

“LUNAR ZEN GARDEN”

NATURAL DESIGN

AS A KEY FOR RELIABILITY IN
EXTREME SPACE ENVIRONMENTS

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Introduction

- ISSUES :**
- difference of gravity
 - absence of natural terrestrial stimuli
 - isolation in a limited space
 - radiation, etc.

These modify psycho-physiological factors
such as human biorhythm and sensory
perception.

Counterbalance :

To work and find solutions we must be inspired by

creativity, harmony and variety!



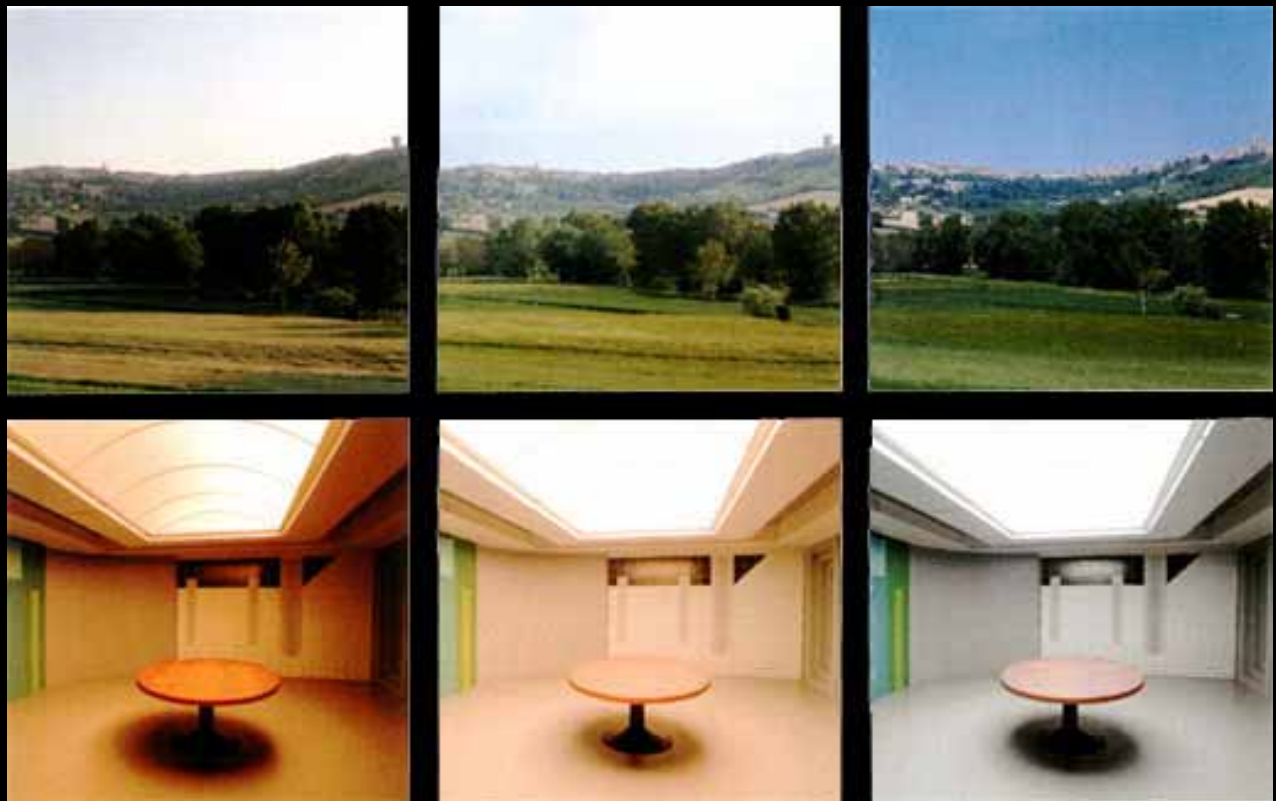
Natural Design:

- A discipline based on naturally occurring phenomena involving the natural elements.
- It aims to create a context of art and design interactions to increase the psycho-physiological well-being of humans.

Natural Design

holds to two primary philosophies:

- One uses natural elements present in existing environments.
- Another involves the evocation of natural terrestrial structures or stimuli in which human beings have been formed. (daily variation of light radiations and colors perceptions, seasons, etc.)




Circadian light concept



Landscape and Spacescape Design

Landscape design is the art of arranging or modifying the features of a landscape, for aesthetic or practical purposes. It attempts to develop techniques by which the social, psychological and aesthetic qualities of the environment will be improved.

Spacescape Design is landscape design in outer space. For universal healing effect, the design should follow the principle of natural design.



Stone Garden

The Zen garden composition is an application of **natural design** methodology that is based upon the evocation of **natural fractal structures**.



Mt. Fuji shaped Kougetsudai at Ginkakuji Temple, a Zen temple, was established in 15th century.

