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BASE ANALOG TO MARS ICE AS A PARAMETRIC INSULATION FACADE

Abstract

The station analog to Mars in the Desert of Pampas La Joya in Perú is part of my research as part of The Mars Society in Peru, and now Im continuing my research in The University of Tokyo seeking answers on how people will build on Mars. The research station in the dessert of Pampas La Joya is a training, research and teaching center in various subjects related to space exploration and survival of human crews on Mars or desert areas unexplored. This construction is intended to simulate a future season to live and work as if they were on the planet Mars. In that station we will develop in detail the greenhouse which is the main room of the station, being the only source of oxygen and organic food for human consumption. This station would become part of the international program called Mars Analog Research Station Program supported by The Mars Society Peru of which I am a member. The goal of this project is to redefine the different use of materials in architecture and generate new ideas and sustainable future in relation to the environment using water as the basis for the design. More than five million cubic kilometers of water ice on Mars have been identified, enough to cover the planet to a depth of thirty-five meters. The development of this research station analog to Mars in Desert Pampas of La Joya draws itself on this vast supply of ice water to propose an autonomous habitat on Mars. Previous habitat designs on space have centered on domes covered by a regolith layer, which provides, claustrophobic spaces with disastrous consequences for crew mental health. This proposal redefines this typology, innovating the structure turning it into a translucent spiral having as a concept the shell of the snails that allows them to protect against drying and at the same time this form is driven by a humanistic approach with comfort Crew and well-being as key factors in the design. The facade is the ETFE structure, a type of thermoplastic polymer that is highly resistant to heat, corrosion and UV rays. This structure contains the water inside, water is presented as an effective option against radiation and transparency allows the entry of natural light.