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TOPOGRAPHICAL DATA FROM SPACE AS ELEMENTARY IN PLANNING DESIGN TRANSFORMATIONS FOR SPACE HABITATS

Abstract

This paper will examine the extent to which topographical data from space may be considered a contributing factor to designing transformations in space habitation. By examining the historical events, where limited topographical considerations contributed to the restricted range of success in designing durable structures, this paper seeks to provide insights into the evolving knowledge associated with strategic landscape mapping, and its limitations in the outer space.

Isolated landscapes are charted by using a mix of rover, lander, and satellite photographs. 'Wide-baseline stereo vision' may be used on the rover to make maps of distant terrain. Precise mapping of the terrain is therefore crucial for lengthy expeditions in space. Absence of such information has the potential to cause wastage of time and energy resources, culminating in non-productive space explorations. Further, errors in estimations from odometry and other sensors will continue to increase the scope of mission failures indefinitely. The study will examine the current approaches employed in mapping visual terrains, using one case study as a reference.

Researchers and practitioners in the sector now, recognise the discrepancy between the necessary precision for improved performance and the constraints of data collecting. The acknowledgment of this "gap of success" inspired researchers and authors who had experience in Europe, and other nations, to participate in its discourse. Consequently, the paper will explore the growing technologies used for data collecting and analyse studies on how technological advancements could enhance data gathering and analysis from space. Through this investigation, the paper aims to provide space engineers and architects with insight into developing topographical maps for the space environment and highlight the restricting factors that can affect the accurate collection of data and design decisions.