Challenges of Life Support/Medical Support for Human Missions (8)
Challenges of Life Support/Medical Support for Human Missions (3) (3)

Author: Mr. Serge Ameye
(country is not specified)

Mr. Maarten Vandecruys
Belgium

VARIABLE CLIMATE BIOSPHERE

Abstract

The Variable Climate and Weather Biosphere is a macro life support system aiming at creating the best suited environment for humans and plants to thrive during extended periods of isolation on another planet, be it the Moon or Mars, and on Earth as in an underground shelter. The assumption made is that humans will use , on the Moon and on Mars, lava tunnels or caves as a first line of protection against radiation and sandstorms in the particular of Mars. The construction is made out of readily available lava or basalt made geopolymers: which have been successfully produced under room temperature on planet Earth. Reinforcements of wall and roof construction are made out of titanium rods, whilst the inside is lined with titanium plate: this produces a Faraday cage for extra protection and at the same time an airtight environment to be fully controlled. The inside consists of various macro biospheres simulating accurately the weather conditions of any major climatic zones of planet Earth in a way that just any plant existing on Earth can thrive in a simulated natural habitat : hence the possibility to have access to any kind of staple crop, vegetable or fruit. To simulate the various climates according to the Köpper classification, there is not only the programmed fluctuating of temperatures and humidity during the day and varying over the seasons of the year, but also of the solar exposure as to spectrum, angle and duration: which guarantees the respect of the circadian rhythm of humans and plants. And, is part of the Köpper classification criteria. Tests have been run and proven that lava and basalt granules form a perfect substrate for plants in fully controlled environments: beating the results of open field cultures in nutritional qualities and yield as well as organic substrates used in vertical farming. A full description and a detailed 3D rendering are included in the presentation as well as the results obtained from the ongoing experiments. This concept has been developed by Maarten Vandecruys and Serge Ameye of www.urbancropsolutions.com. There is a patent pending.