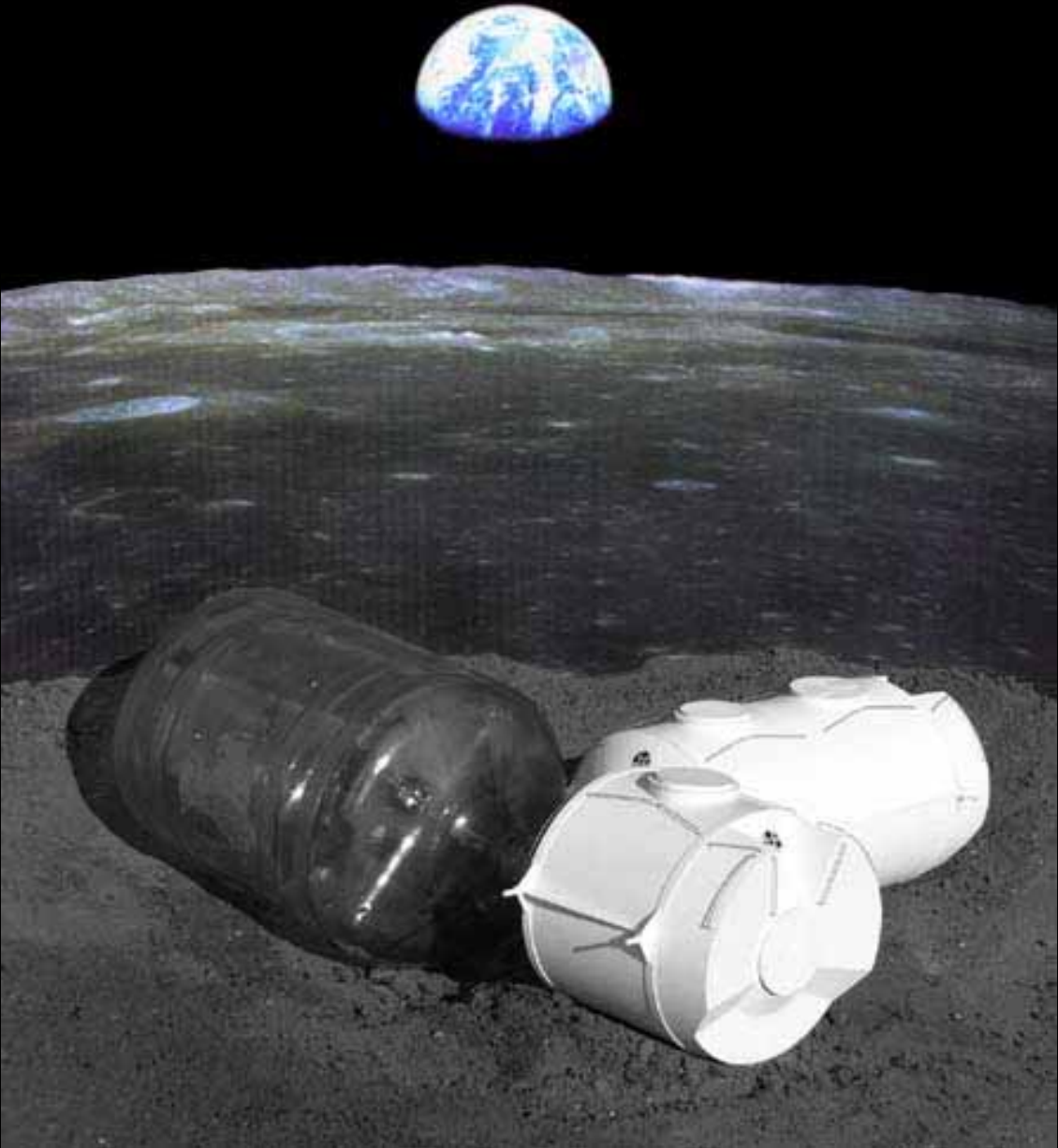


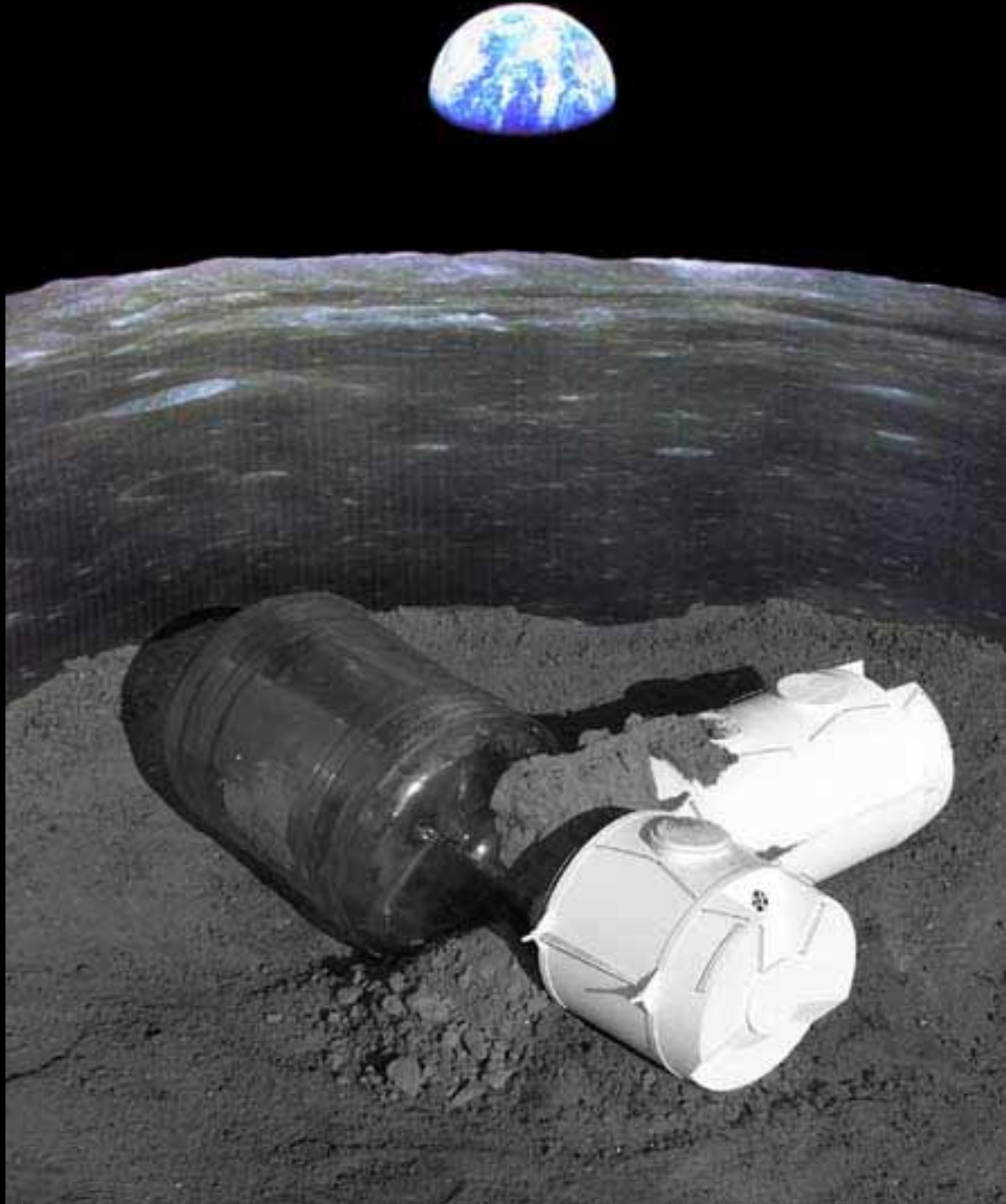
An innovative design to enjoy the reflection of moonlight and to feel the pretty view with the moon placed above the mountain.

