



EXECUTIVE SUMMARY

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Northdonning Heedwell (NH) is pleased to announce the fully compliant Bellevistat Space Settlement proposal in response to the Foundation Society's RFP dated 2 January, 2028. It is Mankind's endeavour to conquer the realms of outer space and beyond. Thus, with extreme dedication and an aspiration to be part of this ambitious project, our expert design team has developed this comprehensive design plan.

Bellevistat is proposed to be a settlement supporting 18000 permanent residents at a time. The salient features of the design are:

- A unique aspect of the modular design is that the settlement will be inhabited within just a few years of construction so that the settlements purpose of being a hub for on orbit refining and mining of extraterrestrial materials and zero g heavy manufacturing
- Views of outer space will be visible to the residents. The comfort of the
 residents will not be compromised at any cost. Different neighbourhoods will be
 provided so that the residents are not bored with a monotonous community
 infrastructure.
- Three widely separated docking ports have been provided with multiple docking strips. This will enable efficient and quick communication with other settlements particularly Alexandriat, the moon and the earth.
- To increase efficiency and for the comfort of the residents of Bellevistat, robots and multiple automated systems have been introduced.
- A complete schedule and an estimate of the cost has also been attached along with a thorough detail of the structure and operations to be carried out in the settlement.
- Bellevistat will be a highly profitable venture as it has the ability to harness space resources and transfer them to the earth.
- An earth like environment will be provided by constructing green patches, parks and gardens, kitchen gardens, water bodies and lakes, special areas for camping and hiking and by maintaining a proper day and night cycle.
- Provision of a healthy and a balanced diet to the residents will be ensured and utilities like electricity, water supply, waste disposal will be taken care.
- Innovative engineering techniques will be used to reduce construction time in the settlement.
- Backup systems and contingency plans have not been ignored, incase there is an emergency.
- Bellevistat will have a flourishing tourist industry, with tourists coming from the earth as well as other settlements. These tourists will have a luxurious stay with attractions and activities not available on the earth.

| POPULATION | PERMANENT: 18000 TRANSIENT: 1000 |
|-----------------------------------|-------------------------------------|
| DATE OF CONTRACT | 2 ND JANUARY 2028 |
| YEAR OF COMPLETION | 2052 |
| COST | US\$200 BILLION |
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2.0 STRUCTURAL DESIGN

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2.1 External Configuration

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2.1.1 Main features of Bellevistat:

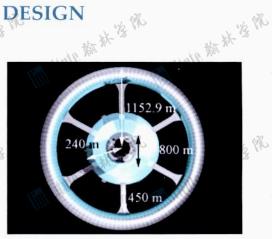
Effectively shielded cylinder and torus for construction.

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- Provisions for attachment to asteroid, and mining of asteroid material.
- 3. Mirror-system for natural day-night cycle
- 4. Attractive and functional community design
- 5. Tourist attractions
- 6. Multiple docking ports in case of redundancy

2.1.2 Main Structural Components of Settlement:

- 1. segmented central cylinder
- 2. single torus
- 3. Spokes connecting the torus to the cylinder.



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Figure 2.1.0 Top View of Settlement

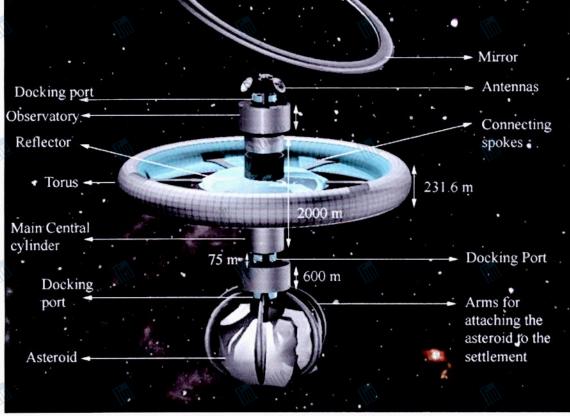


Figure 2.1.1 External Drawing of the Settlement

| · k | · · · · · · · · · · · · · · · · · · · | Table 2.1.1: USES OF LARGE ENCLOSED VOLUMES |
|----------------|---------------------------------------|--|
| Titule \$10 PK | Segmented Central Cylinder | Automation services, storage, heavy industry, asteroid mining, storage and refining, research, power generation, observatories and other zero-g activities. |
| Million | Torus | Residential area, agricultural area, industrial area. |
| | Spokes | Upper circumference lined with solar panels for power generation. Connect central cylinder to torus. |
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| - AZ | Docking Ports | Transportation of | cargo and passengers. | 2 032 | A32 |
|---------|-----------------|--------------------|------------------------|------------------|--|
| 13 17 | Asteroid Centre | Mining, storage an | d refining of asteroid | material. | |
| The Ohn | Phil Olive | State State | The ature | The Olive | Bill Olive |
| Hilling | Malline | Table 2.1.2: Dimen | nsions of Main Struct | ural Components: | THE STATE OF THE S |

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(%)

| | Structural Component | I The state of the | Dimensions |
|--|----------------------------|--|--------------------------|
| | | Major Radius (R1) | 1152.9m |
| - AZ | Torus | Minor Radius (R2) | 231.6m |
| 12 13 To | 13 10 | Down Surface Area | 2948800m² |
| 水水水水 | "你" | Radius (Radius) | 700m |
| | Segmented Central Cylinder | Length | 2000m |
| | Miles. | Volume | 3078770000m ³ |
| | | Radius | 45m |
| | Spokes | Length | 450m |
| , % | , A | Volume 🧳 | 2862776m³ |
| TO THE THE PERSON OF THE PERSO | 3 | THE BENEFIT OF THE BE | " A B |
| TO SHE | 2.1.3: CONSTUCTION MAT | FERIALS: | All Side |

2.1.3: CONSTUCTION MATERIALS:

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While selecting materials for use in the construction of the main structure of Bellevistat, (the company) has kept the safety of the residents and the viability of the structure a top priority, as well as keeping economic feasibility in mind.

| William Mar H. 13 P. | moving shell surroun and at the same tim settlement. The settle | nding the torus. This value, due to being deta ment will have a glas | will provide addit ached from the l as ceiling to allow | mum protection, and will consist of a non- tional shielding from radiation and debris, torus, will not add to the weight of the sunlight to filter in, for the psychological ws to provide views of space and of the |
|--|---|---|---|--|
| | | Table 2.1. | 3: Construction 1 | Materials |
| A30 | .30 | A30 | er Wall (Main La | 39 |
| 1/2 4/10 | Material / | Source 1/2 | Use 4 | Reason For Selection Of Material |
| William W. 33 180 | NASA High Strength Aluminium Alloy (MSFC398) | Aluminium obtained from asteroid produced in Alexandriat. | Main hull (first layer of wall) | Very high strength and wear resistance at high temperatures of 500-700°F. Material cost of less \$1 per pound. |
| 1 | Carbon Nanotube mesh | Asteroid | Second layer | Extraordinary strength. Tensile strength of 200 GPa. Young modules of over 1 Tera Pa. |
| 3 11/16 Apr 1/4 3 | Super Adobe | Lunar Soil | Third layer | High strength and resistance.Good insulator. |
| Min | Silicon Nitride | El Min | Fourth layer | Good high-temperature strength. Creep-resistant and Oxidation-resistant. Good thermal-shock resistance. |
| Titute the the training of the | Aluminium Silicate | Suitule the Hr is file | Fifth layer | Excellent high-temperature capability. Thermal shock resistance is exceptional. Thermal insulator. |
| Ì | Crushed lunar regolith | Moon | Non-moving (outermost shell) | Crushed lunar regolith matrix will be a non-moving shell in some areas so that hull does not need to bear extra |
| Stitute Mark 18 1980 | Militate # # 13 P. | Maritine Mark & P. | motivite the state of | The state of the s |

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| | 2. | 1.4: Radiation And Debris Protection |
|-----------|---------------------------------------|---|
| | Material | Properties |
| | Graphite fibres diffused with Bromine | Effective shield against electromagnetic radiation |
| The Print | Silica Aero gel | Most effective Aero gel insulator Absorbs infrared radiation |
| OLO COLO | Nextel | Protects from debris due to its high tensile strength |
| | Kevlar mesh | Debris protection due to high tensile strength and Young Modulus. |
| - | 2.15: Materials | For Transparent Portion (Ceilings And Windows) |

| Material | Reason For Selection |
|-----------------------------|--|
| Lead-glass | Shields from X-rays |
| Silicon Aero-gel | Producing Silica Aero gel in a weightless environment (micro-g industry in central cylinder) can produce particles with a more uniform size and reduce the Raleigh scattering effect in Silica Aero gel making it transparent Prevents heat transfer through conduction, convection, and radiation. |
| Aluminium Silicate glass | Shields against radiation. |

2.1.4 GRAVITY AND PRESSURE:

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Generation of Gravity: Gravitational force will be produced by rotation. Centrifugal force generated by the rotation will act as a gravitational pull. Pseudo gravity will be produced by rotating the torus at an rmp of 0.86. This is an ideal rate of rotation because it produces gravitational field strength of 1g. Furthermore, this rate of rotation requires that the settlement have a major radius of 1152.9 m to produce 1g,

| STRUCTURAL LUMPONENT | PRESSURE | GRANTY |
|----------------------------|----------|--|
| TORUS | | |
| SPOKES | | |
| DOCKING PORTS | | |
| OBSERVATORIES | 4 % | |
| ASTEROID HARVESTING CENTRE | " | The state of the s |
| CENTRAL CYLINDER | | atilillo |

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4%

Figure 2.1.3 Pressure & Gravity Distribution

which is ideal for the population size specified by the Foundation Society. It provides an ideal balance between economic feasibility and comfort of the residents as the line of sight thus generated is 63.5 m, which is essential for psychological stability of the inhabitants. In addition, a low rpm prevents the inhabitants from experiencing the Corollis Effect. The formula used for determining rotation rate is as follows:

 $W^2 \times R1 = 9.81$ W=0.0922 rad/s r.p.m = 0.86

The settlement will contain areas lacking pseudo gravity, as this is essential for optimum output from various sectors such as industry and refineries.

2.2.1 ALLOCATION OF INTERIOR DOWN SURFACES

| itule man | Table 2.2.1: Area Allocation In Torus | It was still some |
|----------------------|---------------------------------------|---------------------|
| Uses of Areas | Surface Area Required Per Person(M2) | Total Area Utilized |
| Residential | 49 | 931000 |
| Schools and Colleges | 1 | 19000 |
| Shops and Offices | 3.3 | 62700 |
| W. B. A. | 10 数型 XX XX | 10 数型状。深入10 |
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| Hospitals | 0.3 | 5700 |
|----------------------|--|---------|
| Assembly | 1.5 | 28500 |
| Open space | 拓 | 190000 |
| Storage | State of the state | 95000 |
| Transportation | 12 | 228000 |
| Service Industries | 4 | 76000 |
| Agriculture | 61 | 1159000 |
| Misc. Infrastructure | 7.1 | 134900 |
| Recreation | 13 10 1 | 19000 |
| Total Total | 板 155.2 | 2948800 |

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2.2.2 USE OF MICRO GRAVITY AND UNPRESSURIZED FACILITIES

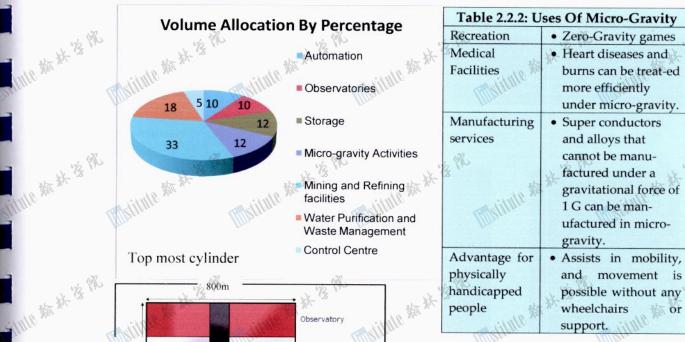
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| Top most cylinde | er |
|---|--|
| Soom Soom | Observatory Micro g. activities |
| Thin the state of | Transportation corridor Storage Water purification/management Control centre Power plant |
| Mittell Mit He 18 18 2000m H | Automation services Waste management Fuel storage Control centre |
| William White the state of the | Heavy industries Storage Storage |

2.2.3 Vertical Clearance in Each Area:

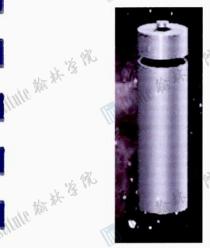
| Torus Component | Vertical Clearance |
|--|-----------------------|
| Torus | 245 m |
| Spokes | 100 m |
| Docking Ports | 50 m |
| Asteroid Mining and Refining Centre | 300 m |
| Heavy Industry Cylinder | 250 m |

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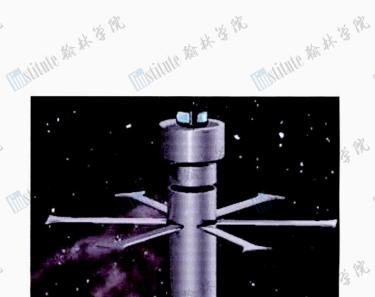
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Construction of **Docking Ports**



Phase 3 Construction of Spokes



Phase 4 Construction of Torus



Phase 5 Construction of Antennas



Phase 6 Construction of Reflector & Mirror



Phase 7 Construction of Refinery





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Phase 8 Construction of Arms
Port

Phase 8 Construction of Arms

Institute Arms

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2.4.1: Attachment of Asteroid:

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As illustrated in the diagram arms will be constructed to attach the asteroid to the settlement. The arms are segmented and movable provided with anchors at front these anchors will clutch the asteroid brought near the settlement. In the arms near the anchors there will be a decontamination room to separate the dust from ores. The segments will act as a pathway for transportation of miners, tourists, automated machinery and robots to the asteroids where the machinery and robots will do mining work and tourists can have an experience of viewing the mining site.

