THE OASIS

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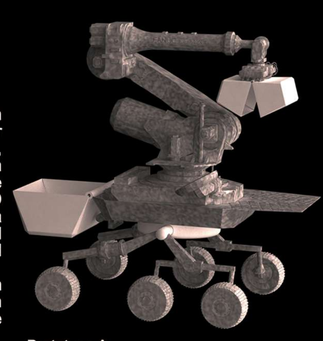
The first Self Sustaining and self sufficient community on Moon (In a Lunar Lava Cave)

An oasis (/oʊˈeɪsɪs/; plural: oases /oʊˈeɪsiːz/) is an isolated area in a desert, typically surrounding a water source, such as a pond or small lake. Oases also provide habitat for animals and even humans

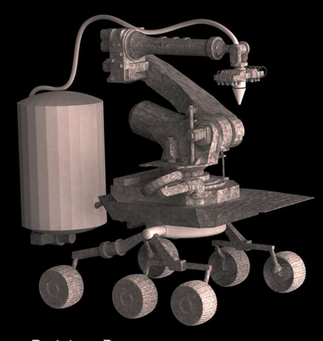
The Lunar Oases are made fertile when sources of freshwater, from frozen aquifers, irrigate the surface via man-made wells after melting and purifying it in the reactor in the core

CONSTRUCTION METHOD
The Extraterrestrial Vernacularism

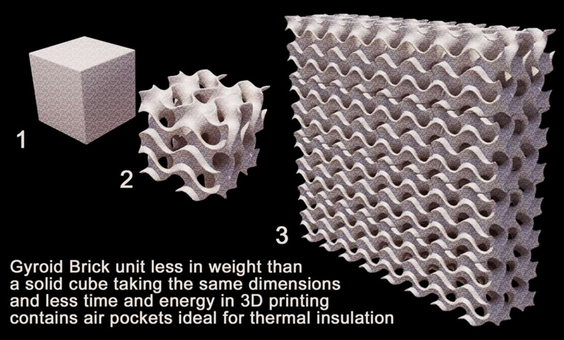
As our ancestors managed to survive in the extremely harsh environments on earth thousands of year ago through building their communities using the local materials of surrounding environment, where as you find mud houses in the Nile valley, Igoloo houses in Northern pole, Wooden houses in Northern Russia and canada. The same principle applies on Moon. Using today's technology of 3D printing forming a weight-bearing 'catenary' dome design with a minimal surfaces structured wall to shield against thermal fluctuations and space radiation, incorporating a pressurised inflatable inside it to shelter astronauts.
Using a robotic arm with 3D extruder, on a mobile vehicle with 6 m frame to spray a binding salt on Lunar regolith mixed with magnesium oxide (widely availble on Moon) to create a sand-like building material.



Prototype A
ABB robotic arm equipped with excavation unit for digging and regolith gathering

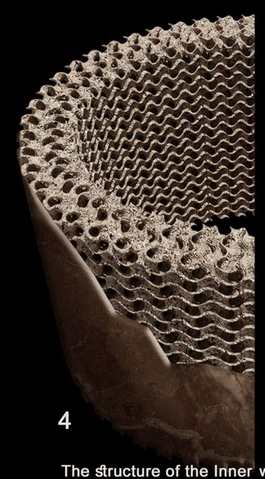


Prototype B
ABB robotic arm equipped with 3D extruder and regolith reservoir

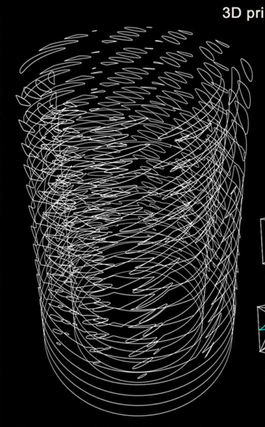


Gyroid Brick unit less in weight than a solid cube taking the same dimensions and less time and energy in 3D printing contains air pockets ideal for thermal insulation

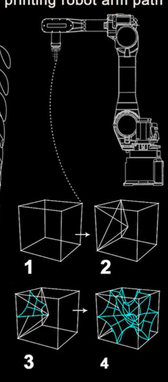
Source of Inspiration, Mesa Verde cliff dwellings Vernacular architecture