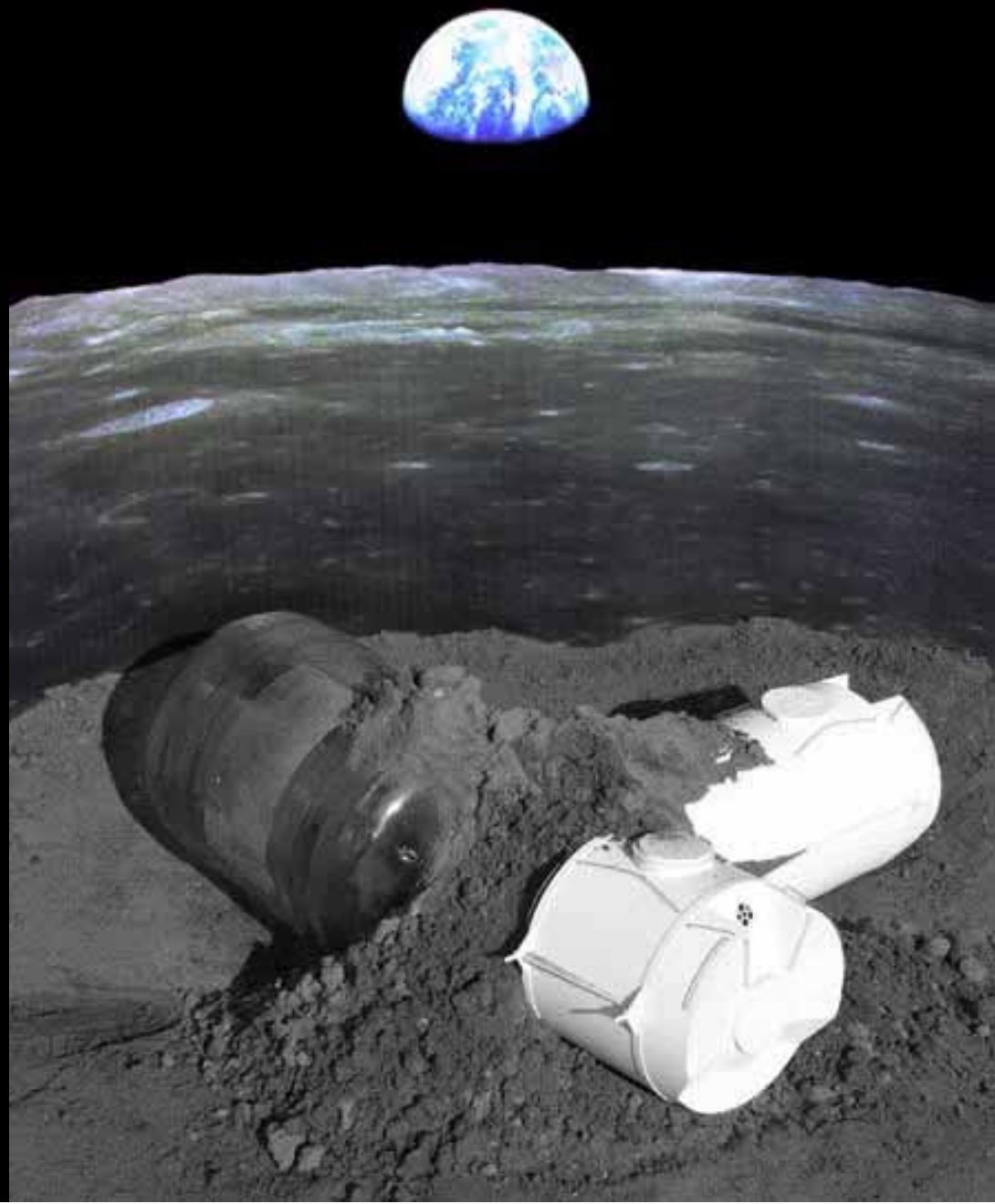
Natural Design of the Interior of the Modules