2.4.2: Ore Refinery Operations:

There will be ore refinery industry in the cylinder (Fig 2.4.1) constructed near the asteroid as shown in the diagram. A docking port will be constructed right next to the refinery for efficient transport of refined ores to earth or other settlements.

2.4.3 DUST SEPARATION SYSTEM:

A robot (ex-bot) will specially be constructed and will be used to separate all the dust from exterior surfaces of the settlement. It will also work on docking ports to separate the dust from docking surface. Hence the dust will get collected In the chamber present in the robot. Dust separation mechanism is also used for preventing the entry of dust in the interior of the settlement. In this mechanism vacuum dust suckers will be used in the tunnel providing path from docking tunnel to the central transportation corridor. This will be pressurized

so that vacuum can suck the air. When the dusty ores enter this tunnel, the dust being a lighter particle also gets sucked with air.

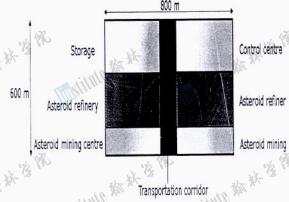


Figure 2.4.1: Lower cylinder

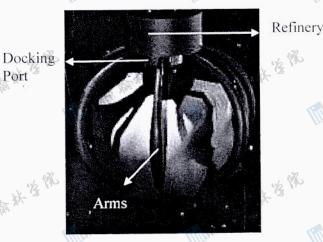


Figure 2.4.1: attachment of asteroid

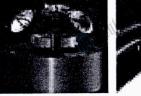
There was the Ports: There will be 4 docking ports. The docking port is away from the pressurized areas therefore any deviations of the vehicle from their original paths will not .effect the pressurized volumes. The ports are widely to become an economical activity at Bellevistat.

The three main zones of the storage and the separated from each other so that in case accident on one port the other port can be used. These docking facilities will also be needed if space tourism is

The three main zones of the docking port are: storage zone, docking zone and controlling zone



Docking Port 1



Docking Port 2



Docking Port 3

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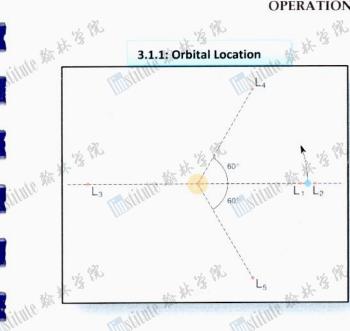
OPERATIONS AND INFRASTRUCTURE

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3.1.1: Orbital Location

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The orbital location chosen for the Bellevistat is L4 due to the following reasons:

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- The stability given to the settlement due to L5's resistant to gravitational perturbations. When and if the equilibrium of this settlement is disturbed it returns to orbit the Lagrange point without drifting further away, and without the need of frequent rocket firings.
- Absence of settlements in L4 provides ample space for Bellevistat to harness and use asteroids without and damage to other settlements.

3.1.2. Table for the materials required and their specifications:

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| | Material/Equipment and Purpose | Composition | Source | Transportation | Storage |
|---------------------------------------|--|---|-------------|------------------------------------|------------------|
| Citato Paris | Robots (For construction as specified in Automation) | Ville III | Earth | Pico Jet/XP 2028 | Used immediately |
| - | Oxygen and nitrogen (Atmosphere) | - | Earth | Pico Jet/XP 2028 | Used immediately |
| 1 , 1 | Water (power generation) | In the form of ice | Moon | Solo-2000 | Used immediately |
| 大 | Kevlar mesh | 灰 C, H ₂ , N | Moon | Solo-2000 | Central Cylinder |
| Hitimo | Carbon Nanotube (Second layer of structure) | Carbon | Earth | Pico Jet/XP 2028 | Central Cylinder |
| - | Super adobe (third layer of structure) | Regolith | Lunar Soil | Solo-2000 | Central Cylinder |
| ALL AST | Aluminosilicate glass (fifth layer of structure) | Al, Si, O ₂ | Moon | Lunar shooters/ mass catchers | Central Cylinder |
| ditute And | Nextel (Debris protection) | Al, O ₂ | Moon | Lunar shooters/Mass catchers | Central Cylinder |
| | Lead glass (ceilings and windows) | Pb | Earth | Pico Jet/XP 2028 | Alexandriat |
| Bittle Stark 'S | Graphite fibers diffused with bromine (protection against EM radiation) | 新兴·洛·尔 | Earth | Pico Jet/XP 2028 | Central cylinder |
| WHI. | Silicon Nitride (fourth layer of structure) | Si, N | Earth | Pico Jet/XP 2028 | Alexandriat |
| 8 | Aluminium Silicate (fifth layer | Al, Si | Earth | Pico Jet/XP 2028 | Alexandriat |
| ************************************* | FR THE SHARE | . · · · · · · · · · · · · · · · · · · · | 110 紫 米 沒 % | Myithito And At '85 PR | itute ## # 18 18 |
| delititle " | Mistilita A. | | THE NA. | Maritude And Miles | William Was |

The state of the state of of structure) Solo-2000 Central Cylinder NASA High Strength Alexandriat Aluminium Alloy (MSFC398) (for the Main hull) Pico Jet/XP 2028 Central Cylinder Silica Rubber Adhesives (as an Earth adhesive) Moon Solo-2000 Central Cylinder Crushed Lunar Regolith (for outer-most shell) Earth Pico Jet/XP 2028 Silica Aero-gels (as an Alexandriat insulator) Earth Pico Jet/XP 2028 Alexandriat Kevlar fibers (for the mesh)

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3.2.1. Food Production:

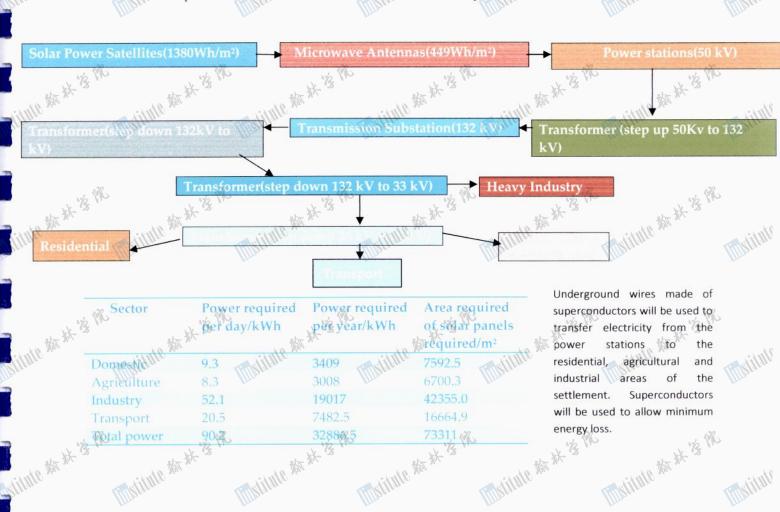
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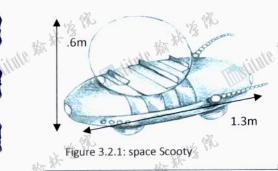
| | Growing | Harvesting | Storing | <u>Packing</u> | <u>Distribution</u> |
|--|--|--|--|----------------|----------------------------------|
| | Aeroponics; | Robot | Vacuum storage and | Vacuum | Underground capsules and |
| | Hydroponics | . 42 | thermo-acoustic | packing | delivery trucks dispatched at |
| - ·- · · · · · · · · · · · · · · · · · | 3 | 3 | refrigeration technique | 3 | orders placed through a computer |
| THE THE | Total ale | | 16 39g | | by customers; sold in malls |
| Phillips | THE STATE OF THE S | THE STATE OF THE S | THE STATE OF THE S | Till Hill | THE STATE OF |

3.2.2. Power Generation: Solar power satellites (SPS) containing photovoltaic cells made of Gallium Arsenide will be used (30-35% efficient). These cells will directly convert sunlight into energy. This energy will be transmitted to antennas located in the central cylinder of the torus in the form of microwaves. The antennas will convert the microwaves into DC electricity providing a power of 449Wh/m². The power station will also be located in the central cylinder.



3.2.3: Internal and External Communication and Transport System:

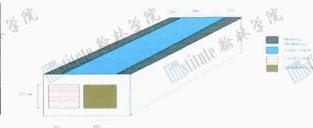
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Figure 3.2.2: Luxury car

Figure 3.2.3

| No. | The state of the s | | 1/2 T/2 |
|---|--|--|--|
| Titite Shi | Within the colony | With the Earth | With the Moon & Alexandriat |
| | Electrical Elevators connected to the micro-gravity | Space Shuttles (specified in 3.3) | Mass Catcher: to |
| | centre | | receive raw |
| | Electrically powered Personal Rapid Transport | | material from the |
| | travelling on tracks made of high conductivity | of the | moon |
| | materials to reduce power loss as shown in fig. 3.2.3 | ************************************* | Mass Launcher |
| The above | Space Scooty (Fig. 3.2.4) | 16 200 m | Space Shuttle Space Shuttle |
| CONTRACTOR OF THE PARTY OF THE | Underground Magnetic Capsule Pipeline system | Miles Milling | (specified in 3.3) |
| Millian | (Robot-Supernova and Nova) used to transport | line. | Illia |
| | exports and other goods to and from port facilities. | | |
| | BMX Biker MAX (provisions for shielding as Box Box Bix 2 2 5 | | |
| | illustrated in Fig 3.2.5 Luxury electrical car will be available for tourists to | . 4 | . % |
| | rent and for families which can afford | 17.13 | 13 |
| 源 加 | Portable communication receiver with miniature | Satellites (powered by solar | Satellites (powered |
| dilillo | virtual display, an optical system to produce and | power): 3 around earth at GEO, 3 | by solar power) |
| IIII | transmit virtual images and a microphone/speaker | around the moon, 2 at LEO and 1 | using radio wave |
| | to receive and transmit audio. | at L4. Use of 2 types of antennas: | transmission using |
| | WiMax-World Wide Interoperability for microwave | Low-gain(Omni-directional) for | antennas specified |
| | access is a technology aimed at providing wireless | close communication and High- | earliar (in |
| | data over long distances. | gain(Unidirectional)for distant | communication |
| 加加 | Use of fiber optics | communication. | with the Earth) |
| Jillili | Ultra High Frequency System | All the state of t | This will be a still the s |
| 0 x | | | |



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Fig 3.2.4 BMX biker

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| Number | Capacity | <u>Duration of</u> <u>one complete</u> <u>journey</u> | Number of Stops | Speed |
|--|----------|---|--------------------------|------------|
| 2 (1 clockwis e and 1 anticlock wise) | 100 each | 10 mins (including stops) | 4 stops of 1 min each | 30 km/h |
| in the state of th | | 110 海 林 绿 绿 | Milital Mark 18 | Marital |

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3.2.4. Climate/Atmosphere Control:

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and lowering of humidity

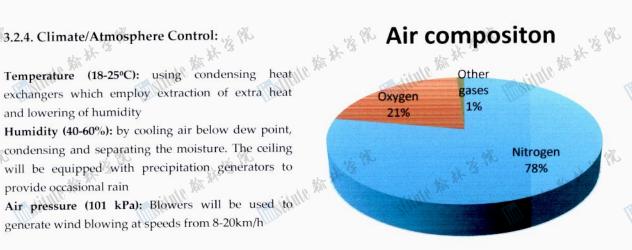
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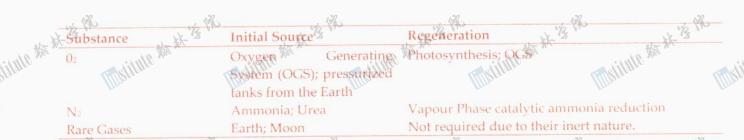
Humidity (40-60%): by cooling air below dew point, condensing and separating the moisture. The ceiling will be equipped with precipitation generators to

Air pressure (101 kPa): Blowers will be used to generate wind blowing at con-1 generate wind blowing at speeds from 8-20km/h

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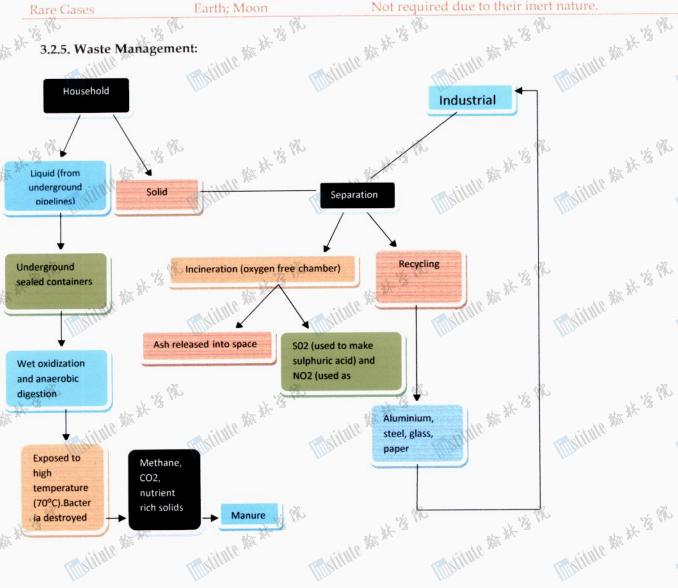
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13 12 3.2.5. Waste Management:



3.2.6. Water Management:

Water Usage: Daily a human being consumes 1.5-2 litres.

