

34th IAA SYMPOSIUM ON SPACE AND SOCIETY (E5)
Interactive Presentations - 34th IAA SYMPOSIUM ON SPACE AND SOCIETY (IP)

Author: Ms. Marian Elaine Rivera Vera
Student, Mexico, 211110052@upmh.edu.mx

Mr. Diego Yañez
Student, Mexico, 193110221@upmh.edu.mx

BIOCLIMATIC HABITATS ON MARS

Abstract

Humanity wants to take the next step in space exploration, inhabit other planets seems to be the next move, Mars is the closest to Earth and the most adequate planet to host life as far as we know. It has similar conditions to earth, also there is the existence of water which is fundamental in order to have a possibility to terraform Mars. ¿Why Mars? One of the most important aspects is the distance between Mars and Earth, that makes it easier to ship the materials and tools that are needed to live. There are many similarities between Mars and Earth, even if they are different.

This project proposes a bioclimatic, self-sufficient and robot-fabricated habitat on Mars, the value of this habitat sets in efficient energy-sustainable, communal life, sociability, a space of creation and exchange. People are the essential core of the project. This would create a new ecosystem for the humankind, but everything has its limitations, to create an adequate place to live is necessary to consider the different conditions that exist, like pressure, temperature, radiation, wind, oxygen, gravity and water. There are many variables that affect the way to create architecture, some of them are location, structure, materials, cost and comfort for the inhabitants.

To create this project, the first step is to do a site analysis adapting it to this new environment, contemplating general analysis, land delimitation, architectural styles and characteristics, visuals, regulations, acoustics, normative references, landscape links, topography, soil characteristics, solar irradiation, study of insolation at different times of the day and year, wind exposure, ecology, environmental impact assessment and materials. After that, it is important to comprehend that energy cycles are fundamental to create this habitat on Mars, the costs to ship materials to Mars is extremely expensive, with a cycle energy network is possible to reduce this cost and create the minimum footprint in the environment, this way it is possible to create a self-sufficient habitat. The cheapest way to construct is by 3D printers, automatize systems and a different construction technology.

The result of this investigation is the prototype of a bioclimatic habitat on Mars. To conclude, Mars is the most adequate place to host this project, even with the conditions previously mentioned, the project finds ways to solve or reduce the impact of the variables that closely affect the integrity of the human kind