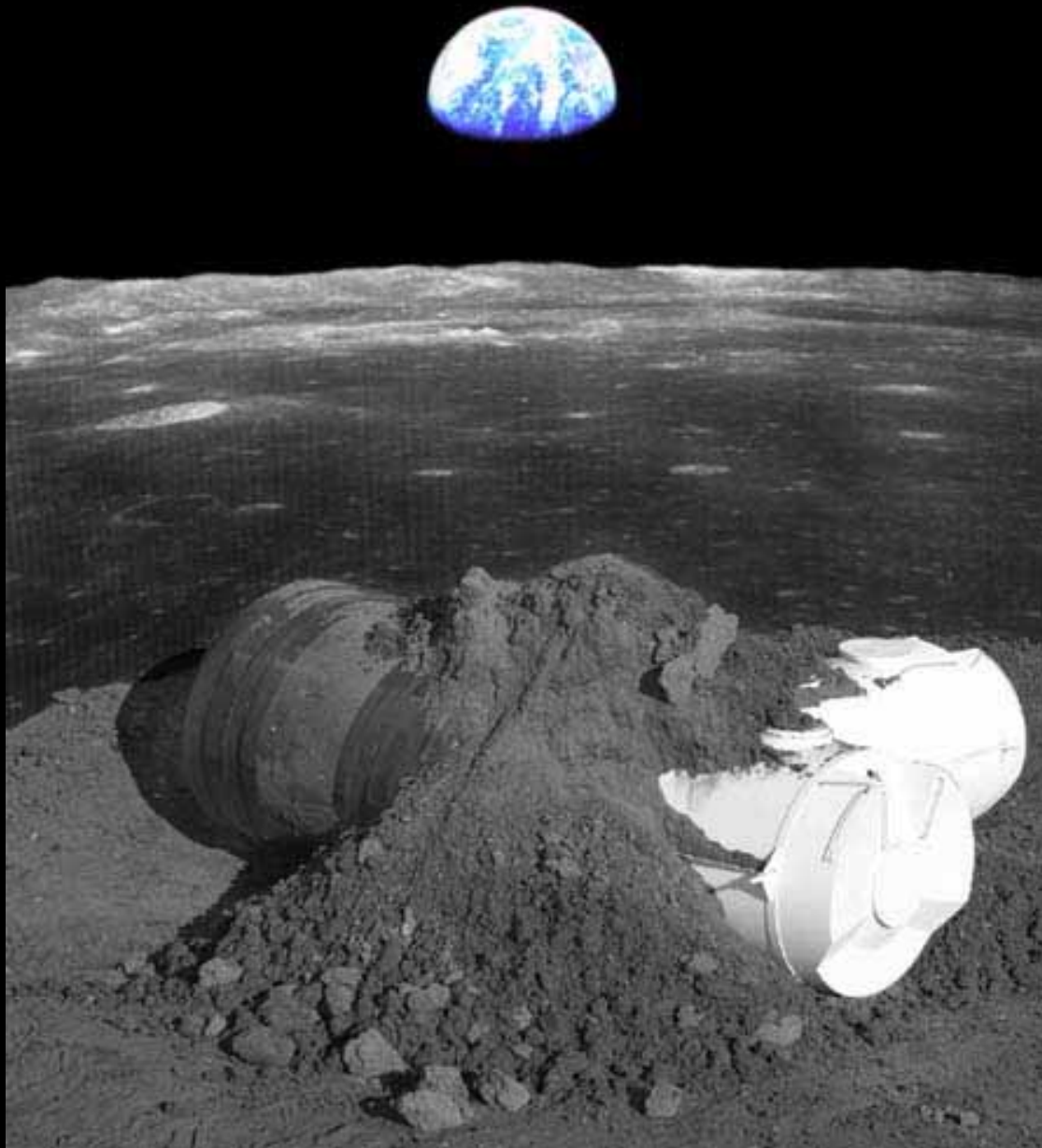
→ Pictures & lights show daytime & night time