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| Water Usag | ge: |
|---|--------------------|
| 36% 36% 36% 36% 36% 36% 36% 36% 36% 36% | Humans Agriculture |
| 7% 25% | ■ Industry |

| s 1.5-2 litres. | is the | in the same of the |
|-----------------|-----------------------------|----------------------------|
| s 1.5-2 litres. | K PK | 111111111111 |
| | Quantity(l/day /individual) | Total Amount(l/day) |
| Humans | 30 | 570000 |
| Industry | 33.8 | 570000 646000 125300 |
| Animal | 6.6 | 125300 |
| Agriculture | 23.4 | 447500 |

Mylittle star &

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Fire Detection, Alarm and Emergency Services: The VESDA (Very Early Smoke Detection Apparatus) Alarm system is used for fire detection. A hotline to the fire department has been installed and the fire extinguishing mechanism uses Dry Chemical (monoammonium phosphate) Extinguishers.

Marithe 3/4 14 3

3.2.7 Water Production

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desitate the the Initially water would have to be extracted from the moon as ice which would then be melted by the solar energy and then purified. Water can later be produced by the Hydrogen fuel cell (2H2+O2->2H2O) method. Recycling and use of excess humidity is also a feasible method. Hydrogen fuel cell is the most reliable method as it does not have any excess by products. Oxygen can be brought from the moon and hydrogen from the earth

| - w | hydrogen fron | n the earth | in the | W wh | 12 Ph |
|-----------------|---------------|---|-------------------------|--|--|
| itule the the | Purification | Microbial check valve | Multifiltration process | Volatile removal apparatus | Ozone and iodine |
| - to | Distribution | Underground pipelines to every house and industry | Superstores and malls | Excess storage in all tanks | |
| Milita Market 2 | Storage | Interconnected tanks with valves and pumps | Mylitute the the | myithte star of | Melitute starte 's |
| South West of | Emergency | Lake for recreational purposes may also be used | 3 PR | THE STATE OF THE S | The state of the s |
| maritude " | Mistale | ling titule | Maritude A. | Millitary V. | institute A |

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3.2.8. Day/Night Cycle:

| The state of the s | 13 Ph | THE STATE OF THE S | The state of the s | |
|--|---|--|--|---|
| Duration | Day | White Ship Ship Ship Ship Ship Ship Ship Ship | Night | W. |
| 14 Hours long day and 10 Hours long | • | Natural Light via windows for wide spectrum | Shutters | 000 |
| night | | light | Smart Glass | |
| | • | Mirrors continuously adjusted at different | | |
| 237 | A30 | angles to provide illumination from dawn till | A32 | |
| An Ray | B KIN | dusk 1/3 1/3 | 13 40 | |
| 振 秋· | • | | 板板 | 100 |
| matitude. | • | Artificial lightening in homes/work places/buildings | | III |
| | 14 Hours long day and 10 Hours long night | 14 Hours long day and 10 Hours long night | Natural Light via windows for wide spectrum light Mirrors continuously adjusted at different angles to provide illumination from dawn till dusk Intensity of light controlled by smart glass Artificial lightening in homes/work | Natural Light via windows for wide spectrum light Mirrors continuously adjusted at different angles to provide illumination from dawn till dusk Intensity of light controlled by smart glass Artificial lightening in homes/work |

| 3.3.1: Space Vehicles and Int | 13. 140 | The state of the s |
|---|--------------|--|
| Name and Location | Required No. | Space Infrastructure Purpose |
| Alexandriat at L5 | - | Commerce, banking and trading along with industries to on research, tourism and manufacturing. |
| Lunar Shooters on the Moon | 6 | Used to transfer lunar materials to MEO port. |
| Mass Catchers at L4 | (6) | Active and Passive catchers installed to catch materials lunar shooters |
| MEO Port at MEO (Medium Earth Orbit) | 3 | Base for vehicles (launch and orbit) to undock and start |
| Space Tugs at Bellevistat | 2-3 | To move satellites between orbits |
| Solar Power Satellites in the Low Earth Orbit (LEO) | 6 3/10 | To provide electricity from solar power |

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Inditate 精·光·接·然

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3.3. Thistitute Are the 'E' Se 3.3.2: Space vehicles:

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张俊观

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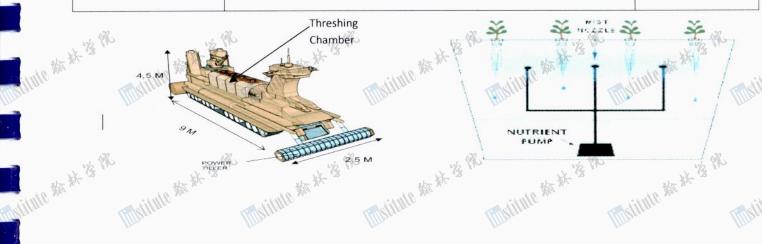
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| z.l: | 产外 ₍₃ | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | *** | 23 | *** | A TOTAL | F 3 | AL CS |
|---------|------------------|--|---|---|---|--|--|--|
| R Ollin | | | Lighth Mills | Variable 4 days | und 6 | MINITED NO. | 15-20 High | to My 1/2 3 |
| | d) | to Bellevistat | Oxidizer: | | | | | |
| | 1/2 PM | 1/2 PL | Oxygen | k the | 1/2 Ph | | 1/2 Ph | |
| to the | Orbit | Transplant | Ammonia | Variable-aro | that 6 | 350.00a | 14-18 | |
| Illino | MAX (Include | Rusengers from MEO port to | Mistille | 3-4 daysille | | Militare | liteli | 10 To |
| | d) | Bellevistat | | | | | | 10 m |
| | | | Hydrazine | 3 days | | 110,000 | | A |
| | Xbox (28 | passengers from | 4 | k th | 次外 | | 次界 | h |
| a l | December | Bolloviant | 4/5 AV | | 版状》 | A STATE OF | (- '- | 35m |
| Till " | d) | Mylitill | Hillitate A. | This it it is | Ne- | Tillititity A. | Tily lit | 60m |
| | Solo- | Transport cargo | Water | 28-30 days | 5 | 450,000 | As | |
| | 2000 | between | (hydro/stea | | | | requir | 25.m |
| | (Include | Bellevistat and | m | A32 | Δ32 | | ed | 430 |
| | d) 1/2 /10 | Alexandriat/othe | propellant | 13 KM | 13 KM | ار. ب | 13 KM | 30m V |
| 大大 | THE THE | r locations e.g. | system) | 10 | 物於 | 被政策 | Λ' | A CONTRACTOR OF THE PARTY OF TH |
| 10000 | | led black year | | | | . Lall | 0 1 2 | |
| | Auto 3 | (Include d) MAX (Include d) Launch Xbox (X) by 3 Contracte d) Solo- 2000 | to Bellevistat Transport MAX (Include d) MEO port to Bellevistat Launch Transport of passengers from Earth to Bellevistat Launch Transport of passengers from Earth to Transport cargo between (Include Bellevistat and | (Include from MEO port d) to Bellevistat Oxidizer: Liquid Oxygen Ammortat MAX Revengers from (Include MEO port to d) Bellevistat Launch Transport of Hydrazine Xbox (Xo passengers from by Earth to y Earth to y Earth to y Solo- Transport cargo Water 2000 between (hydro/stea) | (Include from MEO port de | (Include from MEO port to Bellevistat Oxidizer: Liquid Oxygen Wariable-around 6 MAX Resengers from (Include MEO port to d) Bellevistat Launch Transport of Hydrazine 3 days 10 Xbox (20 passengers from Earth to Bellevistat d) Earth to Bellevistat d) Solo- Transport cargo Water 28-30 days 5 2000 between (hydro/stea) | (Include From MEO port by drogen 4 days) d) to Bellevistat Oxidizer: Liquid Oxygen Oxygen Variable-arouted 6 350,000 MAX Ristengers from (Include MEO port to d) Bellevistat Launch Transport of Hydrazine 3 days 10 110,000 Xbox (20 passengers from by 2 Earth to 3 Earth to 3 Earth to 4 Earth to 5 Earth to 6 Earth to 6 Earth to 6 Earth to 6 Earth to 7 Earth to | (Include from MEO port dy drogen 4 days) d) to Bellevistat Oxidizer: Liquid Oxygen Oxygen Ammorta Variable-arous 6 350,000 14-18 MAX Rivengers from (Include d) Bellevistat Launch Transport of Hydrazine 3 days 10 110,000 8-10 Xbox (10 passengers from by Earth to X Earth |

3.4. Agriculture and Livestock:

String the the

| | | <u>Agriculture</u> | |
|-------|---|--|---------------------------------|
| | Method | <u>Crops</u> | Area Required (m ²) |
| 110 海 | Aeroponics (Fig. 3.4.1); Hydroponics | Lettuce,soybean,tomato,pea, artichoke, sparagus,squash, spinach,pepper,celery, cauliflower,broccoli,cabbage,eggplant | 347,700 |
| OH. | Soil (From moon) | Wheat,rice,maize,pulses,fruits Eucalyptus trees and rose bushes lining the roads and in recreation parks | 5215500 |



| Method | Type | Facilities Required | Area Required (m²) |
|---|--|--|--|
| Micro cattle and cloning (somatic cell nuclear transfer technique) | Microcattle, chickens, tilapia, myotonic goats | ShearingSlaughter HousesDisease Control CentersSanitizationPacking | For growing feed and rearing- 173,850 Facilities-115900 |

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3.5 Innovative Designs and Facilities

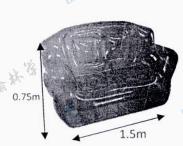
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The trees on the settlement will not be used for industrial purposes and so the furniture will not be made out of wood. The following things will be made of fibreglass:

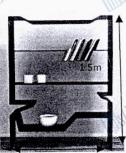
- Tables
- Chairs
- Crockery and cutlery
- **Shower Cabinets**
- withite the the is the Shelves and cupboards

| of fibregiass: | Materials | Product | Sources |
|----------------|---------------------------------|--|---------|
|) 11-10 | Fiberglass(Si,O2) | Tables, chairs, crockery, cutlery, cupboards etc | Moon |
| undtitute An | Polyethylene (thermoplastic) | Inflatable sofas | Earth |

Fiberglass is used because silicon and oxygen are easily available from the moon. Fiberglass is lightweight, highly resistant to impact and convenient to install and use. Inflatable sofas and beds made of plastic will be used which can be inflated using an automatic pump. They will save space as they can be deflated when they are not needed and stowed away.







1m



0.5m 3.6: Space Manufacturing and business opportunities:

| | y 3 | The state of the s |
|----------|--|--|
| 10% | Business Opportunity | Details to the last t |
| Illin | Manufacture of spacecrafts | Manufacturing facilities and assembly of spacecraft at Bellevistat will be situated in |
| | NIII. | the central cylinder. Special warehouses will be constructed for storage of goods used |
| | | for spacecraft manufacturing. |
| | Production of innovative interior | Surplus will be exported to Alexandriat and Earth. The manufacturing unit will be |
| ~ 城 | furnishings | close to the Docking ports for fast, easy and efficient transport. |
| IIII | Provide equipment for large scale | Robots including supernova, Mar-Ed, FSM, SSNS-4 and many more can be |
| | space and Lunar construction. | transported to new settlements for construction purposes. Bellevistat will serve as a |
| | | construction site for new settlements and lunar projects. Construction of smaller |
| | 18 9h | subunits will be carried out on Bellevistat which can then be transported to the |
| 不 | ** " " · " · " · · · · · · · · · · · · · · | assembly point-in space or on the moon- and assembled accordingly. |

William We my 3 Maithle 35 74 3 Minitale AT XX 3 Maritule 350 XX '3 Mighty to 30 Maritule # ** Manufacture and Launch of Launch of satellites for space exploration projects from Bellevistat will efficiently satellites Maidule to the State of the reduce the cost as compared to launching from the earth. Research centers in estitute the the is Bellevistat will ensure the manufacture of satellites which will introduce a new era of space exploration. Turte the the table of table Maritate & K '8 18 海洪海州 加加蘇萊紫幣 FIG 3.6: SOME EXAMPLES OF PRODUCTS TO BE MANUFACTURED ON BELLEVISTAT Whiting the the 'the life was Maritude ** 3 Maritud War 14 3 Military 84 13 melitute the the light of the 加州加州 赫 珠 溪 烧 面的排作精 加州州 游 林 接 豫 **国际的地** THE STATE OF THE 加州加州 游 林 浅 豫 Maritute 森林 珠 '溪 塚 面对加州海拔光泽 Maritale 养 株 接 烧 Maritute 教 林·淺 豫 Marithta 教 林 接 % 加州加州 加州加州 赫 株 後 % 加州加州 and the start of 18 Missitute to the state of the 加州加州 加州加州 赫 株 溪 烧 面的抽作物。

