T-223

Problem Statement:

Shelter Design:
The team has to design the shelter for those living on Kepler 1649c, taking the atmosphere and weather into consideration. Ideate the living space and various other utilities such as clothing and food. Make sure you ideate how to recycle, reduce, reuse.

Abstract for Solution:

Basic: Kepler 1649c is a sibling of planet Earth,as it is in habitable-zone of the red-dwarf star Kepler 1649 and it is believed that it can be the next Earth.

Similarities between Earth and 1649c:

Size, Mass, Influx of light, Magnetic effects.

Differences that arise:

Possibly weak magnetic field, Colder climate, Possible thin atmosphere, Absence of Green-House gases, Rocky-surface, Low Orbit Duration.

Shortcomings:

Lack of observed data about the planet, leads to making lots of assumptions. It can be fixed, by drawing comparison to existing research outcomes.

“The Differences between Earth and 1649c, is coverup by the similarities b/w 1649c & Mars”

So, the solutions applicable for Mars wrt Shelter design is largely applicable for 1649c.

Solution Design:

Shelter designed for a group of people:

1)Basic utilities (oxygen, power, local communications, waste disposal, sanitation and water recycling)

- **Oxygen:** Artificial oxygen igloo.
- **Power:** through fuel cells, solar units.
- **Water production** through chemical methods and for scaling, using melted form of the frozen water present.
- **Waste disposal**: Solid Biological wastes is used as fertilizers to grow crops.

2)Storage facilities

- Available food storage.
- Water storage facility.
- Equipment storage (toolkits, self-defence etc)

3)Airlock, for pressurization and dust management

- Maintained for use by personnel who stay inside these chambers

4)Resource extraction equipment—initially for water and oxygen, later for a wider cross section of minerals, building materials, etc.

5)Equipment for energy production and energy storage, solar and fuel cells.

6)Food production spaces and equipment.

- Green-Houses for optimising plant growth.

7)Equipment for moving over the surface—space suit, crewed rovers and possibly even aircraft.

- Using eco-friendly methods: Electricity, Fuel-Cell EV

Therefore, the following things are addressed:

- **Shelter Material**, using bio-inspired sustainable polymers, resistant to slight physical deformations, due to storms and temperature changes.
- **Energy production and storage**, using green methods like, fuel cells, solar etc.
- **Food production and storage**, using green houses, reusing biological wastes as fertilizers, refrigerating units for enhanced shelf lives(R744-CO_2)
- **Transportation equipment**, using possible solar and electrically propelled systems.