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Space Architecture: Habitats, Habitability, and Bases (1)

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INVESTIGATION OF HOW ARTIFICIAL LIGHTING AND BIOPHILIC DESIGN FOR A SPACE ENVIRONMENT AFFECT HUMAN MOOD AND EMOTION

Abstract

As Space exploration continues to challenge human adaptability, particularly in confined environments like Space stations, more research is needed to establish effective aids to adaptation. This study will address a critical gap in Space habitability research by exploring the potential of the integration of artificial lighting used for plant growth and biophilic design principles to enhance mood and emotion in Space environments. The findings are expected to lead to optimised lighting strategies that benefit not only Space missions but also urban living environments with restricted access to natural light. An experimental design using an Analogue Space module will expose participants to various lighting conditions, with both subjective and objective assessments measuring mood and emotional responses. In addition, participants will go through an electroencephalography (EEG) test while providing psychological responses under different lighting conditions.

This study bridges the fields of architecture, psychology, and space agriculture, extending biophilic design principles beyond terrestrial applications. It is the first to specifically analyse how artificial lighting for plant growth in confined spaces like Space Station impacts human mood and emotions. The study is motivated by the potential cohabitation of humans and plants in Space, with results that can also be applied on Earth to improve the quality of life in dense urban environments. Moreover, this interdisciplinary approach will contribute to the body of knowledge by developing and advancing biophilic design studies. Ultimately, the study aims to advance interdisciplinary knowledge on human-centred design and environmental sustainability in extreme environments.