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HUMAN FACTORS

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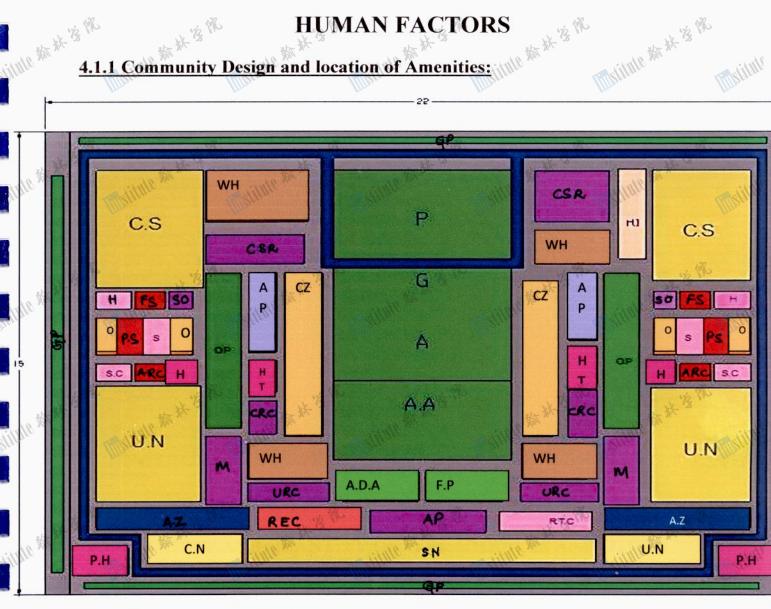
Melitute 30 74 3

Withthe Man # 18 18 HUMAN FACTORS 4.1.1 Community Design and location of Amenities:

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4.1.2 KEY FOR COMMUNITY DESIGN

| | 4.1.2 KEY FOR CO | MMUNITY DESIGN | | | |
|-------------------|--|---|-----------|---------------|--|
| ~ B | A PECION N | | W Ch | Took of | S Comment of the Comm |
| 小 种 被 按 | REGION | SPECIFICATION | SYMBOLS | TOTAL AREA | maitule ## # '\$ PS |
| Million | THE STATE OF THE S | This it was a supplier of the | Tinglille | /cm2 | THE THIRD IS |
| | Open area | Green Patch | G.P | 17.6 | Mr. V |
| | | Health Centers | O.P | 30 | Represents water b |
| | | Gyms, Spas, etc | O.P | 1.5 | in the settleme |
| ·/a | Residential Area | Country side | C.S | 84 % | motitule ## # '3 P. |
| Tute Man Mr. 18 | *** *** **** | Urban neighborhood | U.N | 84 | A CA |
| TITE STILL | out Ohn | Space neighborhood | S.N | 56 | Stuffe Ship |
| MALINE | Community | Schools | S MISTING | 1 | ENSTRUE TE |
| - | Services | Hospitals | H | 1 | |
| | | Research and Training Center | R.T.C | 2 | |
| | .90 | 20 | .9/ | .90 | -90 |
| mailule the At 13 | The little the start of the sta | Monthly Market 13 188 | 1. 13 YN | 柳水浅水 | motivite # ** ** |
| 旅机 | The same | 板板 | % | 杨秋 | 杨季 |
| atilille. | atituli . | atitule " | Hitita | 100 | atitille " |
| Ulps | Million | Illing. | Miller | | Illing |
| 130 | | | | | |

林溪水

Represents water bodies den k k k k in the settlement

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林溪水

| Service Industry | Assembly and Religious Centers | A.R.C | 6 |
|---|--------------------------------|---------|---------|
| | Police stations | P.S | 4 % |
| 海 加 | Fire stations | F.S | 3 恢 5 7 |
| Peorestion and | Repair and Emergency Center | R.E.C | 2 |
| Recreation and | Urban Recreation Center | U.R.C | 2 |
| Entertainment | Amusement Park | A.P | 6 |
| | Museum | M | 4 |
| A20 | Commercial Recreation Center | C.R.C | 1.6 |
| 13 18 18 18 18 18 18 18 18 18 18 18 18 18 | Countryside Recreation | C.S.R | 4 8 |
| 板状 | Space Observatory | S.O | 2 4 5 1 |
| Storage | Warehouse | W.H | 24 |
| Transportation | Roads and Pathways | R.P | 29 |
| Commercial sector | Offices | 0 | 4 |
| | Commercial Zones | C.Z | 28 |
| A377 | Shopping Complex | S.C AND | 3.2 |
| Agricultural Sector | Plant growing Areas | P.G.A | 212 |
| Agricultural Sector | Animal Areas | A.A | 24 |
| THIN! | Food Processing | F.P | 19.5 |
| 200 | Agricultural Drying Area | A.D.A | 39 |
| Tourism | Hotels | H | 3.2 |
| | Hotels | H | 1.5 |
| A3// | Private Houses | P.H | 12 |
| Administrative | | A.Z | 10 |
| Zone | | | |
| Administrative Zone Miscellaneous | - willing | M.I | 17 |
| Infrastructure | 100 | 1000 | |
| Total Area | - | T.A | 738.2 |

Moritule ## **

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The areas mentioned above and the design of the community is with respect to half of the torus. The other half & will have a similar arrangement with minor changes. All areas have been calculated according to the requirements put forward by the NASA space study. Mistinte ## #

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Distance scale: 1 cm2 = 3932 m2

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4.1.3 VARIETY AND QUANTITY OF CONSUMABLES AND OTHER SUPPLIES 13 PM 计加度 教 按 "遂

张俊.

| Consumables | Production/p |
|---|--|
| W | erson/month |
| Water Electricity Cloth | 3600 liters 3000 KWh 10 m |
| Electricity | 3000 KWh |
| Cloth Maller | 10 m |
| Toiletries | 1 kg |
| Electrical | 5 units |
| appliances/equipmen | |
| of the | 1/2 1/2 |
| Storage devices/units | 4 GB |
| Storage devices/units Stationary Other Office equipment | 2 kg |
| Other Office Mills | 1 kg |
| equipment | |
| Medicine | 200g |
| Maritude & K. 13 182 | Whitith |
| Mistime And Mistime | indicate the state of the state |

| Average | monthly | Snace | settlement | diet |
|---------|---------|-------|------------|------|
| Average | HIGHLIN | Space | Settlement | uiet |

| a L | | | |
|---|------------|------------------------------|----------------------|
| nth white the the | A Ph | Amountg/ person | Cal's |
| ************************************ | Variety | Amountg/ | Car sk |
| titule Alle | Ittit | person : | Mkcal |
| Blica | Meat: | Tilligh | |
| 1 | Γrout | 1200 | 2340 |
| - | Rabbit | 1200 | 1920 |
| | Beef. | 1290 | 4260 |
| | hicken | 3200 | 1470 % |
| 杨季 | Produce | 旅旅 | 杨秋 |
| stitute the state | ggs dill | 1200 1200 720 15000 | 4260 1470 1170 |
| 1 | Vilk IIIII | 15000 | 9900 |
| | Ory plant | | |
| | aroduce: | | |
| stitute star st | , % | (1) 新班 ** '漢 學》 | 加度熱水等 |
| . 18 | B. | St. B | 33-3 |
| TO THE W | Jan 1 | " 画 | TO THE WAY |
| Jilling. | | | III |
| | | | |

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| Totals | 54420 | 73340 |
|---------------------|--|-------------------|
| Orange | 3000 | 1530 |
| Tomato | 3000 | 8/1/11/660 |
| Potato | 3000 3000 3000 | 2280 11111 660 |
| Apple | 3000 | 1680 |
| Peas | 4500 | 3780 |
| Lettuce | 3000 | 420 |
| Carrots | 3000 | 1260 |
| and fruit | | The c |
| Vegetables | The state of the s | Stitille |
| Sugar Vegetables | 3000 × 3000 | 10890 11550 |
| Rice | 3900 | 10890 |
| Wheat | 5400 | 18240 |

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Maritule And Ar 3

Figure: Distribution of consumables

Smart cards will be used for all forms of payment online or otherwise. The residents will earn and spend points, the record of which will be stored in the card. Consequently a record of all the transactions made can be kept. **独林省**

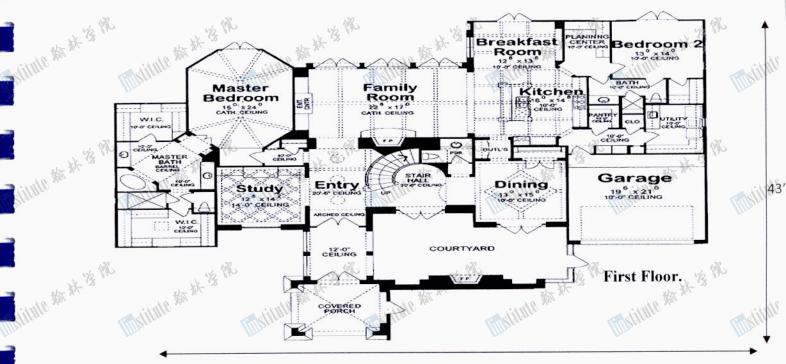
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4.1.4 PSYCHOLOGICAL FACTORS

| | ре керт. | |
|-----------|---------------------------------------|---|
| utre W | 4.1.4 PSYCHOLOGICAL FACTORS | HE WE WAS AND THE |
| TO Styles | Psychological Problems | Steps takenithe 30% suithite 30% |
| | Adjustment to new atmosphere | Artificial gravity, seasons provided, psychologists, medicos |
| | Claustrophobia and Solipsism syndrome | Yoga classes, gyms, peaceful environment |
| . \ | Monotonous lifestyle | Community clubs, spas, zero-gravity games, camping, 3 1/2 |
| 短火 | 据 | different types of neighborhood designs |
| | Home (Earth) sickness | Mimic of day/night cycle, climate change |
| | HIII. | Illia Illia |

4.2.1: External Drawing and interior floor plan of a family country house:





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Area of the house: 292m2

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74'

Maximum Number of people that can be accommodated: 6 persons.

Military W. 3

Number of these houses: 16

ditute the the little 4.2.1: External drawing and Interior floor plan of modern apartments for singles:



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张俊佩

Inditate 赫 赫 · 溪 · 溪

张俊雅

Area of an apartment: 47m²

Number of persons per apartment: 1

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Number of apartments: 5000

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別加度熱水光資源

法资料

张"多界

Maritute 赫 林 俊

titute 赫 妹 诸 经 4.3. 4.3.1: DESIGNS OF SYSTEMS, DEVICES, AND VEHICES FOR USE BY HUMANS

Milital At 3

Milital Mark 3

Systems, Devices, and vehicles for 加地海珠港溪 enhancing Productivity

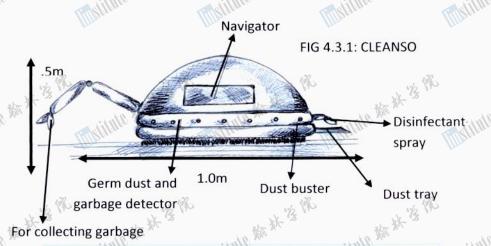
Milita A The State of the State

Acebot to help with office work (refer to 5.3.2) Saber to help with household chores (refer to 5.3.3)

Robomed to deal with medical Emerger refer to 5.3.1) Transport robots:

goods (refer to 5.3.1)
Wi-Max technology * Olympic, Urbie, and provide internet to all users (refer to 5.3.6) 加州的

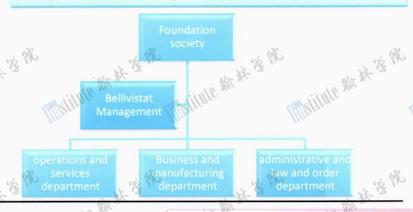
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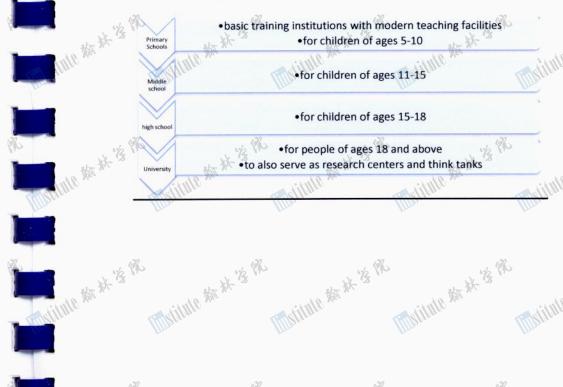
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4.3.2: Government and Management:



4.3.3: Educational System:

Maritute # # 18



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4.3.4: MEANS FOR SAFE MOVEMENT IN LOW GRAVITY:

Safetwin low-g areas

- Safety belts.
- Padded walls
- **Emergency** exits

Workers can move around the low g area with the help of a moving rail on the inner the central surface cylinder, which would allow them to attach and detach themselves at their own will. Militate At 18 18

Mittale And At '8 18

4.3.5 SPACE SUIT DESIGN FOR WORK OUTSIDE PRESSURIZED SETTLEMENT VOLUMES

The state of the same of the s

The state of the s



Movement in low-g areas

Marithe 3/4 14 3

Handholds to facilitate movement Tethers to facilitate movement Magnetic boots to keep people bound to surface 🔏 🖔

Implitute 3/4 34 3

Man maneuvering units with safety precautions



FIG 4.3.1:LAMBOT

Key features of space suit:

Mariture 300 34 3

The state of the second

titule the

Maintenance of pressure, temperature, gas composition for comfort of the user

Protection from micrometeoroids and radiation

Enables communication with ground controllers and other astronauts

Not bulky at all. Easy to don and doff. Unbreakable, lightweight helmet.

