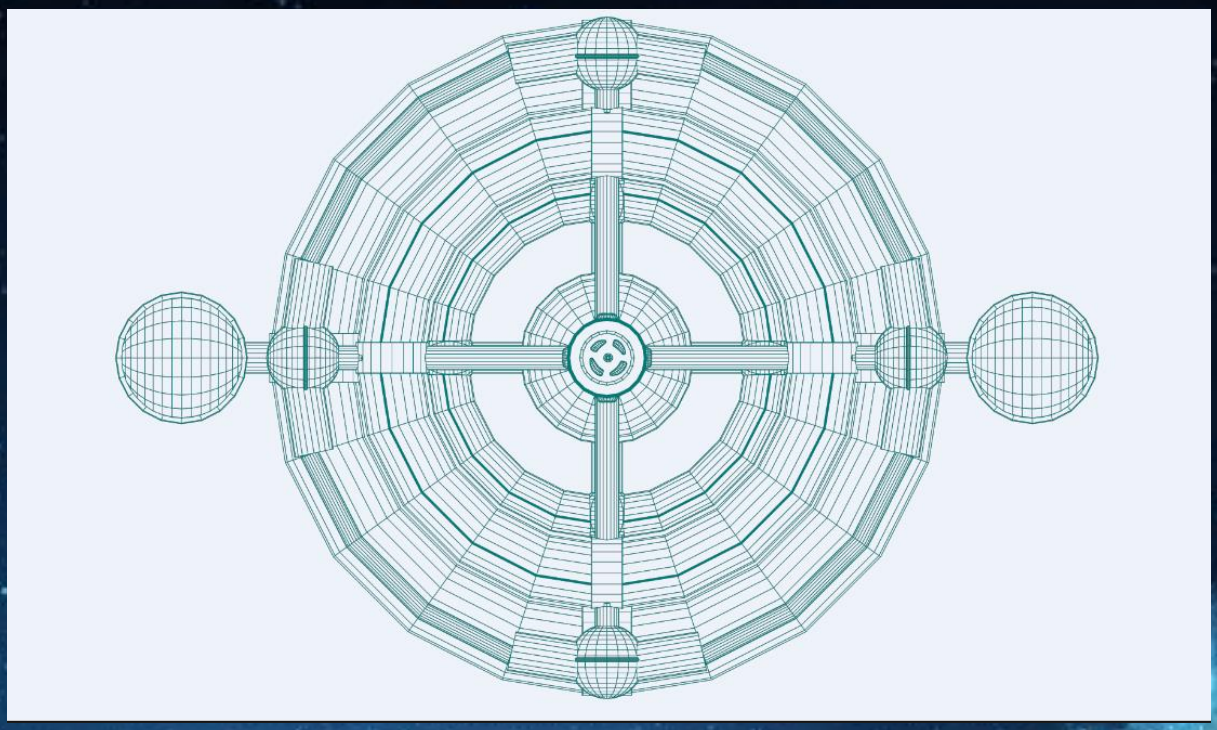
This is the structure of our settlement. It has 4 torus and 2 spheres. It also has a double tori in the middle.

This is the front view.

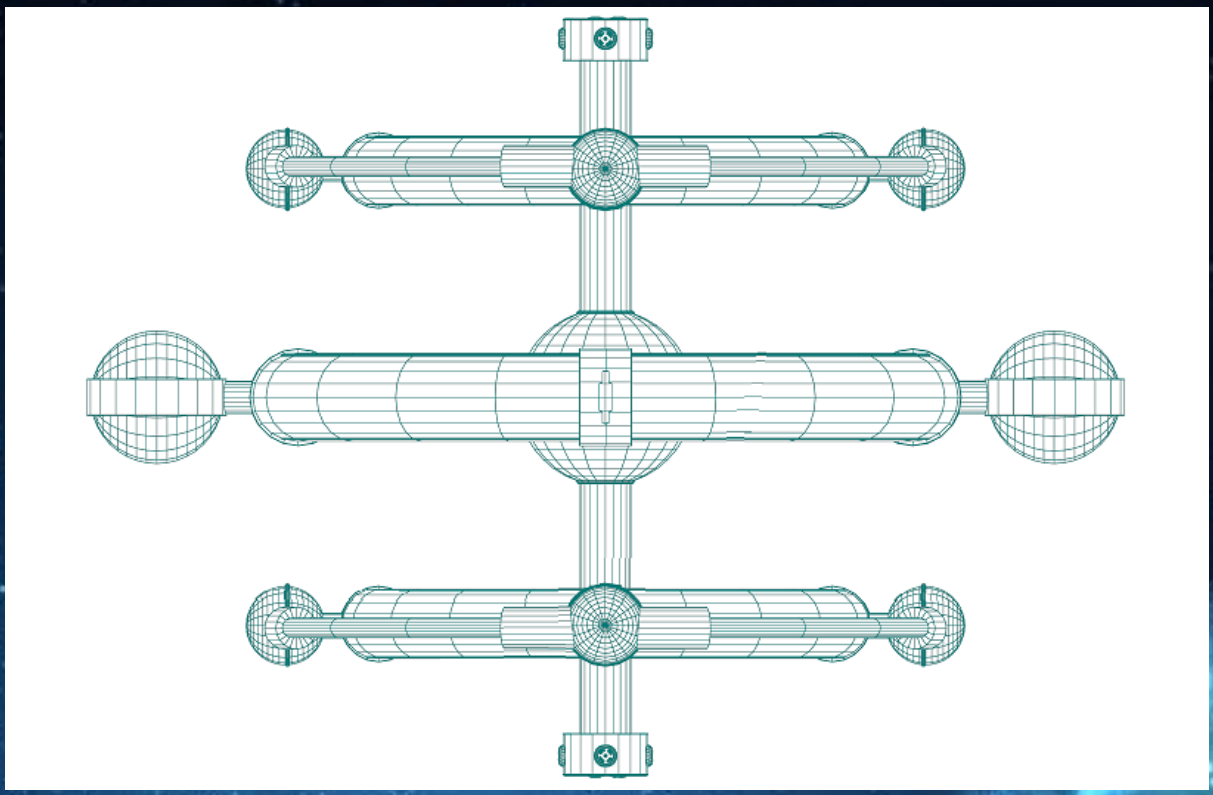


This is the top view. It also enables line of symmetry.

This is the tilted view. In this view the settlement is tilted in an angle of 20.3^0



This is the netted view of the settlement. Symmetry can also be observed in this.



This the netted front view of the settlement.

this is the pole that connects the central hub to the torus.

This the central hub. It contains the docking port.

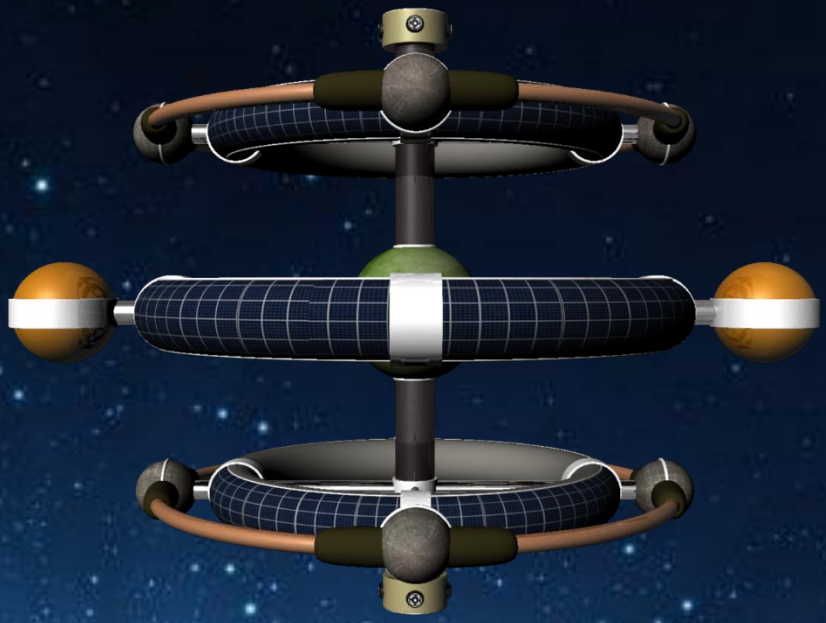
This is the second stage in the building of the settlement.

This is the third stage in the building of the settlement

This is the fourth stage in building of the settlement.

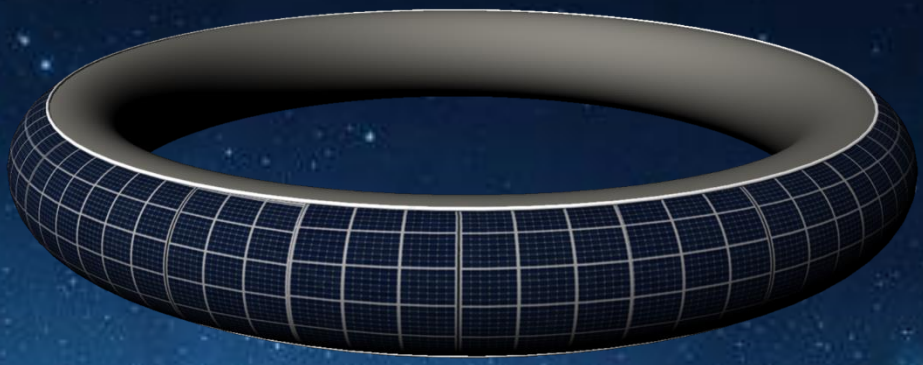
This is the fifth stage in building of the settlement.

