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Human Habitation Beyond Low Earth Orbit (3)

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SELF-SUFFICIENT AND SUSTAINABLE TECHNOLOGY FOR HABITAT SYSTEMS FROM SPACE  
TO EARTH**Abstract**

In space habitats many factors such as the high cost of material transportation have been pushing the research of closed loop application to the life support system both from a physiological and psychological side. Today the increase of population and pollution as well as the global economic instability, makes autonomous production of food and energy a request also for megacities.

Settlement in space have been imagined almost since the beginning of their perception ago rather green, for survival reasons. Plants produce oxygen and consume CO<sub>2</sub> while humans the opposite. Therefore there is the need to support each other. Moreover there is the psychological factor, which applies to both the city and Space. It is important for humans to experience the cycle of life through the cycle of the plants. The current research on life support systems is based on the work of micro-organisms, vegetables and humans (e.g. MELISSA) and has many similarities with the systems that are developed for food and energy production in the city. The problems are basically the same, though for Space much more extreme; lack of space, light, air, water, temperature control plus oxygen and lack of gravity.

The extreme-design research group has been dealing with the psychophysiological habitability of autonomous habitat in extreme environment since 2007 and from 2009 working in the EuroMoonMars ILEWG campaign in the Mars Desert Research Station simulation facility.

This paper addresses the research of similarities and differences between the space and megacities applications and propose the exchange of information and technologies. Building such a system for the city could help experience how would be to live in a similar system on Space, while we could adapt systems that have been designed for life support in Space on earth applications.