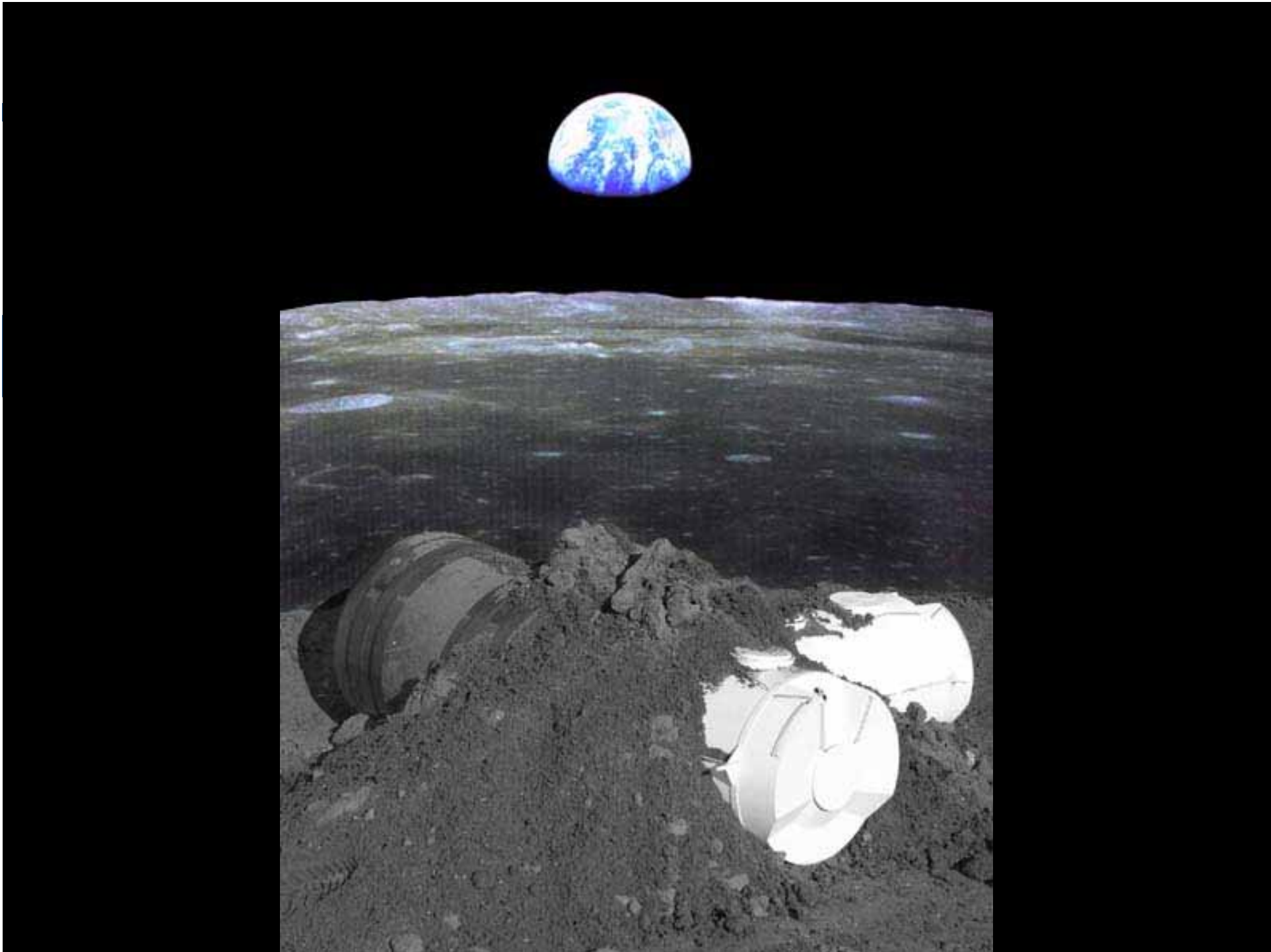














**An aesthetic spacescape design to enjoy
the beauty of both the Earth and the Moon**

"Lunar Zen Garden"

A form of Outer Space Art and Natural Design application



Organic Form and Comfort "Lunar Zen Garden"

Unconsciously people are comfortable with rounded shapes. Why? Because people hold primal memory of their mother's body shape and there are no straight lines in nature.