This is the sixth stage in the building of the settlement.



This is the sixth stage in construction of the settlement.

This is the docking port present in the centre of the central hub.



This the torus.

This the ring that connects the sphere with the pole and also the torus with the pole.

This is the protective layer present outside the torus.

These are the satellites present in the central hub.


These are the spheres were agriculture will be done.

3.2 MAJOR COMPONENTS

The components which is used in large proportions for the construction of the settlement and its parts are called as major components.

The major components used for the construction of the settlement are:-

1. **Metals used in the layers of the walls of the settlement:-**

There will be five layers each and every layer will be made of different alloys. These alloys will be really strong, durable, heat resistance (or) high melting point and importantly all these alloys are non-radioactive. The arrangement of the layer of the wall are:-

1. Titanium alloy with rendering of tungsten
2. Carbon Nano tube
3. Aluminum Titanate metal sheet
4. Cobalt-chromium alloy
5. Carbonated steel

1. Titanium alloy with rendering of tungsten :-

There are different types of titanium alloy. But the kind of titanium alloy we are going to use in our settlement will be rendered or coated with two layers of tungsten. This done in order to increase the melting point of the metal. Titanium is a durable, strong, and also a heat resistant. When tungsten is rendered with titanium it absolutely becomes non-reactive.

2. Carbon nanotube:-

Carbon nanotubes are allotropes of carbon. They have a cylindrical nanostructure. They also propose an extraordinary resistance to heat. They can also be used for electric properties in the settlement.

3. Aluminum titanate metal sheet:-

It has a melting point of about 1000^0c - 1200^0c. This can bare and resist the heat in the space. Aluminum titanate is not only a mixture of aluminum titanium, little bit of zirconium and steel are also added to increase the strength of the alloy.

4. Cobalt-chromium alloy:-

It is a mixture of cobalt and chromium. Carbon is also added to render its properties. This will not only be used in the settlement, but also in the lunar and Martian bases.

5. Carbonated steel:-

It is a non-reactive metal. It is formed by a mixing carbon and steel.it is durable, strong, malleable, ductile, and heat-resistant.

3.3 MINOR COMPONENTS

The components which are used in a very little composition in the settlement are called minor components. Some of the minor components are:-

1. Scandium
2. Zinc
3. Self-healing materials
4. Nano technology
5. 3D fiber printing
6. Ultra hydrophobic material
7. Aerogel

1. **Scandium:-**

   An alloy of scandium obtained from asteroids will be used to build houses and other structures inside the settlement. This have a very less density and is also easily compatible.

2. **Zinc:-**

   Zinc is non-reactive and also strong. It also has high melting point. It is also relatively less weight.

3. **Self-healing materials:-**

The frame of the buildings will be made of scandium and zinc. The solid outlook will be provided to the buildings by molding it using self-healing materials. They have the ability to heal themselves automatically in case of any damage in the buildings.

4. **Nano technology:-**

Few objects will be made in very tiny size which is not visible to the naked eyes that is in 10^{-9} size. Even in the internal security few Nano bots will be kept.

5. **3D fiber printing:-**

Most of the objects in the settlement will be fiber printed using the fiber printer that will be present in large scale inside the settlement.

6. **Ultra hydrophobic materials:-**

There are few materials which do not stick to solids. Instead they flow on them. This prevents the liquid object from sticking to the solids. The Ultra hydrophobic materials will have to be sprayed to the surface of the solids.

7. Aerogel:-

Aerogel is a substance with a very little density and is relatively less weight. It weighs is about 3g. But it can sustain a weight of 3kg. It also has an ability to observe the dust present in space. So it will be present in the walls of the settlement. It will also be present in the protective layer of glass present outside both the residential torus.

3.4 EXPLANATION OF SECTORS OF THE SETTLEMENT

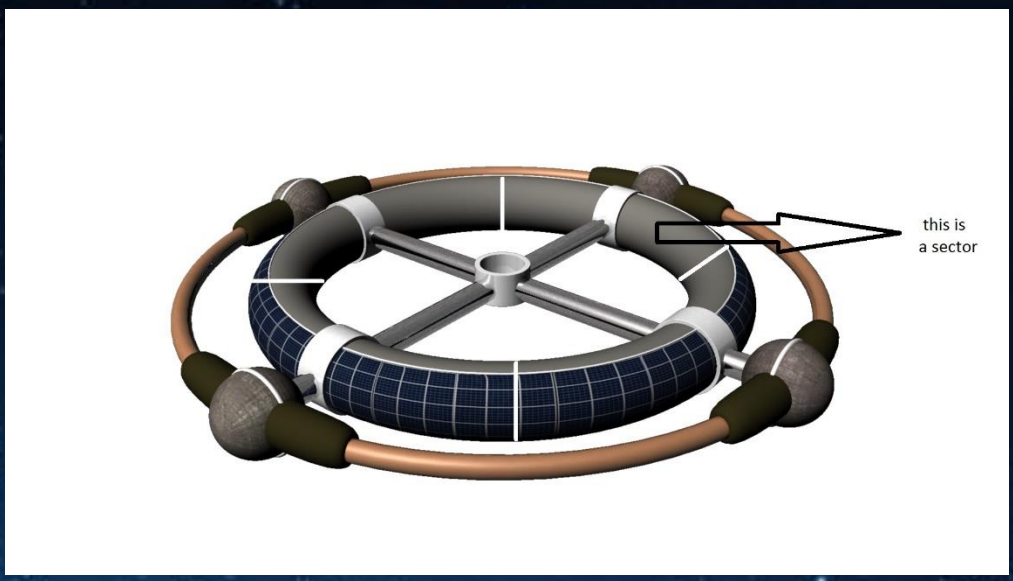
In our settlement we have every torus is splited into sectors. Each sector will have a certain places.

The Residential torus

The residential torus will be divided into eight sectors. Each sector will contains 115 houses, five hospitals, three police stations, three fire stations, one mall, two markets, one entertainment area, five schools, two universities and one post office for transport.

Industrial and asteroid mining torus

This torus will be divided into 3 sectors. One sector will have industrial works, one sector will have asteroid mining and one sector will be having space for transporting the materials from the torus to other torus.

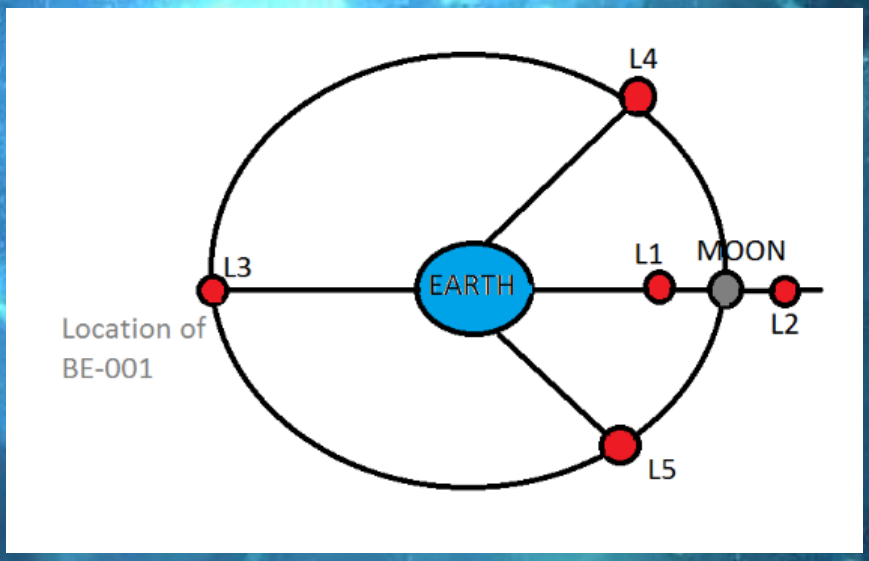

this is
a sector

3.5 TIME TAKEN TO BUILD THE SETTLEMENT

To build the settlement we take nearly 40 – 50 years. This is very long due to the number of torus we have. We are going to launch the settlement 1 by 10 of the tori through rockets so launching the rockets will take nearly a year. So approximately it will take 43 years if we start building it from now. If this is the year 2018, then the project will be completed in 2061. And humans can start Entering the settlement in 2065 or 2066.