Inside layer: light weight nylon with fabric vents. 5 layers of aluminized Mylar interwoven with 4 layers of Dacron for heat protection A layer of Tofler control state. of Dacron for heat protection. A layer of Teflon-coated cloth for protection from scrapes

| HILL THE ATT | MAJOR CATEGORIES OF WORK IN AND AROUND THE SETTLEMENT | TOOLS NEEDE | D TO DO THESE TASKS | |
|--|--|--|---|-------|
| PRE TIME THE THE PARTY OF THE P | Communication Warehousing and Delivery | 5.3.1) Antennae's, Radar system, virt ndividuals with robots Novas which are Delivery robo | cual screens that enable contact outs, security cameras, conveyor able detection and ordering sys | belt, |
| A Maritude Star At 19 | Maithin the the state of the st | 11. | mostinte state of 1882 | *** |

Health and Services

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Engineering and Robotic Services

Education and Research
Settlement
Maintenance and
Security Services
Other Government
Services

Robomed which is a medical robot, disease examination system, nano devices, surgical equipment. Facility for remote surgery Scientific and communication equipment, Material stock, Computers, Laptops, Robotic parts and torch helmets, KX-1 for interior finishing and Zulubot for floor installation

Acebots, lab equipment, sports equipment and e-books

Cleanso for community cleaning, Inspiron for public safety, Saber for house maintenance, lambot for maintenance of gardens.

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Inspiron, encyclopedia, computers, e-books, communication system

4.4.1: Differentiated Neighborhoods:

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COUNTRY NEIGHBOURHOOD

Mistille All IX

Fig 4.4.1: Country side house











FIG 4.4.3: URBAN NEIGHBOURHOOD (FAMILY HOUSE)

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FIG 4.4.4: SPACE NEIGHBOURHOOD

Milyitute And Art is the

| The state of the s | Variety of neighborhoods | Sizes of different neighborhoods/ m2 | | 加州水水 | 10 数 X 3 % |
|--|--------------------------|---|---|--|---------------------------------------|
| | Country side | 338 1999. | | en space and agricu | es and for singles |
| ************************************* | Space colony | 186 200 | a wide viewoof the will have the luxury | pace observatory so space. Residents onl y to use the most sop who will perform alm | y in this colony phisticated lobot |
| Marine | Urban vesidential area | 3 KK WOOD IN | modern houses los people who want a | ated near the common typical earthly lifest partments for single | decial area for tyle but with a |
| St. M. Share | Total residential Area | 931 000 | 10 斯米·埃 % | 被放发物 | A State Market |
| Mill Hill | A 1/1/1/0- | RECREATION AND | ENTERTAINMENT | AVALIABLE | din Militari |

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4.5: RECREATION AND ENTERTAINMENT AVALIABLE



itute start 's Variety of activities Promote Promote mental Whiting the 18 18 Description & physical fitness stimulation & Enterta Recreat Enterta Recre inment ation inment ion Area in the forest especially Camping area reserved for camping. Games using man maneuvering 面对油槽 恭 举 Zero gravity games Milling the 14 18 PR 加加森林溪縣 Maithte ## * '3 P Include all sorts of machines from weight reducing to body building equipment. All sorts of consumables available. **Shopping centers** 面的排作教養養養 面的排作辦樣學 面的排作教徒。 原数 教 教 原於排作 教 殊 The state of the s

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张溪然

FIG 4.5.1: SPA

Virtual games Distinte Mark '8 18 Whiting the start of the start Yoga centers *** *** **Beauty saloons** 新教·林·接 然 mytime the the first Trips outside settle **Fishing** Parks 面对抽物棒块埃 itute the # '3 Amusement parks stitute 新光·波**Museums**

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A section in the shopping centers dedicated to this.

Implitute 3/4 34 3

Customers of all ages will get professional guidance.

Mylithe All IX 3

From haircuts to makeup done by the very best.

Boats, fishing nets, ice boxes can be rented for fishing at the lake. Small trips outside settlement accompanied by professionals Colorful manual exercising units placed in parks for everyone's use. All kinds of beauty treatment available from massages to face masks. 标 於

Rides and state of the art entertainment facilities available. Perfect for a day out with family and friends.

Precious artifacts and space objects available for viewing by both residents and tourists.



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FIG 4.5.2: AMUSEMENT PARK



FIG 4.5.3: GYM AND YOGA CENTER

4.6: TOURISM INDUSTRY IN BELLIVISTAT:

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Places Specifically Besignated to

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Description/Factors Providing Attraction to Tourists Millitte the the 18 加坡林港

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Matinta star of the Mistille All A 3 Misting & The State of State o

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Withite 類 并 選 WHotels Mytitute ## # 13. 198

- Locations of Hotels (meant for tourist, accommodation) have been shown in 4.1.0., Hotels are located inside the Residential Sector (Urban and Countryside), for Tourists who wish to spend a longer period of time on the settlement . e.g : Visit their relatives etc. (as the houses have just enough space to accommodate the permanent residents.)
- Hotels are located at equal distances between the commercial zone and Open space Belt , This is for Tourists who are more "Holiday Oriented" *The features of the open belt and commercial sector are listed below.
- Hotels are also located near the "Space Neighborhood" and the "Space observatory" for tourists who wish to totally get the Space Effect.
 - It will constitute of a Planetarium, which provides different presentations on space.
- It will have space observation Panels, with telescopes and other observation instruments can provide you with an actual view of the scenario outside the settlement.
 - For tourists who are on the settlement for an educational trip, the observatory would provide documentaries "About the Settlement." As well as the recent updates and Discoveries.

Vinte 紫蓝 珠、溪 塚 Observatory. Space (For tourists on the settlement for Educational as % Well as Trips. Recreational Green Patch and Lake Sides.

Open Space 10 Min

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tilling the state of the state

- Greenery always adds to the scenic beauty which is one the key elements for a tourist to visit.
 - Lakes have been provided around 6 different points around the Settlement, 4 of which are located near the Green Patches so that Activities such as Camping and Fishing are possible.

This area is provided with facilities such as "Health Clubs, Gyms and Spas."

- This is a great attraction for the tourists as they aren't really accustomed to the Space Environment, and might need regular medical Check-ups or "Relaxation Therapies."
- *refer to the recreation and entertainment center for their various features, providing attraction to the tourists.
- The Recreation and Entertainment Centers are situated near the Hotels so that they are easily accessible to the tourists. · 大
- They are also near the Commercial Zones for entertainment with shopping.
- Some area in the zero- g region will be reserved for games and entertainment. Games like zero-g football and dodge ball will be introduced.

Museums

Recreation and

Entertainment

centers.

A great attraction to the tourists on Educational Trips.

ittill it it is to the location

Guided Tours to the mining location on the asteroid will be arranged. For this purpose a transportation corridor is reserved for passengers. Space suit will be available with other security arrangements.





FIG 4.6.2: CAMPING



FIG 4.6.3: LAKESIDE total of the state of the state

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Figure 1: PDA

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Figure 2: Mini Computer

| Potex PDA Using internet facilities, watching television, video calling etc. Will give mobility to the users, as they will be able to stay connected wherever they are. Multi-core computers playing games, keeping records, watching movies etc. Mini For use as servers in the offices 16 GB 4 TB 300 computers Multi-core For use as workstations in offices 4 GB 1 TB 5000 computers Super computer For monitoring orbital paths and computer trajectory, informs the control centre in case of emergencies, and will help in planning extraction of useful resources from the asteroids passing the space station. | State the Act of the | Types of Computers | Uses Uses | mistitute sa | Memory (RAM) | Storage Capacity | Quantity |
|---|----------------------|--------------------|---|---|-----------------|---------------------|--|
| Multi-core computers Used in houses to access the internet, playing games, keeping records, watching movies etc. Mini For use as servers in the offices 16 GB 4 TB 300 computers Multi-core For use as workstations in offices 4 GB 1 TB 5000 computers Super computers Super computer trajectory, informs the control centre in case of emergencies, and will help in planning extraction of useful resources from the asteroids passing the space station. | 1 | | television, video calling mobility to the users, as t | getc. Will give hey will be able | | | 15,000 |
| Mini For use as servers in the offices 16 GB 4 TB 300 computers Multi-core For use as workstations in offices 4 GB 1 TB 5000 computers Super For monitoring orbital paths and 1 TB 100 TB 2 trajectory, informs the control centre in case of emergencies, and will help in planning extraction of useful resources from the asteroids passing the space station. | 引用 | | Used in houses to access playing games, keep | ss the internet, ing records, | * 18 GB | 2 TB 3 | 6500 |
| Super For monitoring orbital paths and 1 TB 100 TB 2 trajectory, informs the control centre in case of emergencies, and will help in planning extraction of useful resources from the asteroids passing the space station. | | computers | For use as servers in | the offices | | | |
| | titute start is for | computers Super | For monitoring orbit trajectory, informs the case of emergencies, ar planning extraction of u from the asteroids pass | al paths and ontrol centre in nd will help in iseful resources | 1/2 P/2 | 100 TB | The state of the s |

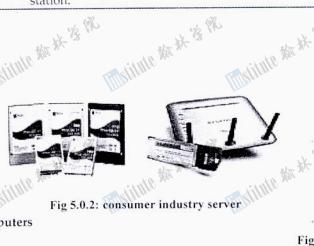
5.0.2: Types of Servers



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Fig 5.0.1: mainframe computers

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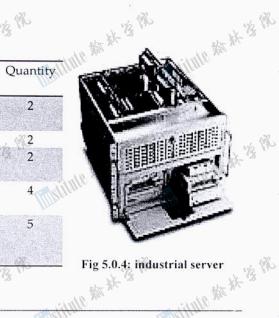
阿斯特斯格特米埃



Fig5.0.3 communications server 面的排作教徒 Maritale 养 株 接 %

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Fig 5.0.4: industrial server

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|---------|--|--|-----------------------|---------------------------|--|
| 100 | servers | a de la companya de l | <u> </u> | Fig 5.0.4 | ; industrial server |
| | | S The second sec | (3) | 13 | 3 |
| THE SHE | 5.0.3 Types of Soft | tware tware | Ohit aluti | Pick Olivin | Bill Olivin |
| | Name of the | Tillstree | Pu | rpose (IIII) | THISMO |
| | Software | | | | |
| | Ming | Monitors drilling a | nd extraction of min | ing materials | The state of the s |
| | Industro | Monitors automate | ed machines involved | l in tasks such as manuf | acturing and |
| . 1/2 | A STATE OF THE STA | packaging | 12 Ph | 1/2 1/4 | 2 96 |
| 外。 | COM | For data collection, | data processing and | t sales transaction | * * * * * * * * * * * * * * * * * * * |
| | WOK | For creating report | s, spreadsheet and pe | erforming different offic | zial tasks |
| | Zii-Ex | For web-browsing | and playing games | MINION. | THE STATE OF THE S |
| | NCS | Network Commun | ication System | | |
| | Antri | Protection from vir | us | | |
| | Controsoft | Monitors air pressu | ure, temperature and | moisture level | |
| 1/2 | Robo Customized | Control robot func | tional programs. Eve | ry robot has its own spe | cific customized |
| 外。 | Software | software. | 138 AF XX | · 3 | * * * * * * * * * * * * * * * * * * * |
| | State State | Still Ship | Stuff Stuff | State State | Olution Property of the Contract of the Contra |
| | Ting I low | THIS I TOWN | Till Siller | Fig 5.0.5: W | Vi-Max |
| | 5.0.4 Types of Net | work devices | | | • |
| | Types of | Specification | Purpose | 19 A | Fig 5.0.6 rd |
| | Network/Device | | | | |
| | WEibra Channel . | Bondwidth 10 I | til a factor and more | | |

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| Types of | Specification | Purpose |
|----------------|--|--|
| Network/Device | ze – – – – – – – – – – – – – – – – – – – | |
| Fibre Channel | Bandwidth 10 | It is a faster and more |
| 1) (3) | Gbps , | flexible way of transmitting |
| Fibre Channel | Birth Olive | data between computer |
| THE STATE OF | TillSilling | Devices. |
| Bellest Router | Data transfer rate | It is used to direct the data |
| | 200 Mbps, | packets to the required |
| | Frequency band | destination. |
| % | ,3,3 GHz | % % |
| Wi-Max | Bandwidth 50 | Provides wireless |
| WI-Max | Mbps per 10 100 | broadband access for the |
| | Channel | entire space settlement. |
| IIII | The state of the s | The state of the s |



Fig 5.0.7 WiMax-wireless internets

5.0.4: Types of storage devices:

3D optical data storage technology is used for storing data. This storage Media is called tapestry Media. the data is s almost 2 Tb. Maritha Mark 18 182 The data is stored in a holographic format. It has a data transfer rate of 200Mbps and a storage capacity of A Military Military Military Mark 18 myitute ## 14 'B

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5.0.6: Data collection:

Data is collected from the Expert systems working at various places like Hospitals, industries and mining sites. Various sensors like Infra Red, pressure and humidity sensors installed in the robots will also collect data in critical circumstances.

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5.0.7 Data Distribution

Special routers designed for Bellevistat called Bellest routers will make sure that the collected data reaches its destination without any interruption. These routers will be installed with all the servers located at particular places.