The structure of the Inner wall



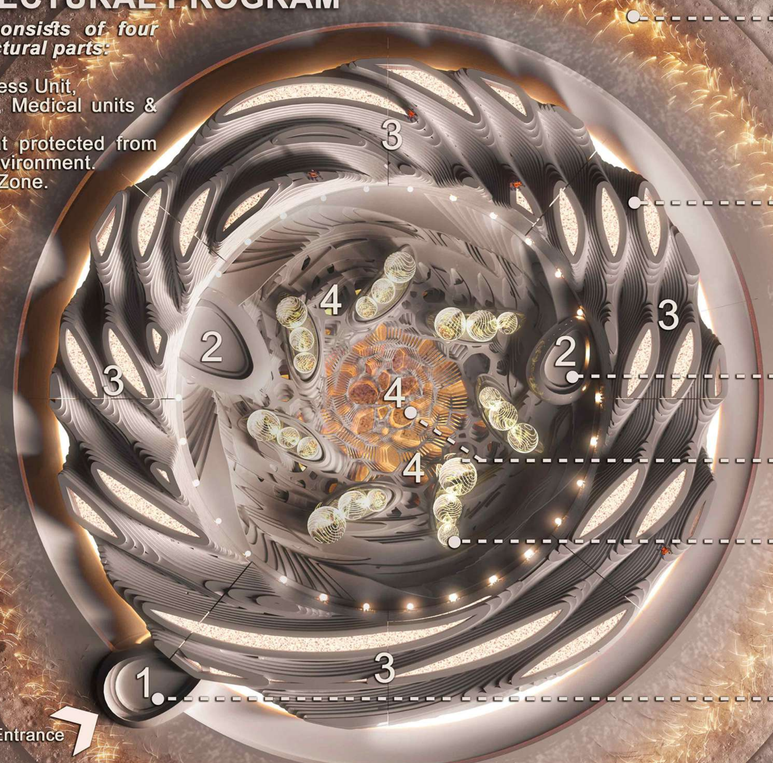
The path of the 3D printed contours



ARCHITECTURAL PROGRAM

The Oasis consists of four main architectural parts:

1.Surface Access Unit,
2.Safe House, Medical units & Labs.
3.Core Habitat protected from the surface environment.
4.Agricultural Zone.



LED Induction Electricity array of antennas collecting the power from the solar satellites into their own implanted batteries underground to be remitted to the surrounding services

3D printed Life support of core habitat shelters filled with an array or inflatables pods holding an atmosphere of 101.35kPascal (14.7psi)4 in an Earth-normal gas mix at sea level.

Emergency safe house life supporting pod equipped with medical services

Covered Frozen water Well core by the main reactor in the middle

Hydroponics variety of inflatable pressure vessels of diverse sizes and materials for trees agriculture

Surface access unit acting as the main entrance airlock to the colony, It contains, Garage and suitport air locks

MAIN COLONY SITE PLAN
0 5 10 15 25m

MAN MADE SELF SUSTAINING ECOSYSTEM
We provide Food and shelter where there is No Life