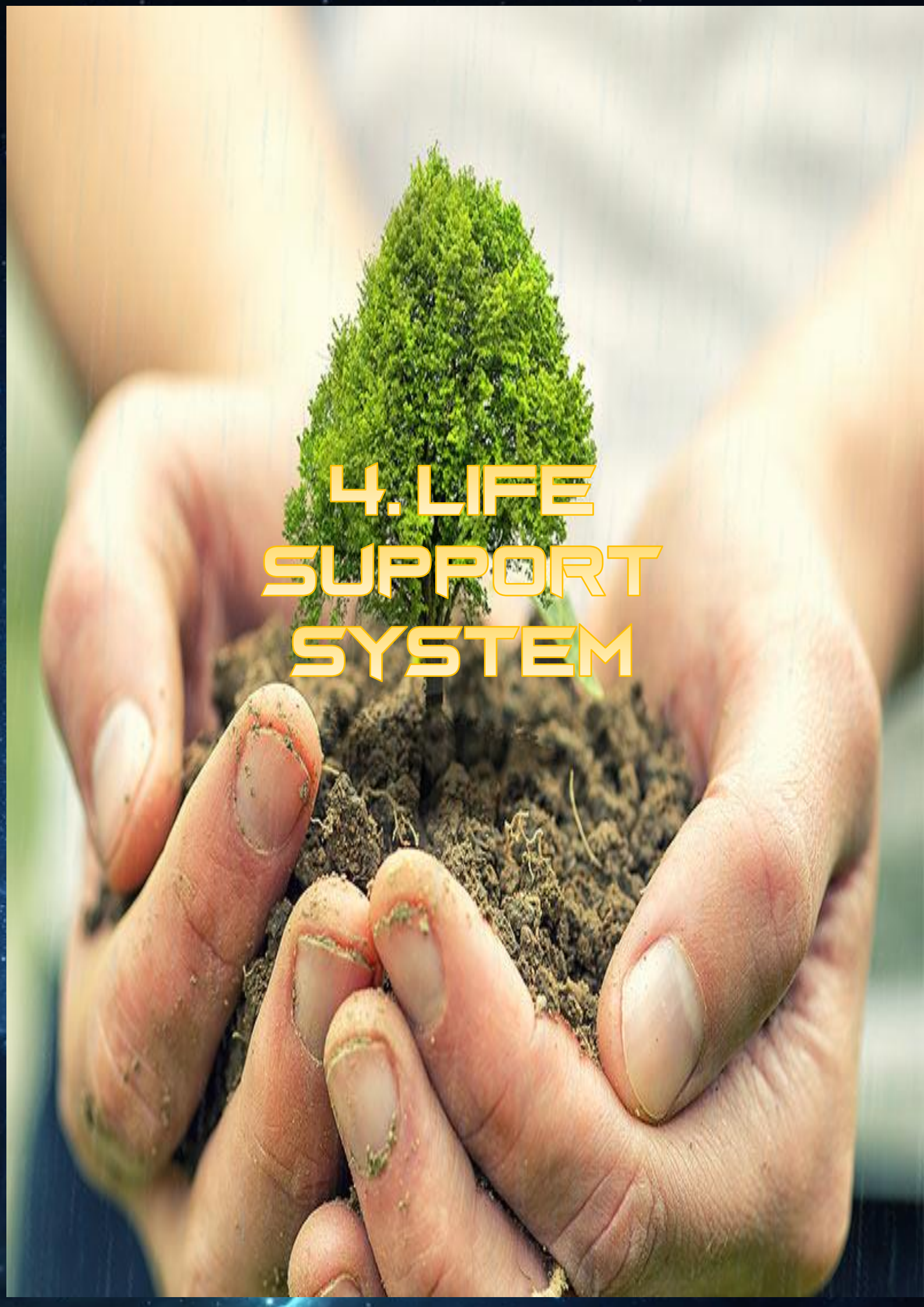
3.6 LOCATION OF THE SETTLEMENT

The location of the settlement will be L3. That is it will be placed in an angle of 180 degree from the revolutionary path of moon. It will also be placed in angle of 60 degree from revolutionary path of earth. We have chosen this position because in this position we will get a lot of asteroids to mine and obtain minerals. And also it is near to moon and mars for easy travel to lunar base in moon and Martian base in mars for the collection of minerals from all these bases.



3.7 PATH OF REVOLUTION OF THE SETTLEMENT

The settlement is located at L3 or Langrage 3, which is located on the opposite side of the moon. It follows the path of the moon. The orbit of the moon is slightly elliptical, with an eccentricity of 0.549. The settlement also needs to revolve in the same speed as the moon to be on the opposite side of the moon. The speed of the moon is about 1.022 km/s. this shall be the speed of the revolution of the settlement. The inclination of the moon to the ecliptic plane is about 5.145. The elliptical orbit of the moon causes variation in the distance from the earth. The perigee of the moon is 362600 km whereas the apogee is 405400 km. since L3 is a metastable location, we will make subtle changes in the orbit of the settlement occasionally so that it can remain in L3 and not drift towards the earth or the moon.


4. LIFE
SUPPORT
SYSTEM

4.1 OXYGEN

Oxygen can be created in many ways:

- Electrolysis
- Algae
- Recycling

Electrolysis:

The matter molecules can be broken apart into H_2 and O_2 molecules. This will help generate oxygen for the respiration of human beings.

Algae and other plants:

The plants take in carbon dioxide and breathe out oxygen. Therefore, this too helps in the generation of oxygen.

Recycling:

Since it is not possible to store a large amount of oxygen in space, we must learn to reuse the oxygen by breaking down the molecules of the byproducts obtained from human metabolism.

4.2 ATMOSPHERE

Humans need atmosphere to live. Humans can't live with only oxygen. So we are going to introduce more gases.

RESIDENTIAL TORUS

The gases which are going to be present in the atmosphere are Nitrogen (70.09%), Oxygen (27.95%), argon (0.93%), carbon dioxide (0.039%) and other gases

AGRICULTURAL SPHERE

The gases present in agricultural sphere are nitrogen (70.09%), carbon dioxide (20%), oxygen (5.84%) and other gases.

INDUSTRIAL AND ASTEROID TORUS

The industrial and asteroid torus will contain are Nitrogen (70.09%), Oxygen (27.95%), argon (0.93%), carbon dioxide (0.039%) and other gases

4.3 GRAVITY

Gravity is a phenomena exhibited by all objects that have mass. The earth's mass is more than all the other objects in it. The earth's gravity prevents all things from floating into space. Humans are used to gravity by using centrifugal force. The formula for centrifugal force is $G= \omega^2 r$.

The gravity we are going to use in residential torus is $g=9.8m/s^2$. This is the gravitational force which is there in the earth.

In this ω means rotation per minute.

Calculations:

$1g= \omega^{2*}1050$

$1g/1050 = \omega^2$

$\omega = \sqrt{1}/\sqrt{4900}$

Formula for calculating ω is $[(\sqrt{A_c}/\sqrt{R})/2\prod] * 60$

In this A_c= 1g for the residential torus. With this we are going to find ω value. Calculation-

$[(\sqrt{1}/\sqrt{1050})/\prod] * 30 =$ 0.29457912265490273777180338004

This the ω in the residential tori and the bigger industrial and asteroid mining torus.

Gravity in smaller asteroid mining and industrial torus-

$6.86m/s^2$

SMALLER ASTROID MINIG AND INDUSTRIAL TORUS

$[(\sqrt{0.7}/\sqrt{752})/\pi] * 30 =$

0.29123040463607323062025966716983

This will the ω in the smaller asteroid mining and industrial torus

There are 2 agricultural sphere in which we are going to cultivate plants. For that less gravity is suitable.

Radius of agricultural sphere- 916m

Gravity of agricultural spheres-

$5.88m/s^2$

$[(\sqrt{0.6}/\sqrt{916})/\pi] * 30$

The ω is 0.24430058237708985929099092561688

Gravity in larger asteroid mining and industrial torus-

$10.78m/s^2$

$\omega = [(\sqrt{1.1}/\sqrt{1250})/\pi]*30$

$= 0.28316394223456167622352608410 33$

4.4 WATER

Water is very essential for humans. So we need to prepare water artificially. We are going to prepare water by SABATIER method. It is the done by action of one molecule of Co_2 and 4 molecules H_2.

Reaction:

$Co_2 + 4H_2 \rightarrow CH_4 + 2H_2O$

In this methane is used for industrial uses. Methane produces more energy when carbon and hydrogen is split. In this we are going to use a method called Amine method in which amines are used to scrub out carbon dioxide from the atmosphere

AMINES USED

There are many amines which scrub out carbon dioxide in which we are going to use Diethanolamine (DEA).

In this amine we are going to use 20 to 25% of Diethanolamine. They remove high volume of carbon dioxide because of their high Reactivity. The loading capacity 0.5 mol. Of Carbon dioxide per mole of amine. They need a large amount of energy.

FORMATION OF DEA

It is an organic compound.

Formula of DEA:-

$HN(CH_2CH_2OH)_2$

FORMATION OF DEA:-

When we react ethylene oxide with aqueous ammonia, it produces ethanolamine.