I raked
this with
simulated
lunar soil

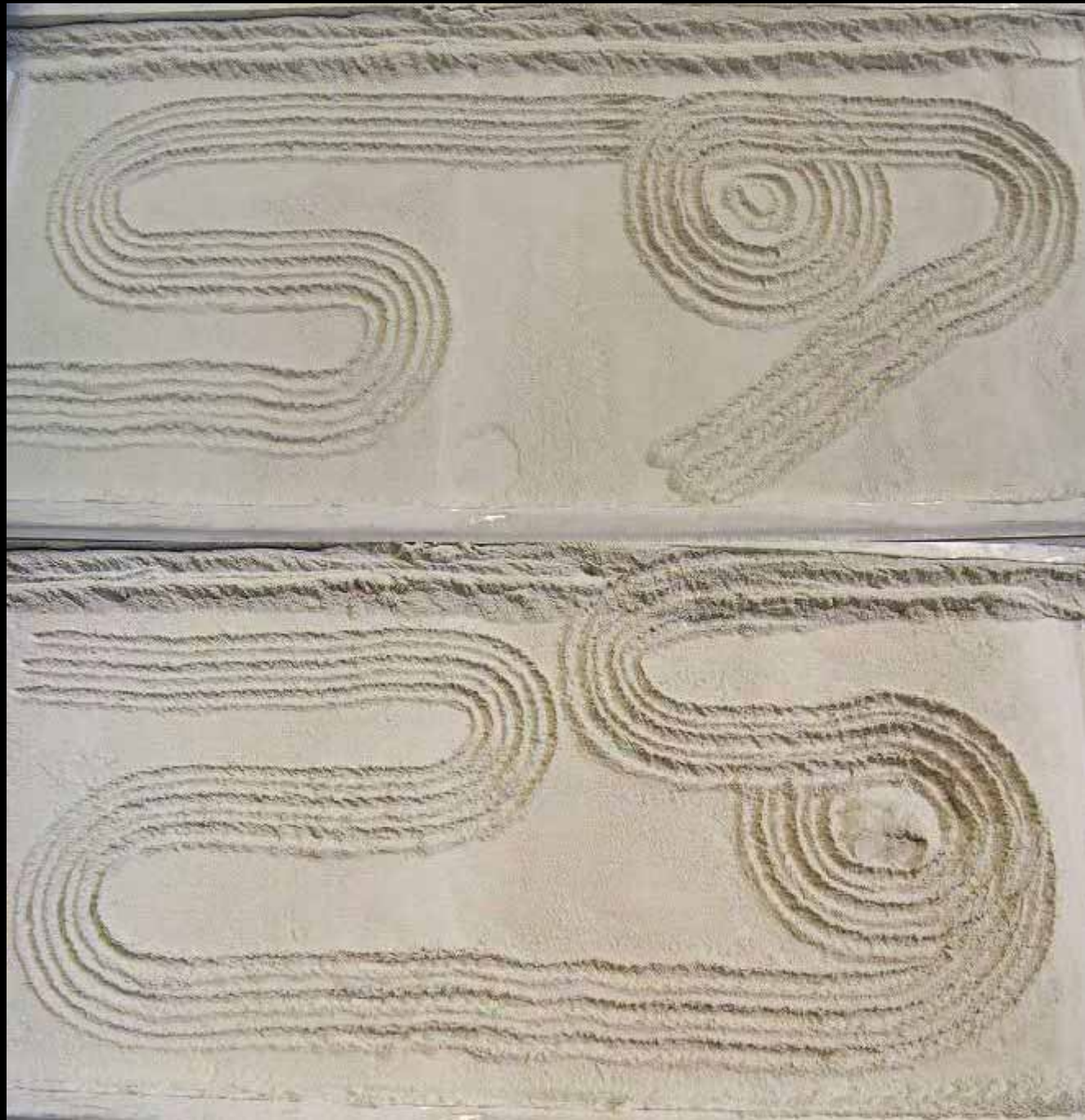
Ayako Ono

A rover will be tested to rake lines on the simulated Moon.



What the rover will do:

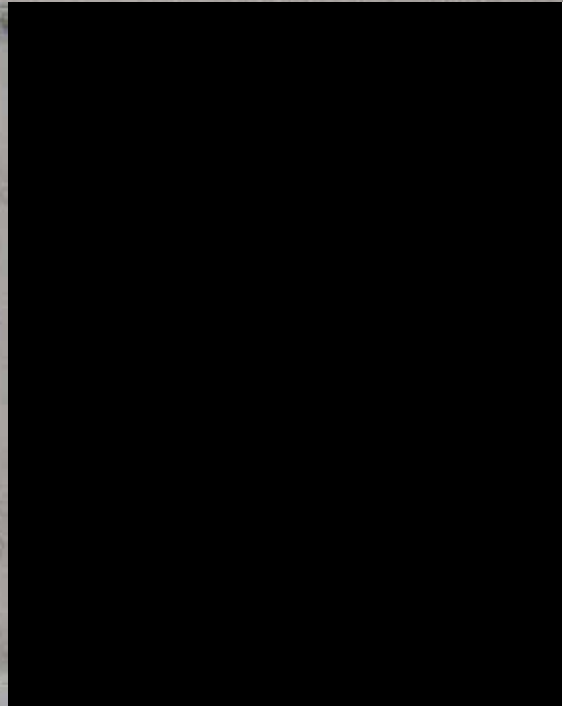
1. Guided by remote control make a good foundation for the garden.
2. Separate different sizes of grains. Remove middle-sized grains.
3. Keep bigger rocks. Use separated grains to make the foundation of the spacescape.
4. Put smaller sand particles on the top layer of the place to make lines.
5. To make lines, move on small sand particles to around the large rocks.



What humans will do:

1. Integrate the basic design into the lunar landscape following Natural Design concepts.
2. Make the plan for the spacescape.
3. Plan the remote control and creative work that can be done on a Zen Garden table version or PC inside the lunar habitat or on the Earth.
4. Maintenance for the rover.