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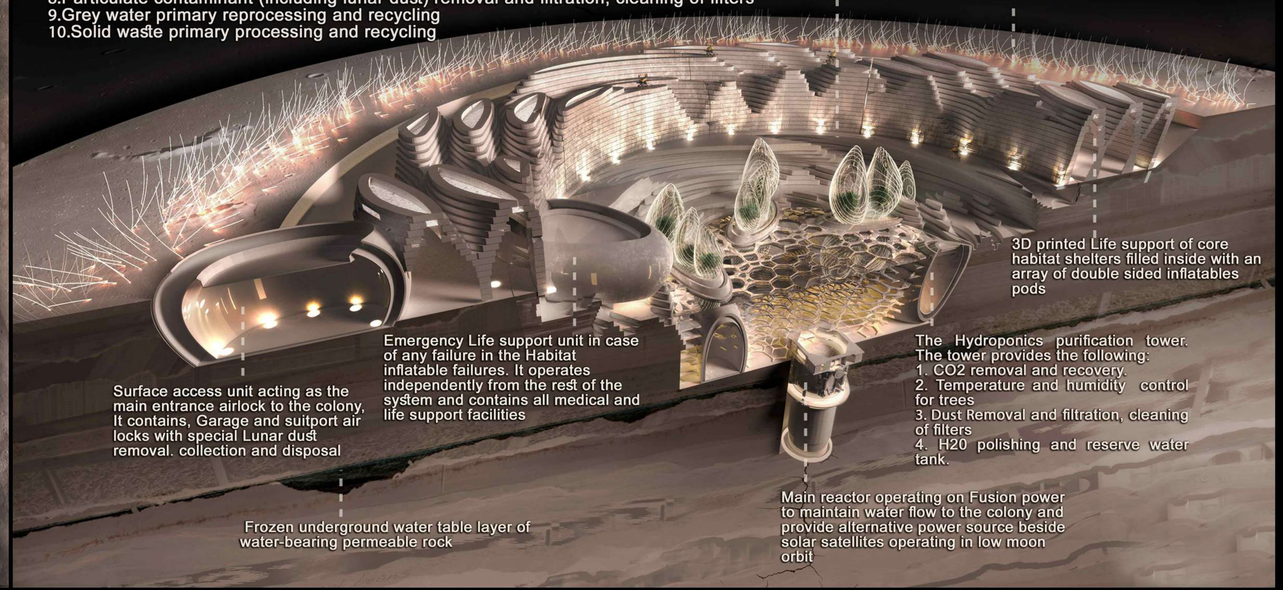
The Closed Self sufficient systems will operate based on the following sequential steps:
1.Air Revitalization – O2 replenishment, with emergency storage of O2.
2.Balancing the Co2 for plants and O2 for Human life support
3.Pressure maintenance on hold at atmosphere of 101.35kPascal (14.7psi)4 in an Earth-normal gas mix at sea level.
3.Buffer gas management for N2 and any artificial atmosphere constituents such as He.
4.Temperature and humidity management and control for all core habitats
5.Zoned heating, ventilating, and air conditioning (HVAC)
6.Trace Contaminant detection, removal, & control
7.Odor control and removal
8.Particulate contaminant (including lunar dust) removal and filtration, cleaning of filters
9.Grey water primary reprocessing and recycling
10.Solid waste primary processing and recycling

Due to the lack of atmosphere. The colony circular geometry will stay inside the circle clean out of dust and will be a pleasing environment for residents to support their psychological health and well being for long term stays on Moon.

LED Induction Electricity array of antennas collecting the power from the solar satellites into their own implanted batteries underground to be remitted to the surrounding services



3D printed Life support of core habitat shelters filled inside with an array of double sided inflatables pods

Surface access unit acting as the main entrance airlock to the colony, It contains, Garage and suitport air locks with special Lunar dust removal. collection and disposal

Emergency Life support unit in case of any failure in the Habitat inflatable failures. It operates independently from the rest of the system and contains all medical and life support facilities

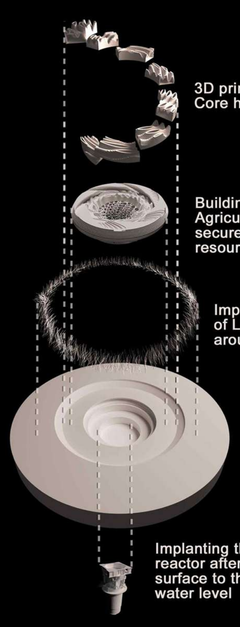
The Hydroponics purification tower. The tower provides the following:
1. CO2 removal and recovery.
2. Temperature and humidity control for trees
3. Dust Removal and filtration, cleaning of filters
4. H20 polishing and reserve water tank.

Main reactor operating on Fusion power to maintain water flow to the colony and provide alternative power source beside solar satellites operating in low moon orbit

Frozen underground water table layer of water-bearing permeable rock

FORM GENERATION
Inhabiting a nature like forms

Combining the parametric design and the sacred geometry principles to blend the aroma of the past of our ancestors and the technology of the contemporary design methodologies



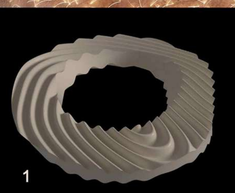
3D printing of the Core habitat units

Building the Agricultural farm to secure food resources

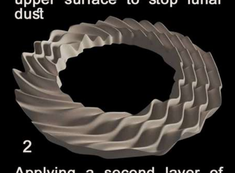
Implanting the array of LED antannas around the site

Site excavation and grading

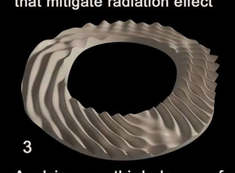
Implanting the Fusion reactor after drilling the surface to the frozen water level



Applying a first layer of ripple effect to create an undulating upper surface to stop lunar dust