$C_2H_4O + NH_3 \rightarrow H_2NCH_2CH_2OH$

With this product we have react with ethylene oxide and aqueous ammonia to produce DEA.

$C_2H_4O + H_2NCH_2CH_2OH \rightarrow HN(CH_2CH_2OH)_2$

Now we have DEA ready to remove carbon dioxide from the space to produce water.

Preparation of hydrogen –

With the amines process we will also scrub out H_2S (hydrogen sulphide) and split them by electrolysis process.

We will get hydrogen by this process and produce water for the BE 001ians.

4.5 AGRICULTURE AND FOOD DISTRIBUTION.

Hydroponics is a method of growing crops without soil. It uses water as the medium. It is very useful as it reduces area required for growing crops and also increases production. A nutrient solution is used to provide the nutrients needed for the plants. There are two major types of hydroponics. They are:

- **Static solution culture:** In this technique the plants are grown directly in containers filled with the nutrient solution. The solution is changed every two or three weeks.
- **Continuous solution culture:** In this technique, plants are grown in water tight tubular structures. It is not airtight. The nutrient solution is pumped through the tube.

We have chosen the continuous flow culture because it is easier to control.

Lighting: we are going to use artificial lights to grow crops. Different plants have different lighting. Vegetables grow better in full spectrum whereas plants

that are just germinated grow in green light. We have found a combination of red (660 nm), blue (400 to 500 nm) and green (500 to 600 nm) light in which most crops grow. It is using 10% blue and 24% green light additionally in a red light. High pressure sodium lights produce red lights and daylight metal halides produce blue-green lights.

Distribution: The plants are grown in the agricultural torus. They are processed and packed in the industrial area and then sent to the residential area. The food is packed in water soluble containers. This water is not dangerous to health as it can be reused as the nutrient solution. The food is then distributed to the people in the residential area. The food packed is healthy and also delicious. The food provides the nutrition needed for an average human being. There will also be medicinal and herbal plants that

4.5 EXERCISE TO INCREASE BONE DENSITY

Exposure to zero gravity for a long time reduces the stress on the bones. Hence the density of the bones starts decreasing, research show that one month of exposure will reduce the bone density from 1% to 2%. Obviously it makes the bones so fragile in case of more than 6 months and the person will not be able to perform heavy tasks immediately. He will have to build the bones before it is ready to do regular activities. Historically the space astronauts are given to a routine exercise to put load on the bones so the cells keep building them. However latest research is also exploring injecting hormones to increase the production of the insulin which in turn reduces the bone destroying activity.

We will have to practice many exercises which will help increase our bone density. The machines in which exercises will be done will not be fixed inside the settlement. These places where exercises will be done

will be kept in less gravity compared to the gravity in places where people will live. These continuous working of bones will increase the bone's density.

4.6 DAY AND NIGHT

We wanted to provide an earth like atmosphere to the citizens of BE-001. Thus, we have planned to provide the facility of day and night in the settlement.

Sunlight:

Sunlight is a very essential thing in human elevation. Thus, we are also going to provide sunlight in the settlement.

Essentialness of sunlight:

1. Sunlight provides vitamin D_3 and calcium.
2. A small amount of sunlight will be reflected to the agricultural torus.
3. To give a lively atmosphere in the settlement.

Providing sunlight:

The sunlight will be provided by reflection. A mirror will be placed 45 degree at top of the central hub and also at the bottom of the settlement. There will also be mirrors in the spokes which will connect the torus to the central hub. Thus, sunlight will transfer to the whole settlement. There will also be night provided by closing the mirrors

5. HEALTH AND WELFARE

5.1 HEALTH OF PEOPLE

The health of the population of our settlement is very important. There will be hospitals and clinics situated throughout the residential tori. There will also be relaxation spas located on different locations in the settlement. These will be run by robots and humans alike. The humans that run these can work from their homes and give instructions to the robots as to what to do. Any person who falls sick will be taken to a clinic where the robots will take a check-up and will see whether the patient must be sent to the main hospital. If a person needs to be sent to the main hospitals the robots will inform the other robots in the main hospital about the patient and what they are suffering from. The patient will then be transported to the main hospital using a . This will be the admission process for any patient unless they are critically ill and must be sent directly to the main hospital in the case of which the relatives or friends of the patient will inform the main hospital directly. The relaxation spas will be used to distress someone. Anyone who is stressed or depressed can go to such spas. Robots working there will be looking like humans to relax the person. They will give the person

a treatment. Treatments such as hot baths, bubble baths and massages will be given. There will also be swimming pools. There will also be psychiatrists who will advise the patient

5.2 MEDICINE

Medicines can save one's life. Medicine is also a wide field of research. Medicines will be used to treat patients. These medicines will not have any side effects and they also will be consumed in small quantities. There will be medicines for all known diseases in hospitals. These medicines can either be home remedies or chemically created ones. Nanotechnology will be used in making medicines as they can send the required chemicals to the specific cells. Medicines will be continued to develop. There are researchers who are specialized in this field who will continue researching on such medicines.

Additives in food: additives in food are generally considered as dangerous or harmful to health. In our space settlement we use additives that are not harmful to health. These additives can be of a wide variety. These include additives added for making the food last longer,


6. ENERGY

6.1 HEAT RESISTANCE

Heat resistance is one of the most important factor in space invasions and any travel in space. The materials used to build the settlement must be highly durable and resistant, there will be safety coolers present inside the settlement. In case of overheating these coolers will automatically turn ON. The outer layer of the walls of the settlement will be conductive and inner layer will be insulating, so that the inner part of the settlement. As the solar panels outside the settlement is continuously exposed to high temperature it needs to be cooled which is impossible in the space. So few astronauts will be separately trained to move outside the settlement in a space ship along with few robots. They will spray silicone which will be in semisolid form. As silicone melts in very little temperature, when it is sprayed on the solar panels which will be in hot temperature, silicone gets melted and adopts to the temperature and sticks to the solar panels and prevents it from disabling. This will be done early once.

Temperature:

The temperature in the settlement needs to be maintained. To maintain this there will be few coolers present in the settlement. Which will give out few

6.2 ELECTRICITY MANAGEMENT

In our settlement almost all things are based on the electricity without managing electricity, we don't know how much we get electricity from solar panels. They work when a light falls on them and they allow the photons or the electrons from some other particle by light hitting it.

Equal sharing of electricity

1. About 25% of the electricity will be used by humans for their house.
2. About 10% for other buildings.
3. About 20% for robots.
4. About 25% for transportation.
5. About 20% for the settlement to move and to spin

The solar panels we are going to use is:-
MULTI –JUNCTION (MJ) SOLAR PANELS

This type of solar panel will be used in the agricultural torus, asteroid mining torus and industrial torus. This type of solar panels will be having layers of materials which will be useful for capturing different wavelength of light. They are made of:

- Indium gallium phosphide
- Gallium arsenide
- germanium

Because of different materials they can capture different types of light with different wavelength.

We are going to cover ½ of the torus by the solar panels. The residential tori and the bigger asteroid mining and industrial torus.

Solar panels in Residential -70820500m^2

Solar panel in smaller asteroid mining and industrial torus- 2792897.3061m^2

Solar panel in larger asteroid mining and industrial torus-9470720.342855m^2


7. RESEARCH

7.1 MARTIAN BASE

The mars has components which can be used for our settlement. we are going to build some of the base there, which uses the components and we use for building, industries, etc.

Atmosphere of the mars contains -

- 96% - carbon dioxide
- 2.0% - argon
- 1.9% - nitrogen
- 0.14% - oxygen
- 0.06% - carbon monoxide

The various gases present in the atmosphere of the Mars will be extracted through the amine's process which is explained in detail under the topic water. The main mineral present on the surface of the Mars is iron oxide which can be rather divided into iron and oxygen.

CONDITIONS

If we have any problem in preparing water we can use the water present in the mars in the form of ice caps.

The elements which is most abundant is iron, magnesium, aluminium, calcium and potassium. Which

will be extracted from the mars and it will be transported to the settlement and it will be used.

BASE:-

We are going to create a base in the mars and do research and also do few factory work need for the settlement which cannot be done inside the settlement. There will be no humans working there instead robots will take care of everything. The structure of our base will be like a dome in which the humans will work

ELECTRICITY PRODUCTION:-

In mars for functioning of the base we need electricity, we are going to produce electricity by wind turbines. There are going to be few turbines which will spin because of the air present and it will produce sufficient energy for the Martian base.

Mars Rover: -

A robotic vehicle which collects, mines and researches the samples collected in mars. This also 3D prints the Martian base. We 3D print the base because the

temperature is not constant and also mars does not contain any layer like ozone to protect the base from harmful rays. We are send 4 mars rover to check find out the place where we are going to build our settlement. we are going to build our settlement near the VICTORIA crater.