5.0.8 User Access to computer Network

The user can access the Wi-Max technology that will provide them with all the internet facilities through their Potex PDAs. There will be a line of sight communication with the microwaves signals being sent from one tower to another. This is to ensure that the users do not develop any health disorders due to the exposure of the harmful waves especially the radio waves which can spread over a wide area due to their lower frequency.

5.1.1: Automation for Construction

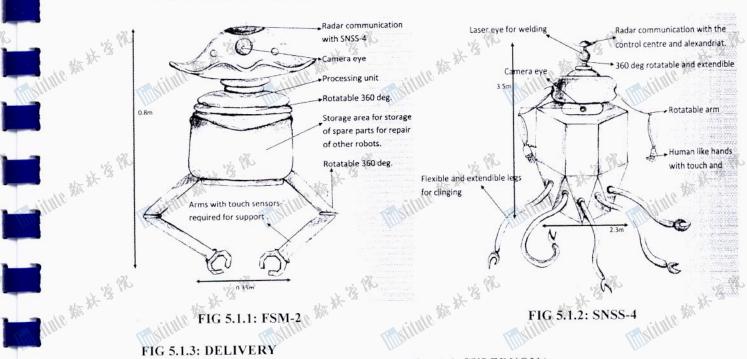


FIG 5.1.2: SNSS-4

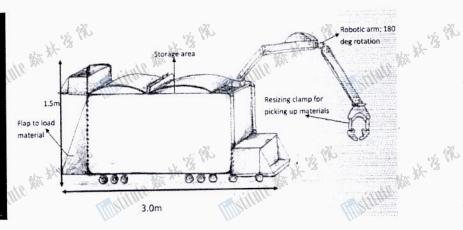
FIG 5.1.3: DELIVERY CAPSULE

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FIG 5.1.4: SUPERNOVA



| NAME OF | FUNCTION AND PROPERTIES |
|--|--|
| ROBOT | |
| Delivery •3 | Two parallel delivery capsules (5 meters in length) travel through |
| Capsule | transportation tunnel inside the central cylinder carrying all the excavated |
| white white | and raw material and equipments from the asteroid excavation site to the |
| The state of the s | refinery and research centre. |
| Super Nova • | It is used for transporting materials and equipments within the torus and |
| | the spokes. It has four wheels with safe-move sensors to avoid hindrances. |
| 16 M | The Robotic arm has resizable clamps to pick up equipments. |
| T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Its rear end has a flap which opens downwards to load the material inside |
| with the state of | the storage area. |
| William William . | Its software contains the whole map of the settlement so it is programmed |
| | to move from one place to another without human controllers. |
| _ | After construction of the settlement it will be converted to Nova. |
| SNSS-4 | It has 4 legs which can wrap themselves around the basic components and |
| 13 - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | then its 2 arms can bring two components or modulus together to be joined. Its main purpose is to bring together and weld different parts of the settlement. The larger uses the electron beam welding method which can be used. |
| 10 10 10 10 10 10 10 10 10 10 10 10 10 1 | Its main purpose is to bring together and weld different parts of the |
| dittiti " | settlement. |
| Illing. | The laser uses the electron beam welding method which can be used conveniently in vacuum. |
| | This method uses the kinetic energy of high velocity electrons and converts |
| | it into heat energy upon impact to melt the materials and weld them |
| | Mogether strongly. The diameter of the beam can be varied to adjust the |
| The Branch of th | penetrating power of the beam. It has camera eyes that can form a 3D image of the part that it has to weld together. |
| · " Fift alms: | It has camera eyes that can form a 3D image of the part that it has to weld |
| - Marille | together. |
| FSM-2 | It has a strong processing unit designed to carry out mathematical and |
| | geometrical operations |
| | It can form a 3D pictures of the parts being joined together and send the addata to SNSS-4 which can carry out the instructions |
| 1/2 1/2 | Carries spare parts for repair of other construction robots. |
| The Paris of the P | Carries spare parts for repair of other construction robots. Installs glass and other important components of the settlement |
| Razor Razor | mistans glass and other important components of |
| Mar-Ed | It is used for the construction of roads and pavements. |
| | The cylindrical rear wheels have an in-built heating system that melts the |
| | mixture so that it sticks and forms uniform road. |
| William Mar At 13 98 | The base has sensors that are responsible for laying down an even layer of |
| W W W | the construction mixture and it is levelled out by the rear cylindrical wheel |
| · Sale Shirts | It is powered by solar panels. |
| | It constructs a 100 meter long road in 30 minutes. |
| Voltaire • | It is a contour crafting technique which uses super adobe and lunar soil for |
| | constructing various shapes and sizes of houses. The grinded, quick-setting, concrete-like paste enters the Contour-Crafting |
| A32 | |
| with the state of | nozzle through pipes. This nozzle moulds the materials into shape. Specially programmed gantry system carrying the nozzles moves on two parallel lanes installed at the construction site. These nozzles move to and fro laying down a layer of the construction mixture each time. In this way the whole building is constructed in less than a single day |
| 频频 | parallel lanes installed at the construction site. |
| The state of the s | These nozzles move to and fro laying down a layer of the construction |
| - Illin | mixture each time. |
| | In this way the whole building is constructed in less than a single day |
| | without human intervention. |
| Constuctobot | For the construction of buildings inside the settlement. Will be used along with Voltaire to increase efficiency and decrease |
| ato 1/2 ato 1/2 | For the construction of buildings inside the settlement. Will be used along with Voltaire to increase efficiency and decrease settlement construction time. |
| of the alues | To be still the single control time. |
| KX-XISINIE KX-XISINIE | It is used for interior finishing. Efficiently carries out tasks such as lighting, wiring and plumbing.(refer to |
| | 5.4) |
| | VI.V. |

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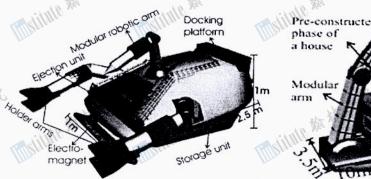
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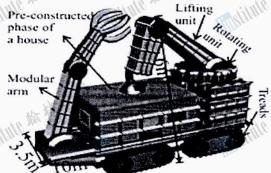


FIG 5.1.5: RAZOR

FIG 5.1.6: CONSTRUCTO

5.1.2: Construction of the settlement:

Once the settlement's basic structure has been laid. Mar-Ed constructs the roads and pavements while Voltaire build and constructo build the houses which are completed by KX-1and Zulu-Bot.

5.1.3: Transportation of material and equipments:

Delivery Capsule brings materials from the asteroid or the docks to the central cylinder while Super Nova transports them from the spokes to the required area in the torus. Super Nova also transports equipments anywhere within the torus.

5.1.4: Assembly of the settlement

SNSS-4 and FSM-2 are designed to assemble the different parts of the settlements structure. They have been constructed using Aluminum Oxide, which in turn is covered by a layer of Polyethylene. Aluminum Oxide has been used because of its hardness and strength and a relatively lower density. Also because of it's relative inertness at higher temperatures and its high melting point. To give it added strength a little percentage of magnesium oxide has been mixed with it. The layer of Polyethylene protects the robots from cosmic rays produced during the solar flare activities. It stops the rays from penetrating inside the robots and it is chemically inert.

Since there are a large number of SNSS-4 and FSM-2s they work together as a multi robot system which has self diagnosing and self repairing facilities. If a fellow robot malfunctions they can repair it without human intervention as they carry extra modular components for each robot.

5.2.1: Safety, Maintenance and Privacy of Data:

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All data sent via Fibre Channels and Wi-Max will be encrypted to provide privacy. This involves the sender having the public key to encrypt the message and only the receiver having the private key to decrypt the message. This method is called the public private key technology. For safety purposes firewalls are installed in the computers. This involves Proxies which stop the packets of data at the firewall and inspects them before they pass to the other side. This also protects the computers against viruses.

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Fibre optics prevents the tapping of Data by unauthorized personnel.

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FIGURE 5.2.1: Fiber optics

5.2.2 Backup Systems

Stitute Star St. 3

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Bitute starte 's 182 加加维州 The major servers that include Main server, Sub server, Communication Server and the super computer have a backup. This starts working within 30 seconds of the server failure

| _ | Type of Contingency | Solutions | Time Taken |
|--|--|--|-----------------------|
| Malitate 教育教育 | Major Power Failure | Backup system will start working Robot will be sent for fixing the situat | Repairing time varies |
| | Fire | Fire sensors will inform the control | IV) < 10 sec |
| | | centre | V) <3 min |
| | | II) place will be evacuated | VI) < 30 sec |
| w/o | The state of the s | III) back up will start if a server is damag | ged VII) variable |
| 3. 小龙林水 | 15 15 13 | Fire extinguishers will be used and the Intelli- | gent 3 |
| Pig Office | Section of the second | robot will handle the situation | Side alux |
| MS/IIIII | Space threats like asteroids | Super computer will inform about the | e IV) <1 min |
| in the second | and/or meteoroids | threat beforehand | V) < 10 min |
| | approaching Bellevistat | II) Protection shields will be activated | |
| | -FF | III) People will be moved to the central | |
| Sinte Mix 's | Main server/ Sub server/ Communication server | cylinder I) Back up System(s) will takeover | 30 sec |
| Calling Contract of the Contra | Failure | The place will be evacuated | I) < 2 min |
| | Air Contamination | Nanobots will be sent to clean the air | r II) <1 min |
| | | The place will be evacuated | III) < 2min |
| 3 | Gas leakage | II) Robogas will be sent to fix the situati | ion IV) < 2 min |
| · h | The state of the s | The same of the sa | Repairing time is |
| State Man 1/4 1/3 | AL AL | the state of the s | wariable with |
| Situle My | Medical Emergency | Robomed will be sent to handle the situation | • <2 min |

5.2.3 Physical Locations of Computers and Servers for critical functions

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| 一种** | Computer/Servers | V- 2 | ysical Locations | 3 410 xx |
|--|--|---|--|---------------------|
| The state of the s | Main Server Sub Server Industrial Server Agriculture Server Super Computer | In the resident In the Industrial are In the Agricult | e located at the central cylial area located in the torule located at the central cylure area located in the torule located at the central cyle located at the central cylure area located at the central cylure located at the cylure loc | ds Hinder His |
| 1、城水、海 | 15 15 PN | the the the the said the the | ** · 沒 例 | 3 PR |

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5.2.4: Robots required for emergency external repairs

| 5.2.4: Robots r | equired for emergency external repairs | |
|-----------------|---|--|
| Names | Purpose y | · K |
| Externo 🚜 | For repairing and cleaning the exterior | The state of the s |
| Glider | For repairing and maintaining the sewage system | Titule May |
| Robogas | For detecting and repairing gas leakage | HIII MARKET TO STATE OF THE STA |
| Intelligent | Detects fire and informs the population | |
| Nanobot | Cleans the dust particles from air | |

itule ## # 18 18 5.2.5: Means for Security, Privacy and authorized access to Data

Authorised Access:

The state of the s

Authorized personnel will have to verify their identification by a heart beat scan followed by an index finger scan. The scanning processors will have predefined data about various users and if that Data matches with the Data stored for an authorized personnel he/she is given access to the critical data stored in the computer/server. Authorized personnel will be required to enter passwords if they want to access critical data.

Even after the verification the personnel is given access to particular data. If he/she tries to make an illegal move the whole system would shutdown automatically after saving the recent changes,

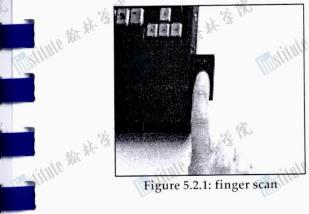


Figure 5.2.1: finger scan



Figure 5.2.2: Retina scan

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SECURITY:

There will be a special code to lock the computer when the authorized personnel are not around. Infra red rays or laser beams will be used to cover a radius of 1 meter around the computers/servers. These will be switched off once the code is entered and the person provides his/her finger scan or retina scan which should match one of the predefined scans. If someone steps in without switching it off alarms will be activated that will alert the robots.

Privacy of Data:

The data encryption method ensures the privacy of all sorts of data.

Personal data such as the data of patients in a hospital, or of the account holders in a bank or the data held by an insurance company will be accessed after a positive result in a retina scan.