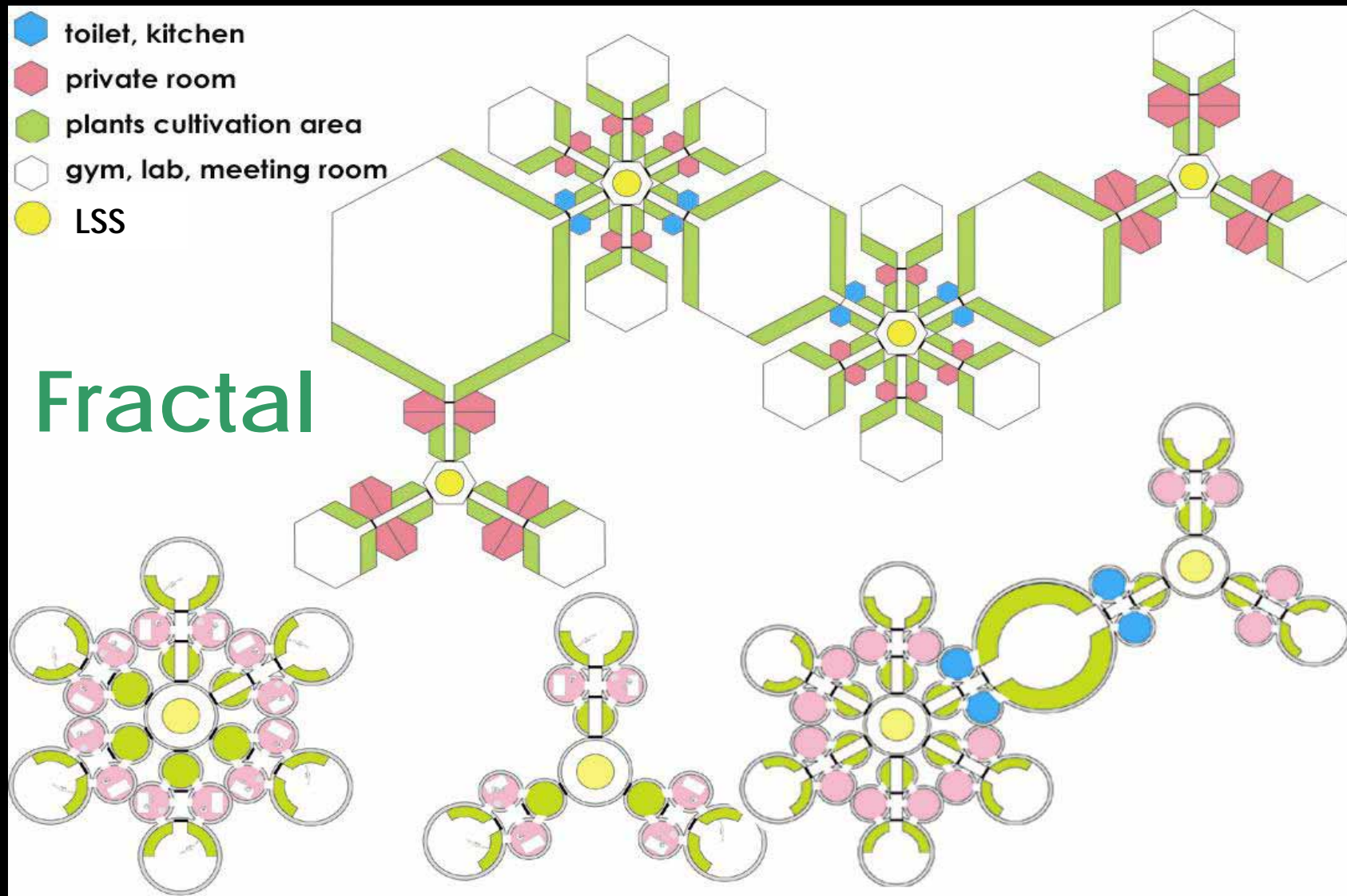




Assumed problems:

- Minute soil (microscopic) and low gravity makes objects' surface powdery due to static.
- Elements take into account both economic and environmental effects because of the difficulties of the extreme environment.

Proposed Fractal Habitat Settlement Structure

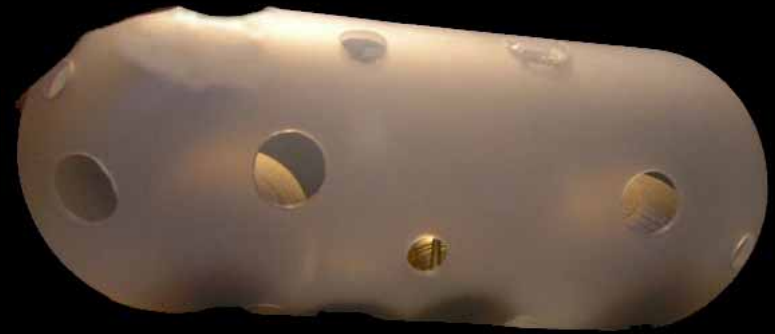


Each private room would consist of a sleeping area where the next to each small plants cultivation area. Piping . . .



... should be minimized to connect each room and life support system (LSS) and the "snowflake-shapes compositions" are helpful.

Outer Space Art

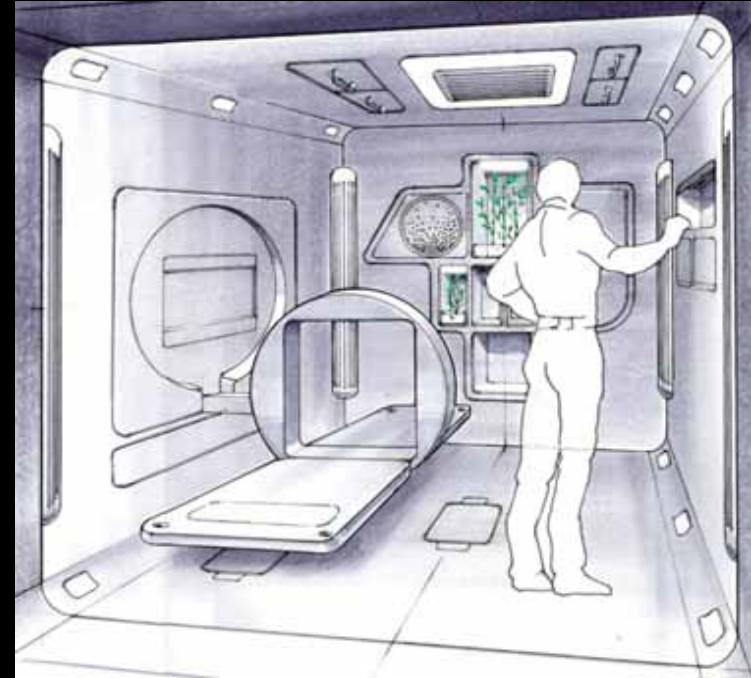


- "The creation of contemporary art is inextricably tied to the process of creating human civilization" (Malina, 1989).
- As a part of space exploration: Art and design in space would encourage and inspire not only pioneers such as astronauts but also space tourists.