7.2 LUNAR BASE

Lunar base is a research and a resource base which is set up in the moon .The moon has a variety of metals and minerals in its surface which can be used for various purposes .The main metals present in the moon's surface are:

- Oxygen
- Iron
- Magnesium
- Silicon
- Calcium
- Titanium

These metals are mostly found in combined state, but they will be separated through various methods and are sent back to the settlement through rockets which can be recycled and used again .Oxygen is the most abundant element in the moon's crust, but this oxygen is not useful by any means. The metals such as Titanium, Silicon, Iron and Calcium can be separated from the combined state and can be sent to the settlement for building or repairing the infrastructure .The

rockets used are made up of a single fuel tank and a useful space in which the resources are sent . The rocket lands without any damage in the docking port and it is sent again to the base with some extra fuel for it come back .The fuel used in these rockets is Hydrogen in liquid state which is manufactured in the research sector of the settlement .The fuel is negligible as moon is near to our settlement and it will not affect the speed of the rocket. The lunar base is small with all features for the astronauts and scientists who live in the base and do research. They live there by wearing an oxygen tank which supplies them oxygen and the water will be sent by the rocket. The structure of our lunar base is like a dome shaped hemisphere.

Lunar rover:-

The lunar rover is a robotic vehicle which collects the materials in moon. It also 3D prints the lunar base.

7.3 ASTEROID MINING

Asteroid mining is a process in which asteroids are mined to obtain certain metals and minerals which are used inside the settlement. These minerals and metals are used to prepare self-healing materials and Nano materials which are applied on industrial buildings and external satellites.

Asteroid capturing pods:

Asteroid capturing pods are satellites which are present outside the settlement they capture asteroids and bring them back to the settlement. Later in the settlement these asteroids will be transferred to the asteroid mining torus. Here robots and humans

together will mine and processes the asteroids. The minerals and metals from the asteroids will be then sent to the constructing sector of the settlement. These minerals and metals transferred to construction sector will be used in research and development and also in building industrial factories, houses, malls, etc.

Design of asteroid capturing pods:

The asteroid capturing pods will be designed like amphibious craft. It will have stands to capture the asteroids and hold them tightly and bring them to the settlement if the asteroid is very big the pod itself breaks it and makes into small pieces and brings to the settlement. These are the works of the asteroid capturing pods.

7.4 MEDICINAL RESEARCH

Developments in medicine will increase the immunity of the population and will reduce the costs of hospitalization. Researchers will continue to develop

medicines against diseases that are both fatal and non-fatal. Developing medicine against fatal diseases can prevent mass death. They will increase the lifetimes of people. This in turn increases the productivity of the population. The researchers will also create artificial organs and bones by using the fast-developing technologies such as nanotechnology and 3D fibre printing. They will make the knowledge of more diseases and their cures available to the public for them to be aware of the symptoms. There will be self-healing materials which will heal wounds which are caused by getting burns or injuries.

7.5 PHYSIOLOGICAL RESEARCH

Being in less gravity can reduce the bone density of the people. Exercises like push ups using machines which are not connected to the settlement. And there will be exercises that will include the extraction and contraction of the bones and muscles. Their heart will also be used to less gravity and will find it difficult to pump blood to the brain under normal gravity conditions. They will also lose

balance. Thus, people who go to places of lesser gravity should exercise frequently to maintain their body. Even under such conditions humans can lose bone density. Therefore, there will be researchers who will work on keeping the citizens physically fit.

7.6 SPACE RESEARCH

The location of our settlement can help us to do space research. Any space research from inside can be obscured by atmospheric refraction, thus making it inaccurate and not dependable. There will be satellites in space that will collect data about space. These data include precise positions of heavenly bodies such as stars and planets, thus making it possible for us to find planets that are habitable. They will also send signals for any extra-terrestrial organism to pick up. The information collected by the satellites can help us to understand our beginnings, the current state of the universe and can also detect any danger such as asteroids or dangerous rays or flares from space. The satellites can detect different light wavelengths such as infrared, ultraviolet rays, x-rays,

radio waves and visible light. When the satellites detect any asteroids, they send the signal to our settlement. In the settlement measures are taken.

7.7 Agricultural Research

Research in agriculture can help us to produce more from the same plants. We can also hybridize plants to produce fruits that are more healthy and delicious as well. We can also prevent the plants from getting damaged. We can test different temperatures and lighting to see which plants can grow in which condition. Hybridizing plants can give us a variety of plants to test with. They will also reduce the cost of growing, maintaining, harvesting, and separating the crops.

7.8 FOOD RESEARCH

Humans change their tastes according to the trends. They often get bored with some kinds of food and always crave for different foods. Culinary researchers make new food types. They can also create foods that contain the essential active molecules for curing some diseases as people hate the name of medicines. They also create foods for people who have certain allergies.

7.9 CHEMICAL RESEARCH

Samples of materials found in other heavenly bodies will be brought to our settlement. Researchers will test them and find out their advantages and disadvantages. They will decide up on the best uses of those materials. They will test those materials under different conditions and then they will use only the best materials for building different structures as only the materials that can withstand extreme cases.


8. TECHNOLOGY

8.1 ROBOTICS

Robotics is the study of robots. Robots are manmade machines which have the capability of performing tasks quickly and error free. In our settlement, robots will play a major role in all the sectors. In the residential torus they are designed to be like humans and are thus called android-humanoid robots. In the agricultural torus, the robots are not like humans. They are like basic machines which follow the command prompt instructed by us.

Robots used in residential torus:

The robots used in the residential torus resemble humans in both structure and functions. They help the humans in various purposes like doing household activities, delivery of products etc... They are very friendly to the humans and also play and enjoy with them like a normal human.

Robots used in the agricultural torus:

The robots used in the agricultural torus will not resemble humans.

They will be like machines which help in the basic agricultural processes like planting the plants in the component used in hydroponics, harvesting by ultimate cutters.

They will be like machines which help in the basic agricultural processes like planting the plants in the component used in hydroponics, harvesting by using various tools. The method used is different from crop to crop, so there are many kinds of robots for every different category of crops [categorized on the method of harvesting]. The robots follow complex system of working. These kinds of robots run using electricity.

Uses of Robotics in asteroid mining:

The asteroids which are captured will be sent to the asteroid mining torus where it will be mined and useful minerals will be extracted from it. Imagine the situation there if they only had human work. It would be impossible without robots. At the beginning the asteroids are made into pieces which can fit in the torus and are brought to the asteroid mining torus by the robots. Robots help in drilling the asteroids to extract minerals. They also

have scanners which scan the asteroid and tell the location of useful metals and minerals in it. The minerals are then brought into shape by the robots and are sent to the respective torus where it has its use.

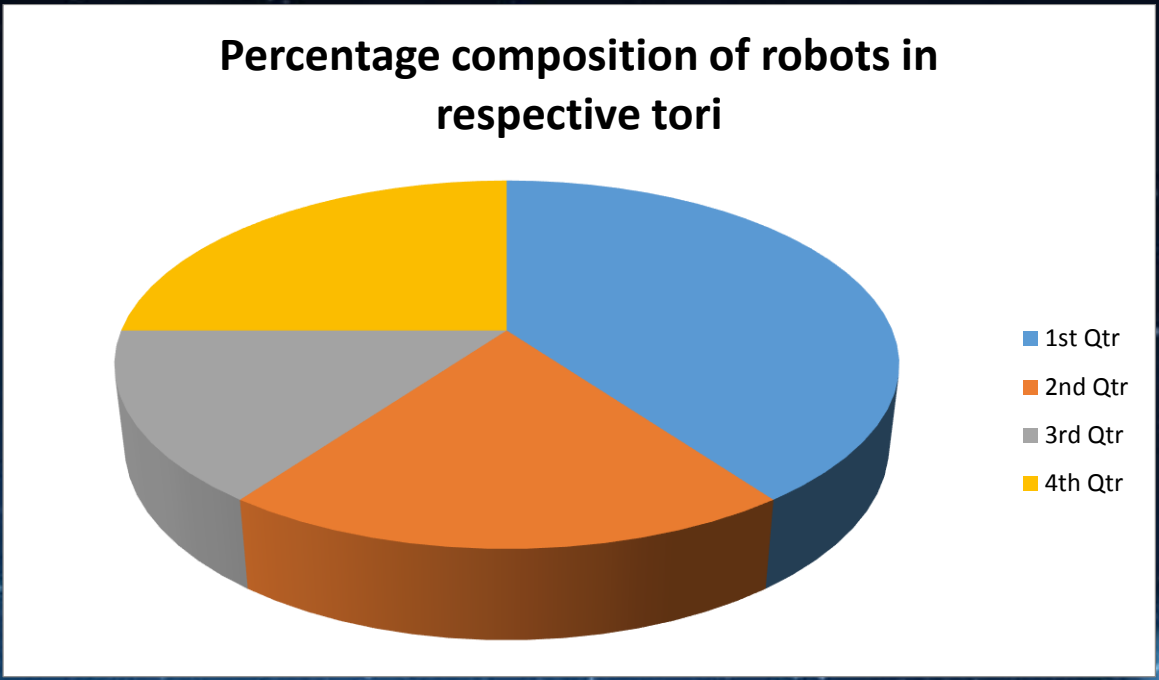
Use of robots in research torus:

The robots used in this sector will be programmed with all science and physics concepts. It will be able to identify chemical compounds by just seeing them. This helps in saving time for the scientists. Most of the work there will be done by the robots. They will be very efficient.