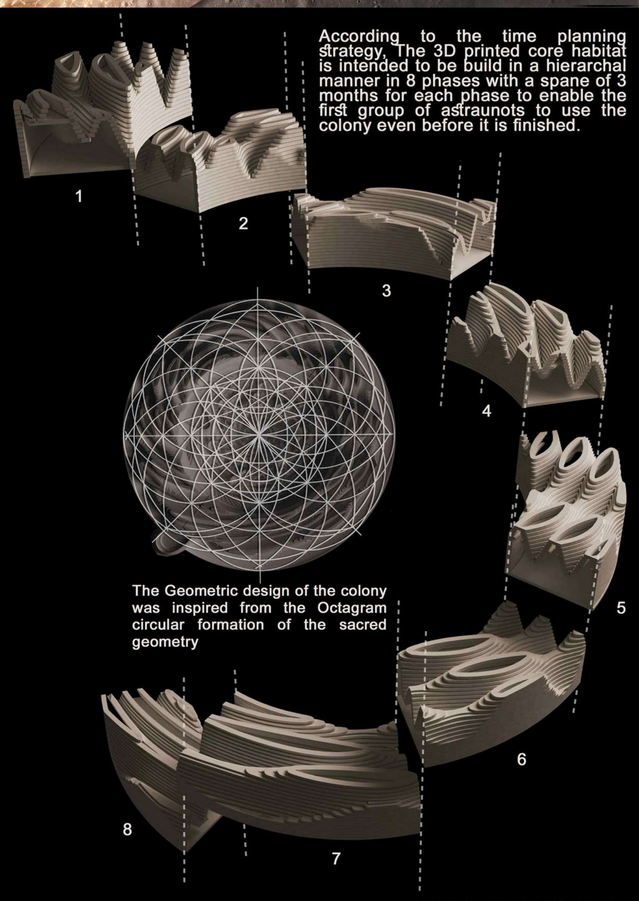
Applying a second layer of wave effect to form a surface that mitigate radiation effect



Applying a third layer of ripple effect to protect the residents from Lunar environment hazards

Applying a first layer of ripple effect to create an undulating upper surface

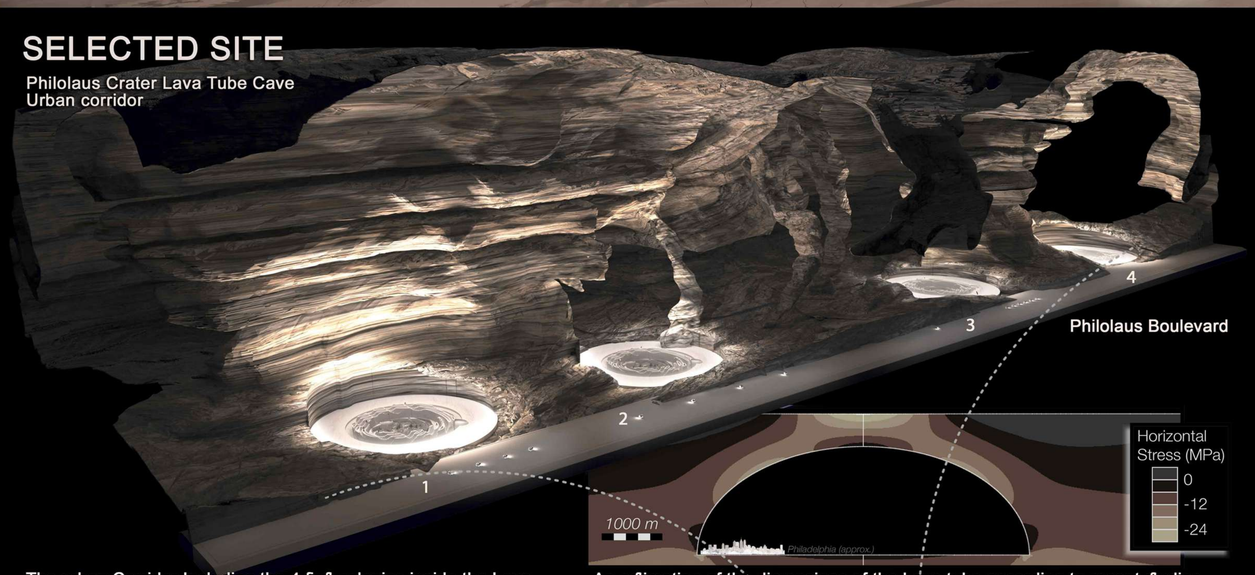
According to the time planning strategy, The 3D printed core habitat is intended to be build in a hierarchal manner in 8 phases with a spane of 3 months for each phase to enable the first group of astraunots to use the colony even before it is finished.