5.3.1Automation System to Enhance Livability in the Community:

In Bellevistat, luxury is deemed important. For comfortable living of the inhabitants and to provide a pleasant ambience, automated services are provided throughout the settlements, which are discussed below: Stitute ** ** ** Vista houses fully automated and have the following features: withthe the the is the gitute 素 并接序

| | Features | Description |
|------------|---------------------------------|--|
| titute the | Self-healing walls and doors | Made up of microcapsules containing a liquid monomer. Should the wall rupture indicating some cracks, the monomer will fill the space and will polymerize, in the presence of the catalyst Grubb |
| 3/1/02 | Doors | Laser sensors detect human presence and it opens and closes after |
| | Kitchen | Voice automated to help in various cooking tasks. Fire detectors and suppression systems. |
| abo) | Bathrooms | Air fresheners and pathogen detectors to ensure clean air. |
| stitute sa | Bedrooms, Dining area, lobby | Sensors to control temperature, humidity, and deodorizers that freshen the |
| T. | Garden | For vista country houses. Automated water sprinklers, which waters gardens when needed. |

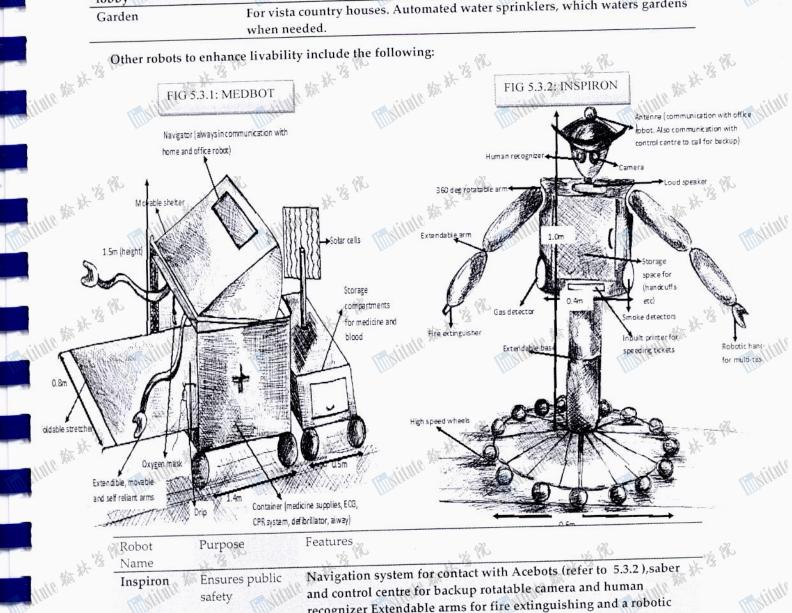
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| 13 | Robot Name | Purpose | Features | 14 CM | 1 1 5 2 2 2 1 c | wahar xx 1/3 (%) |
|--|---------------|--|---|--|--|------------------|
| machine Market | Inspiron | Ensures public safety | and control centre recognizer Extenda hand for multi task | for contact with Aceb for backup rotatable couble arms for fire extin ks. Gas and smoke det built printer for speed | amera and numan guishing and a rob ectors High speed v | otic |
| · · · · · · · · · · · · · · · · · · · | Robomed | For medical emergencies | Extendable stretch Extendable, moval | er to adjust with the sible and self-reliant arn orage for medical sup | ns. | late K |
| Ministration . | Cleanso | For community cleaning | Dust, germ and ga | rt system such as ECG rbage detector and du to keep the environm n special claws to pick | st buster in addition | n to a |
| The state of the s | Ph. | THE WAS THE STREET OF THE STRE | W W | W B CONTRACTOR | The Market of the Control of the Con | 15 1/3 PA |

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items.

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| stitute And | Novas | Delivery robot | For delivery of consuma | bles to residential areas | Malitute & |
|-------------|-------|----------------|-------------------------|---------------------------|--------------|
| | 洪海州 | W M | 15 1/2 VI | XXX 1 | No. 12 Miles |
| | .30 | . 70 | | .70 | .30 |

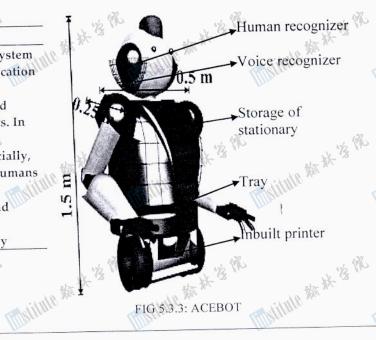
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5.3.2productivity in work environment:

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| The state of the s | 5.3.2productivi | ty in work envir | onment: |
|--|-----------------|--|--|
| ************************************* | Robot Name | Purpose | Features |
| The state of the s | | Performs functions in offices to reduce manual labour. | Navigation system for communication with Novas, Robomed and other Acebots. In built printer .Interacts socially, recognizes humans and voice inflection and responds appropriately |
| The state of | W. | 1/2 PR | 12 Th |
| PR MININE MAN AF 'S | the state | THE STATE OF THE S | in the sky is the same of the sky |
| Tillyllow | THIS HOLD | Tinglin | Tillshore |
| | 5.3.3 Conveni | ence in residence | es: |
| | | | |



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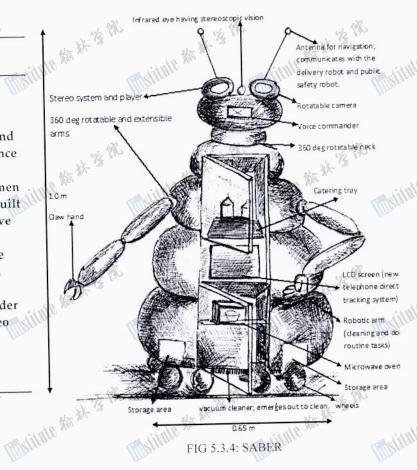
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FIG 5.3.3: ACEBOT

5.3.3 Convenience in residences:

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| 32 | 2 1/6 | y The | 1/2 PM |
|--|--|--|--|
| The state of the s | Robot Name | Purpose | Features |
| | | To perform routine tasks at vista homes | Performs vacuum cleaning, serving and |
| tute the the | The state of the s | 13 Po | surveillance Storage compartmen t and inbuilt microwave oven. |
| Time line the star start is | | 17 PR | Rotatable camera ,voice commander and stereo system |
| PR Maritule Mar # 18 | The state of the s | iz in | (1) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |
| | | 1/2 Ph | The Park |



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是一种 教 · 法 修 5.3.4 Privacy of Personal Data And Control Of Systems In Private Spaces Data Encryption Method Ensures Privacy Of All Sorts Of Data:

Personal data such as the data of patients in a hospital or of the account holders in a bank or the by an insurance company will be accessed after a positive result in a retina scan.

5.3.5 Access to Computer Network and Community Computing For Vista Homes and Offices:

User Access to computer Network:

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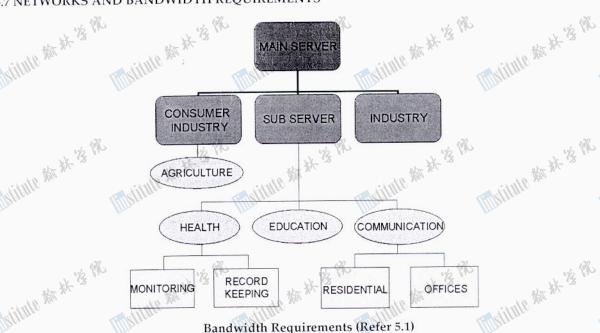
加加斯林·波然

- The user can access the Wi-Max technology that will provide them with all the internet facilities through their Potex PDAs.
- Access to community computing
- To prevent users form developing any health disorders from exposure of the harmful waves there will be a line of sight communication with microwave signals being sent from one tower to another.
- Users can access the High-speed internet provided by Wi-Max through their Potex PDAs or computers at home. Officials can use their mini computers to have access to internet facilities.

5.3.6: Access to robot resources from vista homes and offices. Virtual screens that enable contact of individuals with robots and the control system.

5.3.7 NETWORKS AND BANDWIDTH REQUIREMENTS 面对加州的教教教学

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Bandwidth Requirements (Refer 5.1)

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Continue the st. 3 5.4.1: MEASURES TAKEN TO REDUCE CONSTRUCTION TIME:

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Use of automation for interior construction and community configuration-refer to 5.1.

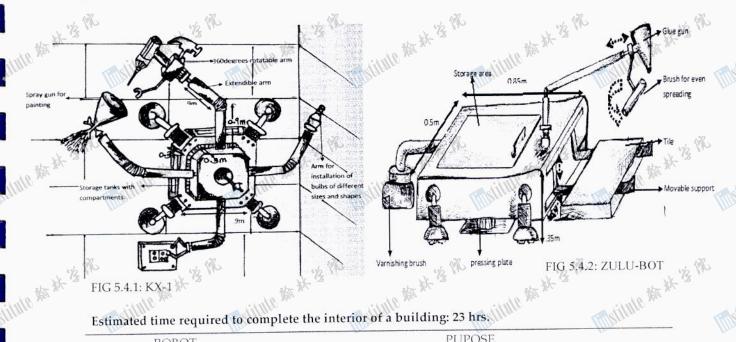
r interior finishing of residences as 1....

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Use of robots for interior finishing of residences and other buildings-details follow.

Use of robots for designing, manufacturing and finishing of furniture.



| | ROBOT . | PUPOSE |
|------|------------------|--|
| | KX-1 | plumbing, wiring installation, lighting, painting |
| 13 W | Zulu-bot nova | floor installation and polishing manufacturing and finishing furniture |

5.5.1: ASTEROID HARVESTING AND MINING:

Automated System for Mining and Transporting Asteroid Ores to Refining Facilities Mining asteroids pose both a threat and a promise. A source of metals and minerals, worth trillions of dollars; its mining becomes a critical step in building supplies for Bellevistat. The robot Grover helps in achieving exactly that, by tackling the dangers of zero gravity and constant rotation of the asteroid. 数 · 沒 · 沒 · 沒

| James Harris | ROBOT | PURPOSE | | FEATURES | Tilly it III | | JMAN ROLLERS |
|-------------------|----------|-------------------------------------|------|--|---|----------------|------------------------|
| 10 数 X 3 | Grover | Mining and harvesting asteroid ores | · 秋 | Solar powered. Light weight. Have grapples to anchor A camera arm to allow ra perception | | '% W | Two human controllers. |
| Millitte And | Militate | Ano Implitute A | • | A navigator for complex p Has the ability to act as a Has the ability of laser grading blade and grade | bulldozer and a c ading by means o sensors. | rane. 「 f a | Militale & . |
| Togitute Marke '3 | Troy | Transporting asteroids to | · ** | Has a robotic hand with be driller. Has a front end bucket, wattachment. | 6 | 冷机 | One human controller. |
| | Aldo | refining facility Mineral testing | • | Ultra portable laboratory | for mineral testin | g | two |

and excavation

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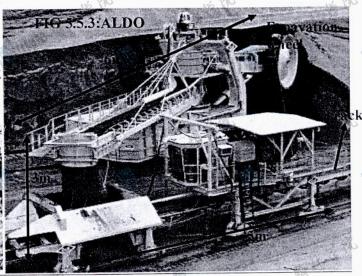
- Coating of super adobe layer for protection against radiations and solar flares
- Excavation tyre for fast efficient mining
- Moves on a track which will be fixed to the surface of the asteroid.
- Ability to estimate the quantity of a certain mineral below the asteroid surface.

human controller

3.5m

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5.5.2: TRANSPORT OF RAW MATERIAL AND SPACE MANUFACTURED GOODS:

GOBOT will be specially designed to transport raw material extracted from the asteroid and the goods manufactured on Bellevistat to the Earth's surface.

The main body of this 'one-way' re-entry vehicle will be made up of Iron and Iron silicates with an outer layer of lunar regolith for protection. The vehicle has an approximate internal capacity of 16,000 m3.

Gobot will use a water (hydro/steam) propellant system. Water will be made on Bellevistat as mentioned in 3.2.

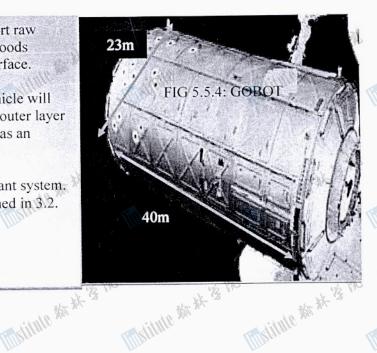
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Maritule Mark 3 Swithing ## 13 18 COST UNITS TOTAL 4381-6570 0-2190 2191-4380 6570-8760 JUNIT (M) S2850 Contract awarded and initial designing and research on feasibility Robot 1 M 750 750 construction 到地 教 说 100M 500 Earth station construction 80 training and physiological testing 加州地游戏 Awarding of 秋% subcontracts 城冰 Assembly of 30M 16 480 mining system Construction of 9000M 1 9000 central cylinder Milling the 14 18 80 3 20M 4 Construction of docking ports 30000 Construction of torus ,thrusters and clamps for asteroid attachment 4000/2 Construction of 海洪 communication satellites and otuti. communication system Transport to L4 5000 加度 教 珠 溪 塚 Construction of 15000 - AFF shield and central 外 disc 3000 Testing of operations Finishing of 121050 加加斯林溪外 interiors and completion of internal transport 1/2 70 Recheck of details 10 Aithite. Stillite and final touches Inauguration William ## # 18 18 加州加州 赫 孝 溪 溪 The strike stri THE STATE OF THE

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|---------------------------|----------------------|------------|-----------------|---|
| DETAILS | F TOTAL INTER | WAL COST | rs/M | Z XX- S |
| ACTION | AVERAGE COST/UNIT | UNITS | TS/M TOTAL COST | 4/5 F |
| Houses | 50 000 | 1 | 50 000 | |
| Commercial infrastructure | 1000 | 3 | 3000 | |
| Industrial infrastructure | 5000 | 100 | 5000 | * · · · · · · · · · · · · · · · · · · · |
| Parks and gardens | 0.5 | 100 | 50 | Em |
| Hydroponic system | 2000 | 1 | 2000 | Eng Pilo |
| Aeroponic system | 6000 | 1 | 6000 | |
| Internal furnishing | 5000 | 1 1000 | 5000 | mar labo |
| Vehicles and transport | 50 | 1000 | 50000 | AP |
| Total cost | | | 121 050 | |
| NOTE: ALL COST | MENTIONED I | S IN US\$. | imstitute # | ****** |
| Mythine | Militality | | Tind title | |