Role of Art

Problems and Solutions

Stimulation and
Relaxation



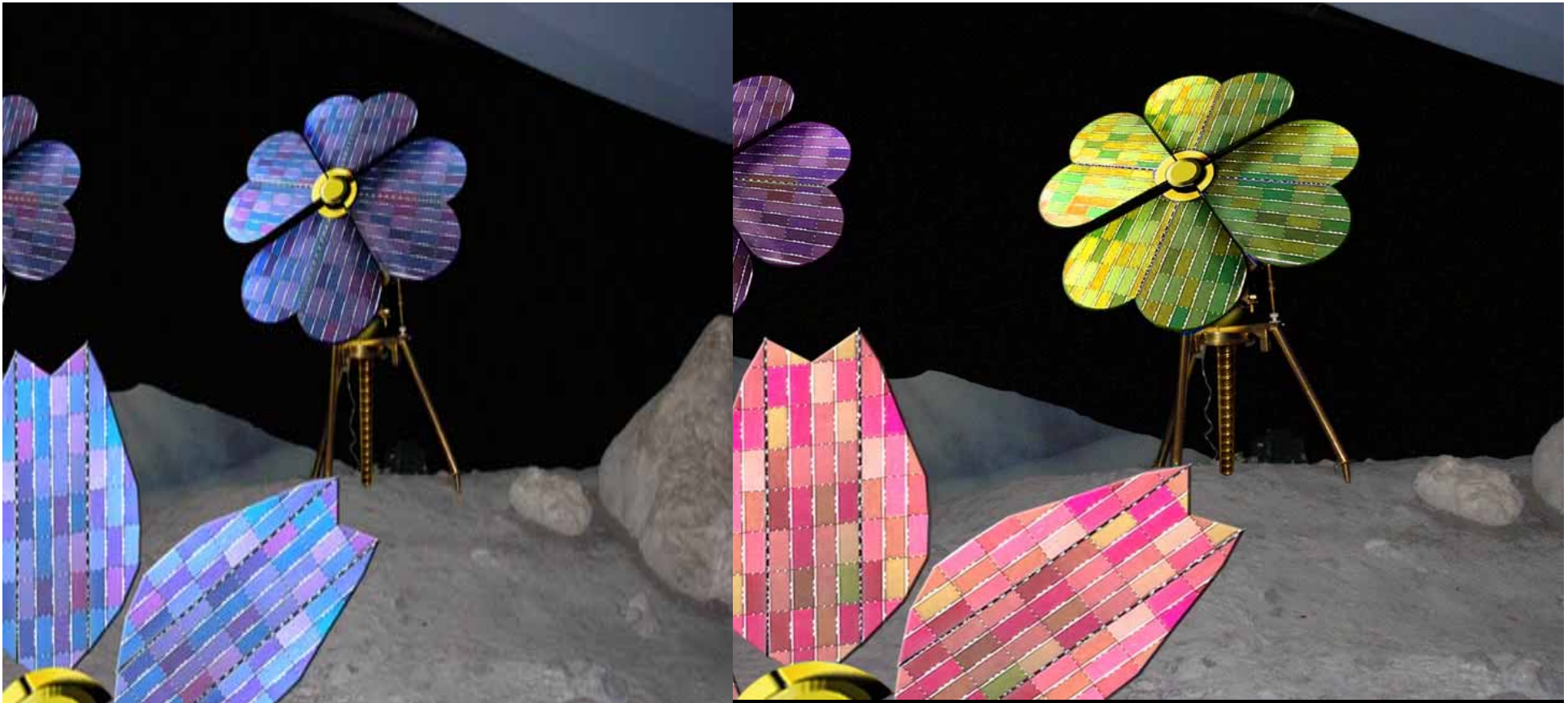
For astronauts:

Space isolation, same crew, quality of life.

Art Therapy: Creating something could be therapy, and it's pleasant.

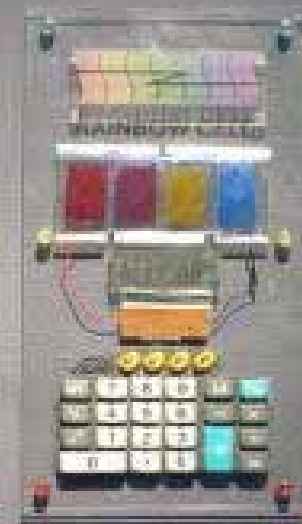
For Space Tourism: Tourist attractions

Space Hotel, Space Resort.



Flower Shaped Solar Panels

These solar panels represent shapes of natural elements (flowers) mounted on rotating systems to point toward the sun. Colourful solar panels should be used. Currently they are being developed at Gifu University in Japan.



For Space Tourism



Lunar Zen Garden and elements will be shown via cameras and monitors to everywhere and this spacescape will become a tourist attraction. The tourists in the spaceship to be put into orbit around the Moon will be able to see the garden from the orbit via binoculars. Perhaps the spacescape will be seen from Earth via telescopes as well.

Conclusion

To avoid missing most of **the positive visual and emotional stimuli** human beings are accustomed to here on **Earth**:

- Natural Design using natural environment as the **Lunar Zen Garden** will become an **ingenuity** of outer space life settlements.
- The garden will also hold strong implications for the **newly emerging field of space tourism**.
- Art and design will occur as a part of space exploration to make human use of space **complete and successful**.

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Thank you for your attention!

Any Questions?

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