The Geometric design of the colony was inspired from the Octagram circular formation of the sacred geometry

SELECTED SITE

Philolaus Crater Lava Tube Cave
Urban corridor



The urban Corridor Including the 4 first colonies inside the Lava tube at the Philolaus Crater

An estimation of the dimensions of the Lava tube according to recent studies

The Philolaus Crater is approximately 43 miles (70 kilometers) wide and located about 340 miles (550 km) from the moon's north pole. The newfound skylights would offer easier access to subsurface ice, alleviating the need to excavate the lunar surface.
Also, the crater is located on the nearside of the moon, which means that it would offer future lunar missions the benefit of direct communications with Earth

The location of some of the newly-discovered lava tube skylights at Philolaus Crater, near the moon's North Pole.

LUNAR FOOD PRODUCTION
Regenerative Life Support Hydroponics Pods

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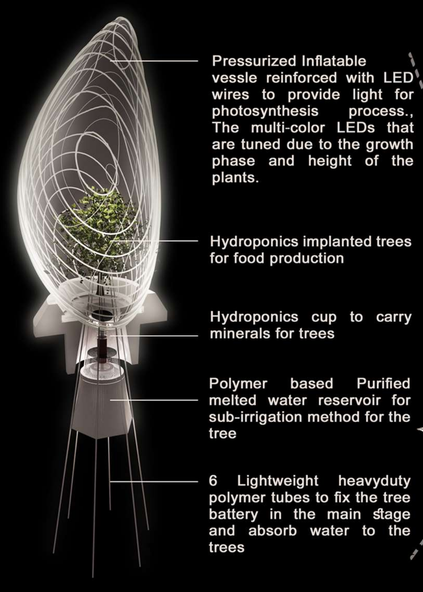


Pressurized Inflatable vessle reinforced with LED wires to provide light for photosynthesis process., The multi-color LEDs that are tuned due to the growth phase and height of the plants.

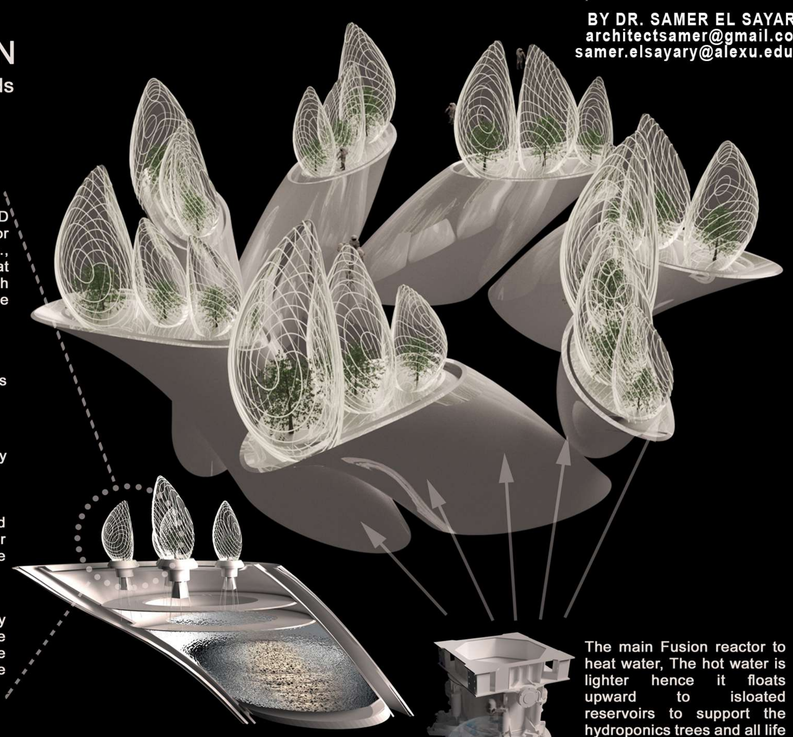
Hydroponics implanted trees for food production

Hydroponics cup to carry minerals for trees

Polymer based Purified melted water reservoir for sub-irrigation method for the tree

6 Lightweight heavyduty polymer tubes to fix the tree battery in the main stage and absorb water to the trees

Hydroponics is a subset of hydroculture, which is a method of growing plants without soil by using mineral nutrient solutions in a water solvent. Terrestrial plants may be grown with only their roots exposed to the mineral solution, or the roots may be supported by an inert medium, such as perlite or gravel.