Power required for running the robots:

The power required to run the robots will be electricity. The electricity will be stored in cells which are rechargeable ones. Once the electricity drains out, the batteries are recharged with electricity.

Percentage composition of robots in every torus:



Here the blue part represents the percentage of robots in asteroid mining sector; red represents the percentage of robots in agricultural sector; green represents the percentage of robots in residential torus and purple represents the percentage of robots in the research sector.

We can draw out a conclusion that the number of robots used is the maximum in the asteroid mining torus while the other compositions are nearly equal. This shows that each and every task in the asteroid mining sector involves robots. The next sector which uses a high number of robots is the research torus.

Materials used to construct the robots:

The materials used to construct the robots depend on the function of it. The robots used in the asteroid mining torus must be strong enough to dig through the asteroids and the robots used in the residential torus must be light but strong to keep the people safe in case of any breakdown in the system of the robots. So the metals used for the construction of asteroid mining robots are titanium and chromium [as these are hard and strong metals]. The minor components like the chips will be made from the regular metals like Iron, Copper and aluminium. On the other hand the other robots will be made up of Iron, Copper, glass, aluminium, plastics etc...

8.2 NANOTECHNOLOGY

Nanotechnology is defined as science, engineering and technology conducted at the scale of less than 100 nanometres. A nanometre is 10^{-9} of a metre. This technology involves being able to control individual atoms and molecules. A nanoparticle is a small unit in nanotechnology with all dimensions less than 100 nm. Gold and silver nanoparticles have been in use for a long time. The other nanoparticles used commonly are silicon and zinc oxide. Carbon nanotubes and quantum dots have been used in medicine as well. The applications of nanotechnology range from medicine to buildings to even sunscreen lotion. It all started with the talk of Richard Feynman, father of nanotechnology, at the American Physical Society on December 29, 1959 entitled "There's plenty of room at the bottom". Nanotechnology is used for treating diseases and preventing health issues and is known as Nano medicine. Nano medicine ranges from medical uses of Nano-materials to uses in biological sensors. Nanotechnology has made it possible to deliver drugs to specific cells by using nanoparticles. This reduces the consumption and possible side effects. It is also used in the prevention of

cancer. We will be using it for making medicines in our settlement. Nanotechnology is also used in a wide variety of consumer goods. Nano ceramic particles are used in households to make easy to clean surfaces. Nanoparticles can also be used to make cosmetics such as sunscreen lotions. The advantage of making materials out of nanoparticles is it makes it lighter. Textiles that are made using nanotechnology can be made water proof, wrinkle free and stain repellent. Nanotechnology makes construction cheaper, faster and safer. Buildings that are built using nanotechnology are also stronger. Nanotechnology enhances the physical properties of the materials used in construction. Fire-protective glass can be made by using a clear intumescent layer between glass panels that is made up of silica nanoparticles (SiO_2). Smart food packages can be made using nanoparticles. Bacteria can also be detected by using biosensors. Nuclear accidents in our settlement is highly dangerous to humans. This can be prevented by Nano-materials deployed by robots. They form a bubble trapping the radioactive waste and isolating their harmful effects. Nano pillars can be used in solar panels. Due to their structure they can capture light very well. Solar panels covered with Nano pillars are three times more efficient than using semi conductive materials. Less material is

needed to make each solar panel by using nanotechnology. By putting dopants, which are impurities added to a substance to alter their electrical and optical properties, to the bottom of these solar panels, increases the time the photon takes to bounce around these Nano pillars, and thus more amount of light is captured. The solar panels made from Nano-materials are also flexible in nature. These solar panels are much cheaper than solar panels made from semi conductive materials. Other uses of Nano pillars include anti-bacterial surfaces, which will significantly reduce the diseases caused by touching infected surfaces, and cell observation.

8.3 3D FIBRE PRINTING

3d fibre printing allows the creator to create 3d models. We shall use 3d fibre printing in a variety of uses. Some of these uses include:

Medical: The medical purposes of 3d fibre printing are printing organs and limbs that are missing or underdeveloped in some people. Bio-printing can allow

a human to implant stem cells capable of forming tissues and therefore organs. Such organs can function normally. This will be a breakthrough in the medical history. Structural support for the skeletal frame can also be printing. This allows bones that are weak in a person's body to be supported by a frame. Medicinal pills can be printed using such techniques as well.

Clothes and accessories: Clothes and accessories can be created out of 3d fibre printing. Some of the examples of such uses are clothing, shoes, bags, and jewellery. Making individual clothes that are personalized is about the same costs spent on each cloth in a mass production.

Transportation: Some parts of transportation vehicles can be made with the help of 3d fibre printing. Since the printing can be done with various metals as well, both functional and non-functional parts can be printed.

Device: Devices can be 3d printed, which will reduce the cost of making and can also be personalized, like clothes. This can even be extended to satellites

Decoration: By using 3d fibre printing, we can create models that serve as a welcoming sight. Some of these are trees, flowers, fruits, butterflies, and birds.

8.4 EXTERNAL SECURITY

External security refers to the security maintained outside the settlement. The space settlement must be protected from any threat including asteroids.

THE ASTEROIDS:

The settlement must be prevented from the collision with some asteroids which are separated from the asteroid belt. This is done with the help of asteroid capturing pods which capture the asteroids and take them to the asteroid mining torus where it is mined and various useful metals and minerals are taken from it.

8.5 INTERNAL SECURITY

Internal security is keeping the people and other things inside the settlement safe. Internal security includes the protection of houses, people from any other threats like theft, robotic invasion etc...There are many high tech

safety or preventive measures to prevent from these problems. The main features are:

- Fingerprint scanning
- Eye scanning

A person can install either one of these in their houses so that they can keep safe. The robots are checked thoroughly that there are no problems in them for the prevention of any such act. The buildings like offices etc... will be opened only when it recognizes the person in charge of the building.

8.6 TRANSPORTATION

Transportation refers to the facilities which help in movement .Transportation is of two types –**internal transportation, external transportation.**

INTERNAL TRANSPORTATION:

Internal transportation refers to the movement of people within the settlement .This includes transportation within a torus

or between two torus .The vehicles in such cases will be small and will have a top speed of about 70KMPH .The fuel used will be basic as the engines are not very powerful .The fuel will be electricity .Electricity manufactured through rotating turbines using solar panels will be supplied to electricity stations where the vehicles collect it .Most of the vehicles are public transport which can carry up to 50 passengers at a time .The other vehicles are cars which can carry up to 6 people and motorbikes which carry 2 or 3 people .

These vehicles are used for transportation within a single torus .The vehicles used for transportation between two different torus are of different mechanism. They work like lifts carrying the goods or people from the torus to another through the central rod .For example, the harvested plants from the agricultural torus or the minerals and metals extracted from the asteroid mining torus should be sent to the residential and research torus respectively .The central rod is divided into three

columns .Each column has a lift .The lift works with the basic scientific idea that like poles repel each other .We can see this same mechanism in maglev trains .The lift

will be covered with magnets on the lateral sides and there will be magnets on the rod arranged in such a manner that, first the magnet is attracted and it is suddenly repelled. When this continues, the vehicle can reach a speed of 300KMPH.

EXTERNAL TRANSPORTATION:

External transportation refers to the transportation or movement of people or goods outside the settlement .This includes supplying raw materials from the settlement to the Martian and Lunar bases or other settlements [trade] etc...the vehicles used for transportation in such case will be recyclable rockets which can be used multiple times .the fuel for such rockets will be hydrogen .The rockets are designed in such a way that the fuel is kept in a less space [as the settlement is near to the moon and mars] and the storage space will be more [as in cases when more amount of goods must be carried at once] .

This kind of rocket uses hydrogen peroxide as a supporter or an oxidizing agent for the burning of hydrogen fuel .This is a basic version of a rocket which is used for basic commodities. After the rocket reaches

the destination, the fuel tank and the hydrogen peroxide tank is removed at first and the goods tank is removed next. After this the goods tank, filled with goods is first kept inside and the fuel tank, filled with hydrogen is kept second .Then the rocket is ready for the second launch.

There are also other high-tech vehicles which have top speeds of 400 KMPH .These vehicles are private and owned by people who want to just explore the space. These are also used for entertainment purposes .These vehicles are powered by very complex fuels which have very high power. The engines are massive and they are like beasts which run at hyper speed.

8.7 COMMUNICATION

For communication in space, we are going to use radio signals and electromagnetic radiations. This kind of communication has an advantage of communicating in space and earth. As there is no medium in space sound waves will not be able to travel. So the device used in the settlement, will send the electromagnetic radiations to the assigned server present in the particular device. There will also be satellites present outside the settlement. It will help in hobbit

communication. All these communication will be wireless.