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海洋海风 学家 **KEY FOR COST AND SCHEDULE:** CONTRACT AWARDED RESEARCH PERIOD CONSTRUCTION **USAGE** 被状况。

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| USAGE | | 张·洛·格 | |
|----------|---|--|--|
| Average | quality | ty Total | III C |
| \$30 000 | 2500 | 75 | |
| \$30 000 | 250 | 7.5 | |
| \$10 000 | 400 | 4 , % | |
| \$10 000 | 200 | 23 | |
| \$5000 | 3000 | 15 | 2/2 |
| 1 | TS LILLION | 103.5 | I III |
| | Average cost/person \$30 000 \$30 000 \$10 000 \$10 000 | Average cost/person \$30 000 2500 \$30 000 250 \$10 000 400 \$10 000 200 | Average cost(M) \$30 000 2500 75 \$30 000 250 7.5 \$10 000 400 4 \$10 000 200 2 \$5000 3000 15 |

APPROXIMATE TOTAL COST: \$ 200 BILLION

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Timestatus 教育教 沒沒沒 Maritute 赫 赫 溪 烧 面的物物 **阿尔拉拉 赫泰林 "溪" 然** 面的排作教

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|--|---|--|--|--|
| | Million. | Million Million. | Million Million | Million. |
| 32 | , 🚜 | , A | - W | W. |
| white the | 2.3.1 William | Describe the process required to construct the settlement, by showing the sequence in which the major structural components will be assembled. | Diagrammatical construction sequence showing details of each phase of assembly. Multiple diagrams and a schedule for the phases. | 6 A 13 Iso |
| | 2.4.1 % | Show structural attachment to and construction on an asteroid captured for harvesting of materials. | Details on the attachment of asteroid given in a paragraph. | 7 强强 |
| Willis | 2.4.2 Minhituth | Identify location(s) where ore refining operations will be conducted. | Paragraph specifying the locations. | 7 limitim |
| P. S. | 2.4.3 | Include systems to minimize transfer of asteroidal surface material (dust) into areas of the settlement where they can affect the quality of life. | A diagram and detailed paragraph of the dust separating system. | 7 |
| The state of the s | 2.5.1 | Specify docking ports to prevent redundancy in the event of an accident. | A detailed description of the four docking ports including the zones in which they are present; storage zone, docking zone and controlling zone. | |
| 加加 | 张·凌帆 | 深如 | A diagrammatical representation of the location of the docking port. | 旅游 |
| Maliture | 3.1.1 Military | Orbital location | Reasons for the selection L4 as the orbital location for the Bellevistat | 8 milyithin |
| iline sta | 3.1.2 | Table for the materials required and their specifications: | A table containing information about the materials; Composition, source, transportation and storage | 8 The state of the |
| | 3.2.1 | Food Production | Information regarding hydroponics and aeroponics in tabular form. | 9 |
| Was to the | 3.2.2% | Power Generation | Flow chart and tables regarding power consumption in the settlement. | 9 13 18 |
| Millo | 3.2.3 Markitude | Internal and External Communication and Transport System | Table stating transport systems within the earth, with the earth and with the moon and Alexandriat. | 10 Millistiffic |
| 93 | 3.2.4 | Climate/Atmosphere | Information regarding air composition, temperature, | 11 |
| atite Miles | 3.2.5 Stitute 300 x | Waste Management | humidity and air pressure. A Flow chart demonstrating | 11 musihili |
| | 3.2.6 | Water Management | waste management. Pie chart regarding water usage. | 12 |
| Muliture than | ** ''s ''' | The state of the s | | The state of the s |
| W Alamana Alam | xx % *** | 13 The state of th | E The State of the | N W W |

| Million | Tinglibra | Mill Mary Mill Mary Mill Mary Mary | Million Million | Till Street |
|---|--|--|--|---|
| | | | | |
| 32 | 3.2,7 and 3.2.8 | Water Production and Day/Night | Table for the purification and | 12,13 |
| 245 | 张·第 | Cycle | distribution of water. Table | (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) |
| atitute star | 3.3.1 and 3.3.2 | Space Vehicles and Infrastructure | for the day/night cycle. Table regarding space | 13,14 dill! |
| | 3.3.1 4110 3.3.2 | Spanning and Million | infrastructure and space vehicles | Milkon . |
| | 3.4 | Agriculture and Livestock | Table regarding the method | 14,15 |
| 5 | 14 PM | of the second | of cultivation, types of crops | 14 PM |
| */ | 张 张 | 23 NA 142 142 142 142 142 142 142 142 142 142 | and the area required for cultivation. In addition, a | 大孩 |
| tute was | atitute say | stitute san | table regarding livestock. | And stitute |
| | 3.5.0 | Innovative Designs and Facilities | Materials, products and sources in tabular form. | 15 |
| | 3.6.0 | Space Manufacturing and business | Business opportunities and | 15,16 |
| | 62/2 | opportunities | their details. | |
| 150 | 4.15 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Community Design and location of Amenities | Diagram of community design with color coding. | 17 发节 |
| The state was | 4.1.2 | Key for community design | Description of each color coded segment. | 17,18 |
| | 4.1.3 | Variety and quantity of consumables and other supplies | Table stating production per month of consumables, | 18,19 |
| 32 | 20 | and other supplies | ayerage monthly diet and a | 277 |
| 810 | 14-13 Mrs | 13 M | flow char regarding distribution of consumables. | 13-13 PM |
| The start of the | 4.1.4 | Psychological factors | Table stating the problems | 19 |
| Milling | Malling | The state of the s | and the how to overcome them. | Milling |
| | 4.2.1 | External Drawing and interior floor | Floor plans, exterior design of | 19,20 |
| 37 | A30 | plan of houses | a family country house, its | 432 |
| 14 | 14-13 AV | 13 AV | area and how many people it can accommodate. | 14-13 AN |
| Sing Olivie | 4.2.2 | External drawing and Interior floor | Floor plan of the houses for | 20 |
| A Plus | Milling | plan of houses | singles and the area it occupies. | Tilly Miller |
| | 4.3.1 | Designs of systems, devices, and | Description of all the robots | 21 |
| 132 | 4.2.2% | vehicles for use by humans | that enhance livability. | 21 82 |
| 1/3 | 4.3.2 | Government and Management | Flow chart stating all the information. | 21 |
| THE STITE OF | 4.3.3 | Educational system | Information about the | 21 |
| Miles | Militare | Military Military | education system for children of all ages. | Tinglithe |
| | 4.3.4 | Means for safe movement in low gravity | Information about the safety of low-g areas. | 21,22 |
| ens. | 4.3.5% | Space suit design for work outside | Description of all the features | 22 |
| also show | 秋· 3 | pressurized settlement volumes | of the space suit. | 大学 3 |
| The Other State | 4.3.6 Stilling Spile | Major categories of work in and around the settlement | Table providing the required description | 22,23 |
| | 4.4.1 | Differentiated Neighborhoods | Urban and country houses. | 23,24 |
| | | | Urban neighborhoods and space colonies. | 31- |
| W. | ** ** *** *** | 1/2 Ph | 3 % What the start of the state | ** ** *** |
| W. S. | 状" | " Whiting the start of the star | S. A. S. | 松水 |
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| W. C. | . 42 | . A | . 4 | . 32 |
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| 4.5 | Recreation and entertainment available | Spa, gym and amusement parks | 24,25 |
|------|--|------------------------------|---------------|
| 4.6 | Tourism industry in bellivistat | Description about tourist | 25,26 |
| Min. | in the state of th | attractions. | Stillie Busti |

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| The state of the s | Types of softwares Types of network devices Types of storage devices Data collection Data distribution User access to computer networks | memory.(refer to table 5.0) A table containing all the required information. (refer to table 5.0.1) Differentiation of softwares refer to table 5.0.2 A table specifying types, specification and purpose of each network device. A detailed paragraph regarding 3D optical data storage technology. Refer to section 5.0.6 Refer to section 5.0.7 | 27,28 km 28 28 28 28 29 29 | Mati |
|--|--|---|--|--|
| THE PROPERTY OF THE PARTY OF TH | Types of network devices Types of storage devices Data collection Data distribution | A table specifying types, specification and purpose of each network device. A detailed paragraph regarding 3D optical data storage technology. Refer to section 5.0.6 | 28 1 1 28 28 29 29 | Militi |
| The state of the s | Types of storage devices Data collection Data distribution | specification and purpose of each network device. A detailed paragraph regarding 3D optical data storage technology. Refer to section 5.0.6 | 28 | |
| The state of the s | Data collection Data distribution | regarding 3D optical data storage technology. Refer to section 5.0.6 | 29 | |
| White St. F. | Data distribution | Refer to section 5.0.6 | - 30 | |
| TAK 1/3 PK | 100 | Refer to section 5.0.7 | | 1 |
| ingitute | User access to computer networks | Refer to section 5.0.7 | 29 | |
| | and the second | Information regarding accessing the Wi-Max | 29 ANT THE STATE OF THE PARTY O | not i |
| 4 % | Describe use of automation for construction, transport and delivery of material. | Diagrams of robots for different functions, with a table stating properties and features of each robot. | 29,30,31 | IIII |
| *** 3 | Marie Ship alute | By MAR-ED, Voltaire, Constructo and Zulu-Bot. | 31 ************************************ | |
| Timbur. | equipments | super nova. | Alka | |
| | | | SARRIA | - |
| THE SE THE STATE OF THE SECOND | Data Maintenance and Privacy of Data | All data sent via Fibre Channels and Wi-Max will be encrypted to provide privacy. Fibre optics prevents the tapping of Data by unauthorized personnel. | S1,32 | |
| | Backup Systems | Table containing backup system and Contingency plans | 32 | |
| Whiting the same of the same o | Intity Militaria | Physical locations of omputers And servers are presented in he Table. | Militale Art 13 | |
| | Maritath Company of the Company of t | Construction of the settlement Transportation of material and equipments Assembly of the settlement Safety, Maintenance and Privacy of Data Backup Systems Physical Locations of Computers and Servers for critical functions | delivery of material. Construction of the settlement Construction of the settlement By MAR-ED, Voltaire, Constructo and Zulu-Bot. Role of delivery capsule and super nova. Assembly of the settlement Safety, Maintenance and Privacy of Data Backup Systems Physical Locations of Computers and Servers for critical functions table stating properties and features of each robot. By MAR-ED, Voltaire, Constructo and Zulu-Bot. Role of delivery capsule and super nova. All data sent via Fibre Channels and Wi-Max will be encrypted to provide privacy. Fibre optics prevents the tapping of Data by unauthorized personnel. Table containing backup system and Contingency plans Physical locations of omputers And servers are presented in he Table. | delivery of material. Construction of the settlement By MAR-ED, Voltaire, Construct and Zulu-Bot. Transportation of material and equipments Assembly of the settlement Safety, Maintenance and Privacy of Data Backup Systems Physical Locations of Computers and Servers for critical functions table stating properties and features of each robot. By MAR-ED, Voltaire, Constructo and Zulu-Bot. Role of delivery capsule and super nova. All data sent via Fibre Channels and Wi-Max will be encrypted to provide privacy. Fibre optics prevents the tapping of Data by unauthorized personnel. Table containing backup system and Contingency plans Physical Locations of Computers And servers are presented in he Table. |

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| | 5.2.4 % | Robots required for emergency external repairs | Names and purpose of each robot. | 33 |
|-------------|-------------------|---|--|-------------|
| iiliil | 5.2.5 mg/illitte | Means for Security, Privacy and authorized access to Data | Complete description with the help of diagrams. | 33 millilli |
| | 5.3.1 | Automation System to Enhance Livability in the Community | Table stating the features of Vista houses and description of different robots. | 33,34,35 |
| | 5.3.2 | productivity in work environment | Description of Aceebot | 35 |
| 1111 | 5.3.3 | Convenience in residences | Description of Saber | 35 |
| tuti | 5.3.4 | Privacy of Personal Data And Control Of Systems In Private Spaces Data Encryption Method Ensures Privacy Of All Sorts Of Data | Personal data such as the data of patients in a hospital or of the account holders in a bank or the data held by an insurance company will be accessed after a positive result in a retina scan. | 36 W |
| | 5.3.5 | Access to Computer Network and Community Computing For Vista Homes and Offices | Access of WiMax is described in full detail. | 36 |
| 3/11/2 | 5.3.6 | Access to robot resources from vista homes and offices | Virtual screens that enable contact of individuals with robots and the control system. | 36 W |
| | 5.3.7 | Networks and bandwidth requirements | A flow chart specifying all the requirements. | 36 |
| | 5.4.1 | Automation for interior finishing | Features of KX-1 and Zulubot | 37 |
| ititi | 5.5.1 3 Markitate | Asteroid harvesting and mining | Automated System for Mining and Transporting Asteroid Ores to Refining Facilities | 37,38 |
| | 5.5.2 | Transport of raw material and space manufactured goods | Description of Grover Troy and Aldo | 38 |
| | 6.1 资料 数 数 | Duration and completion dates of major design, construction and occupation task | Table showing dates and costs | 39 W |
| of the same | 6.2 | Cost of the settlement and an estimated number of employees | Table estimating number of employees and the final cost of Bellevistat | 40 |

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BUSINESS DEVELOPMENT (SECTION 7) HAS BEEN INCORPORATED IN SECTIONS 3,4
AND 5 AND IS PRESENTED AS A PART OF THESE SECTIONS IN THE ABOVE
COMPLIANCE MATRIX.

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