Section through the Hydroponics purification tower. The tower provides the following:
1. CO2 removal and recovery.
2. Temperature and humidity control for trees
3. Dust Removal and filtration, cleaning of filters
4. H20 polishing and reserve water tank.

The main Fusion reactor to heat water, The hot water is lighter hence it floats upward to isloated reservoirs to support the hydroponics trees and all life form in the colony

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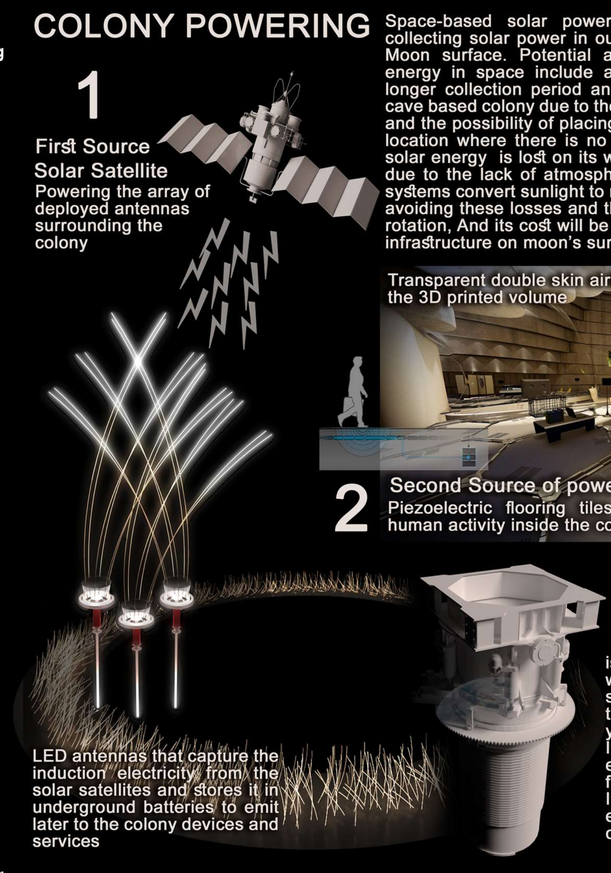
COLONY POWERING

Space-based solar power (SBSP) is the concept of collecting solar power in outer space and distributing it to Moon surface. Potential advantages of collecting solar energy in space include a higher collection rate and a longer collection period and sending it back to the Lava cave based colony due to the lack of direct contact with sun, and the possibility of placing a solar collector in an orbiting location where there is no night. No fraction of incoming solar energy is lost on its way through the Moon's surface due to the lack of atmosphere. Space-based solar power systems convert sunlight to microwaves outside in the orbit, avoiding these losses and the downtime due to the Moon's rotation, And its cost will be much less than establishing an infrastructure on moon's surface.

1

First Source
Solar Satellite
Powering the array of deployed antennas surrounding the colony



LED antennas that capture the induction electricity from the solar satellites and stores it in underground batteries to emit later to the colony devices and services

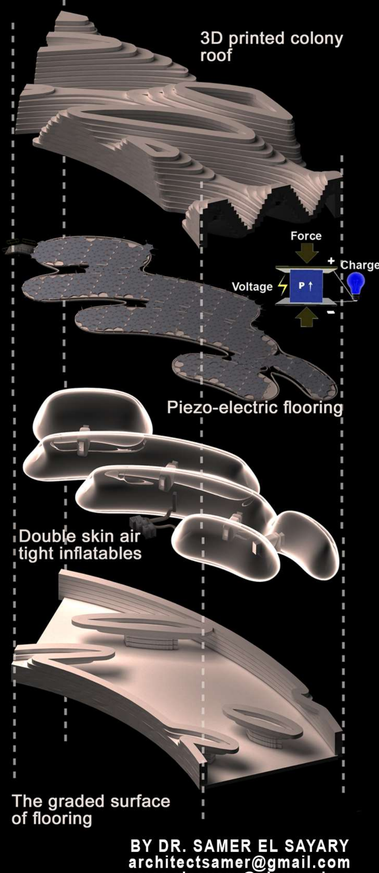
Transparent double skin airtight inflatable located inside the 3D printed volume

2

Second Source of power
Piezoelectric flooring tiles to generate electricity from human activity inside the core habitat inflatables

3

Third Source of power
is the Cold Fusion reactor, It will be the first piece to be shipped after digging to power the colony for average 320 years.
It will be the main source of energy to melt the frozen water for irrigation and support life.
It will also power all vital equipments for the lunar colony to operate.



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