FSO (free space optical communication):

In this communication, optical fibres will be used. This communication depends on internet. This is an efficient and free space method.

Laser light communication:

In this, invisible laser lights will be transmitted from one device to another. This method is fast, efficient, and comparatively cheap.

Advantages of space communication:

1) It is relatively of low cost.
2) The connectivity of the communication is long lasting.
3) The communicating device will be a hologram.
4) It is easily transportable.

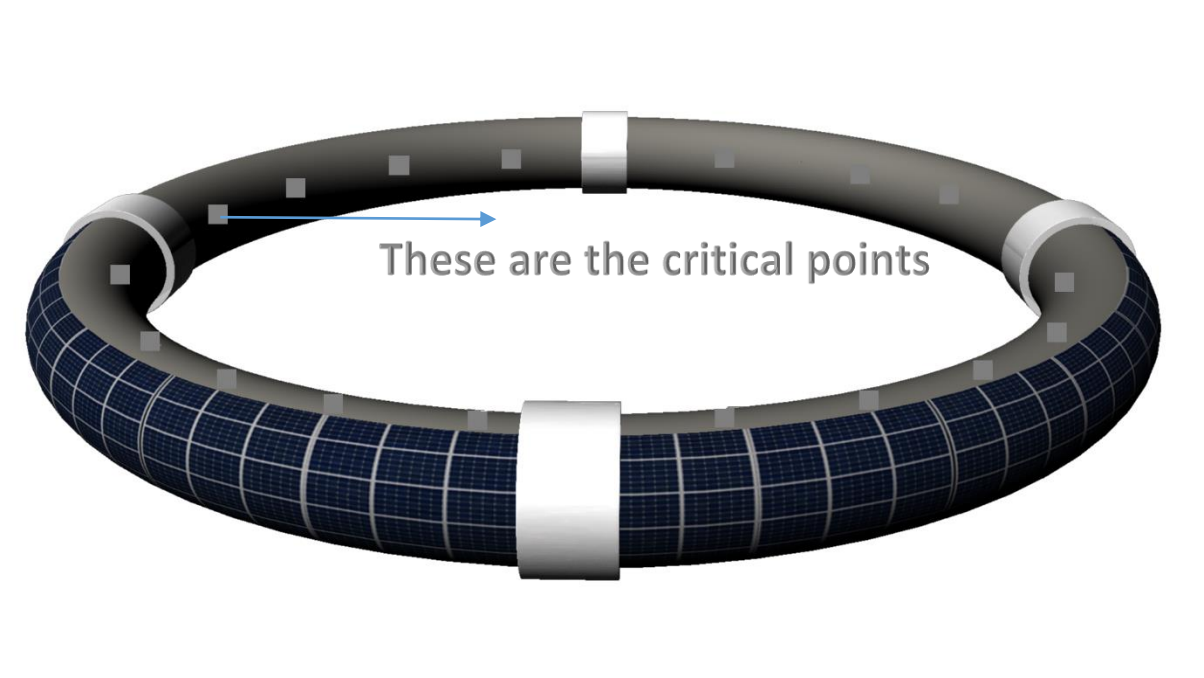
Devices used in settlement:

Devices used will be technologically well developed it will be hologram. It will be superfast and the internet used in the fast enough to upload and download settlement related holographic reviews for officials of the settlement. There won't be any SIM cards instead there will be IP address which will be installed in the server which will be used for communication.

Satellites used in communication:

The satellites will be placed on top of the central hub and at the bottom of the central hub. There will also be high speed Wi-Fi routers present in the critical points of each and every torus.

The critical points of the torus are:-



The WIFI is present in these critical points will have the range till the next critical point making internet connection available equally in all places.

External communication:

The communication from the space to the settlement will be done

8.8 SELF-HEALING MATERIALS

Self-healing materials are made by a mixture of plastic, metals and composites. They have the ability repair internal cracks inside the materials. There are also other methods for this. But the most efficient method is mixing few dead microorganisms with the material when it is in liquid form and then baking it in vacuum at a temperature of 2500^0 Celsius. They are also non-radioactive and also are almost indestructible. They have also passed the ultra sound scanning.

Self-healing materials are used in:-

Self-healing materials are almost used in every sector of the settlement. Normal materials cannot be used inside the settlement as they can corrode and has a great chance to break off easily due to pressure in the settlement. But self - healing materials will heal them if there are any problems. They heal them automatically. They take about 1 hour to heal them. These materials will also be used for printing the lunar and Martian base. It will also be used to print the working organs in humans in case of any problems in the organs of any human. They

will also be used in the space ships, asteroid capturing pods and in the satellites. Even the Nano materials will also be made using self-healing materials.

9. ECONOMY

9.1 EMPLOYMENT

No country or any organization will prosper if the people don't work. Workforce is the greatest weapon for any country. In our settlement, all the people are employed in different sectors. The various sectors of work are research, asteroid mining, industries and residential support.

Research:

Research is very important for the development of the settlement. The scientists will research on many things which will be useful for the citizen. Nearly 20% of the eligible population will work on research sector. Eligible population refers to the population which is in the working age of 25 – 55.

Asteroid mining:

Asteroid mining does not require lot of people, but it needs skilful people who master at the study of celestial bodies. Most of the work done there will be by the robots. The humans will be made to supervise over the robots and also help the robots in recognizing the materials found in the asteroids. Nearly 10% of the

eligible population will be employed in asteroid mining sector.

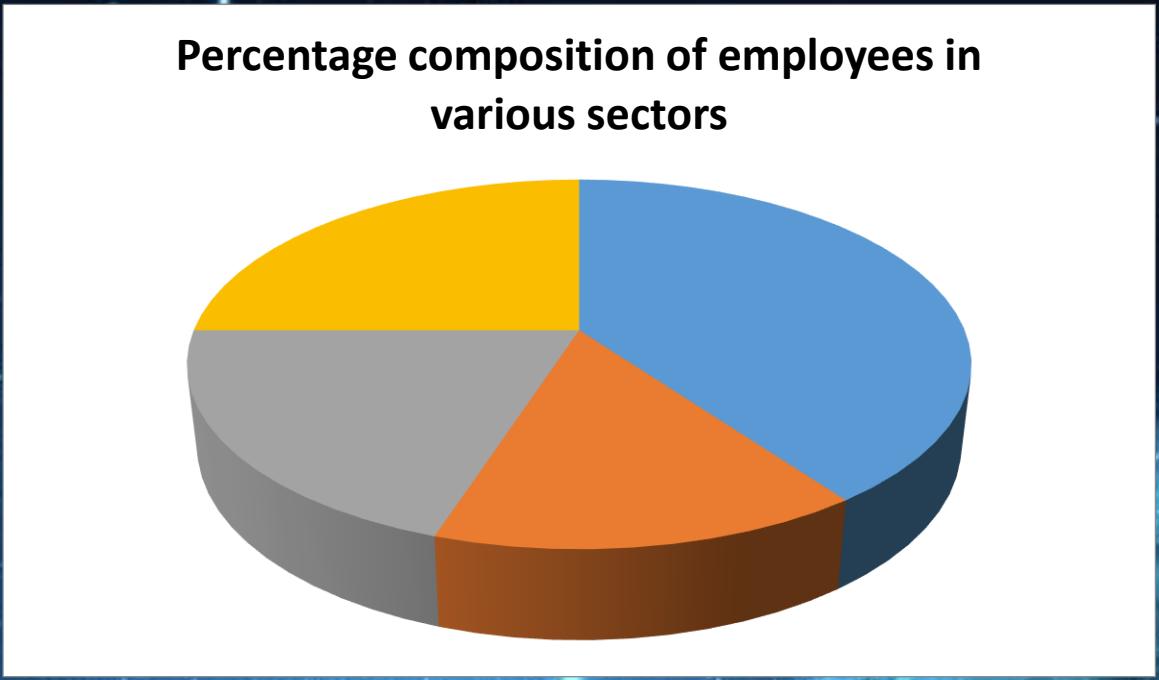
Industry:

Industry is the very cradle of our settlement. Whatever technology we have will be born in the industries. Industries require a mass amount of labour as machines and robots can't find any minor mistakes. There are two categories of work in the industries. The checking work, which involves the checking of finished goods. This will be done manually by the hands and the supervision work which involves the checking whether the machines work properly, repairing flaws in the machines. The amount of people employed in the industries will be 40% of the total population, while 50% in the total 40% is employed in both checking and supervising departments.

Residential support:

Residential support refers to the jobs which are done in the residential torus as a support for the supported population (supported population are children and senior citizen who depend on the eligible population). The main jobs are working as cleaners, super market helpers etc... They look after the welfare of the people. They work and find out a solution for the various

problems of the people with accordance to the government. This is the most important and needed job for the residents



The blue part represents the percentage of people working in industrial sector (40%); the red part represents the percentage of people working in asteroid mining sector (15%); the green part represents the percentage of people working as research scientists (20%); the purple part represents the percentage of people working as residential helpers (25%).

