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

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ARCHITECTURE IN SENSORY DEPRIVED ENVIRONMENTS CASE STUDY- CONCORDIA RESEARCH STATION

Abstract

After the space race, several concepts regarding habitability in isolated and confined environments started to emerge. Various images showing a life similar to the one we know on Earth was idealized as concepts for future space missions. Even though in reality such projects were constrained by efficiency, cost and logistics, research on habitability also looked at other extreme environments on Earth. Antarctica is the most isolated and harshest continent for human life, being often nicknamed "White Mars". The research stations on the Antarctic Plateau are more isolated even than the International Space Station. Researchers are confined to their station during the winter for about 8 months with no fresh supplies arriving and no possibility to get help. A winter-over poses also many psychological risks to each crewmember which include sleeping problems, irritability, and boredom and decreased attention spans. This master thesis highlights risks and coping mechanisms of life in isolated and confined environments with a focus on architectural interventions as solutions for sensory deprived environments. Greenhouses are often seen as ideal solutions by providing fresh produce and sensory enrichment but many architectural concepts present greenhouses separated from living quarters. Apart from the spatial concepts, the lighting concept has to be integrated to provide the desired conditions for plants and humans. This design proposal of a sensory enriched add-on, exemplified in this paper on the Concordia Research Station could also be used on other stations.