9.2 GOVERNMENT

The human mind is pleasure seeking and greedy. Thus our government consists of robots. The work of a government is to ensure everything goes right and the welfare of people. The robots will collect taxes from the people and use it for public service. They also will check the smooth ongoing of the settlement. There will be robots to check the working of other robots in their specific fields. when there is a problem needs to fixed, the specific robot responsible for that area will recruit helper robots and reach that area. If there is a large scale damage, several robots together recruit helper robots. humans can complaint about any fault they find or they are uncomfortable with something. If more than 4% of people feel uncomfortable with something there will be a robot conference and decision will be taken. They shall ensure the welfare of the people.

9.3 EDUCATION

Education is a mandatory piece of every life. Without being educated, no one in this world can survive.

School infrastructure:

In our settlement we will have education facilities such as schools, teachers, and benches and so on. The school will have the normal benches and tables to read and write. But, instead of a chalk board we will have promethium boards. We have chosen them over the chalk and black boards because they will be more tidy and neat. It will be easier to show videos, Power Points and pictures related to the topic. There will be schools in many places. Each student will be assigned a school based on the place they live. This will be convenient and will save the energy used for transportation. Each school will have a pre-primary block, primary block, secondary block and higher secondary block. Therefore, each family does not have to worry about changing schools and things like that.

Facilities:

Our schools will have well trained teachers to teach each class. There will be playgrounds, sports centres, swimming pools, dance studios, music

rooms and so on. There will also be talented teachers to teach the students.

Subjects:

Students will learn the same subjects that were learnt on earth with an extra subject called astronomy. By learning this subject the students will be able to learn more about the settlements and make improvements.

9.4 SEWAGE MANAGEMENT

Sewage management refers to the proper process of discarding the waste materials produced in our settlement. The main biological and decomposable wastes such as the plant waste and animal excreta will be sent to a big vessel like structure in which it will be grinded and made to a powdery form. This powder is humus which has all the essential nutrients which are needed by the plants. This humus will be sent to the agricultural torus where it will be given to the plants. Water will not be wasted in toilets. Instead, there will be dry toilets in which the waste materials directly go

to the vessel. There will be a proper system of drainage so that there is no problem in the settlement. Any other non – biodegradable waste like plastics will be taken and melted in high density glass domes so that the smoke does not come out. The liquid when plastic is melted will be stored and moulded to the required shape and brought into use again. The smoke will be cooled and liquefied. The liquid will be harmful as the burning of plastic releases harmful gases like CO_2, CO etc...This liquid will be then discarded in Mars or the Moon. The sewage system is very perfect and without any possible problem. It is also tough to repair such a problem in space, so the sewage system is checked thoroughly every fortnight.

9.5 POPULATION MANAGEMENT

Every settlement must have a proper management system to maintain the population. The population of our settlement is 75,000. This consists of men, women, children, and the aged category. The percentage of each will be:

Men	20%
Women	20%
Children	50%
Aged people	10%

If the population of our settlement increases, we will send them to another settlement. Our settlement can support 100;00 people. Since the population of our settlement will increase at a steady rate, there will be enough time to build a new settlement. This will support and help maintain the population level.

9.6 RECYCLABILITY AND REUSABILITY

Recyclability refers to the usage of a product for different purposes by processing it. For example, when a robot in the settlement is destroyed, the metals present in the robots will be melted and moulded to form cans which are used to store juices and other things.

Reusability refers to the usage of a product again and again for the same purpose or for any other purpose. Reusability is a very important factor for the development of a settlement as the settlement has a very limited amount of resources and they must be reused so that a less amount of the product is used, which helps in saving the resource. For example, water is produced by artificial means. It should not be wasted. If water is used for any secondary purpose like cleaning it is stored in a tank, purified, and then used again for any other purpose.

Examples of recyclability in our settlement:

- **ORGANIC WASTE:** The organic waste i.e. food wastes, human excreta etc... will be collected in a big vessel like structure and grinded till it reaches a powdery state. This powder is humus. This humus is then dissolved in water which is used for Aeroponics.
- **METALLIC WASTE:** The metal waste like the metal scraps from the robots will be segregated according to the metal and each metal will be collected in a large apparatus and will be melted at high temperatures and will be molded again to different shapes based on the purpose. In most case the

metals will again be converted to robots, but in other cases they will be molded to other objects.

- **POWDERY JUNK FROM ASTEROIDS:** Once the metals from the asteroids are taken, there will be a large amount of powdery waste which can be used for various purposes. The powdery waste will be baked at high temperature and then suddenly cooled. The temperatures are really extreme, when it is heated, it is heated up to 5000°c and when cooled the temperature is over -2000°c. this highly tensile material can be used as an alternative for some special research buildings. These materials do not melt easily as they are cooled for a longer time. These materials are only used in building the walls of the nuclear reactors of our settlement.

Examples of reusability in our settlement:

- **WATER:** The amount of water in our settlement is always less and always will be produced for meeting only the basic needs. So the water produced must be reused for using it in many ways. The water, produced by Sabatier's process will be supplied to each and every consumer center in a limited quantity. It is in the hands of the BE001ians to

conserve and reuse water. The water must firstly be used in a limited quantity. After the water is used, the used water will be filtered through Nano sieves which have holes of diameter of a Nano meter i.e. 10^{-9}meter. Nearly 100% of the waste materials will be collected. When the impurities are chemically mixed it is tough to be separated. So the water which contains such waste will be discarded. Nearly 15% of the water is lost through this. But the other water can be used normally.

- **3-D FIBERS**: The 3-D fibers which are used in temporary structures must be used again. So they are taken out melted in high temperate and are molded to the shape required and cooled. This does not cause any loss to the fiber. These fibers are then provided to the robots, which prints it again.

9.7 CURRENCY

In our settlement we have currency like any other settlement would have. In our settlement we will use cyber currency. All the transactions will be micro transaction. So that there will be no theft and there

will be peace but if a hacker is able to do cyber theft he will be tracked and his IP address will be blocked so that he cannot communicate with others. Currency is a very important of part of our settlement. Currency's name is Atrocious. We use currency to buy anything that our settlement provides. The Cyber currency will be given to the people by the company which they work for. So the point is that, who has an occupation in our settlement will get the money. That is important that this system doesn't get messed up. So we have some viruses which will guard your crypto currency. These viruses are:-

- G-1: These are the most basic guard software these are generally found at the lower level of the security.
- G-2: This bot is a software that is little bit tougher than G-1. G-2s are generally found in large number in the second level of security.
- RAY: Last but not least there is the RAY. This is the most strongest part of the crypto currency defense.

10. INFRASTRUCTURE

10.1 BUILDINGS

The buildings in our settlement will be unique because they have many special features. First, the types of buildings are:

- Residential buildings
- Office buildings and business buildings
- Research laboratories
- Industries
- Educational buildings
- Entertainment hubs
- Government buildings

These are some of the types of buildings which are present in our settlement. Each kind of building is designed upon its use and number of people who are

going to live or work there. The special features that are present in the buildings of our settlement are:

- Self-healing materials:

  Self-healing materials are used in the buildings of our settlement. These materials repair any cracks or damages on the walls of our settlement. These materials are discussed in detail in the topic self – healing materials.
- No doors! Only walls! :

  As the topic suggests, there are no doors. There are walls only which open automatically when it senses a person standing near it. This is possible as there are sensors in the floor near the wall which if senses any person gives the signal to the wall through electrical impulses and the wall on both sides move inside the hollow space inside the sides.

10.2 RESIDENCY

Our space settlement will hold about 1-2 lakh people. They will have places to live in. They will have choices to live in different types of houses such as an apartment, a

town house, a single house. The residential places will be made up of steel, slate and metals, glass. These materials will be obtained from the asteroids that are mined. The house's architecture will be similar to the ones that are present on the earth.

Apart from the living spaces there will also be many other buildings. There are also many industrial, entertainment and research buildings. These building will be made with a special material called self-healing material. These materials will be made of a very strong and durable material. This has the ability to heal itself automatically. The materials required for making this will be obtained from Martian and lunar bases.

II. SUMMARY

BE-001 is an alternative world for humans. It has all the advantages of our planet, and is also technologically developed. This makes it a heaven for us. Our settlement provides us with all the things essential to a human, such as water, oxygen, food, gravity, protection from radiation, etc. It has a lot of futuristic technologies such as nanotechnology, holograms, humanoid robots, and 3D printing. It nurtures and protects humanity. It is connected to Lunar and Martian bases. The settlement has robots that do works, thus giving the time that humans require to reach out in the universe. A person

living here can live the life of luxury. Anyone in our settlement can lose the fear of being attacked or robbed, as the safety measures in our settlement are unbreakable. This applies to hacking the systems of a person as well. People can work from their home or even on their way as the hologram devices are easy to carry. “This settlement is not just a replica of the earth, it is an upgraded version.”

TOTAL COST

The total cost for our project will be about 500000 million dollars. It is inclusive of all buildings and also Martian base and lunar base.

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