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D-MARS HABITAT PROTOTYPE 2.0

Abstract

The Desert Mars Analog Ramon Station (D-MARS) is a non-profit organization, dedicated to establishing an international planetary research analog center at the Negev desert of Israel. An advanced D-MARS habitat, that will host the analog Mars mission AMADEE-20 on October-November 2020, is being established at the Ramon crater. This habitat, defined as prototype 2, is designed to be a platform for international analog missions, aimed also for astronauts training, scientific analog research, and an innovation laboratory for combining existing technologies in future space missions. Nearby this habitat an artificial underground space will simulate a lava tube on Mars. The combination of the habitat and this compound will allow operational and scientific investigation of various scenarios involving habitat and lava tube complex. The Mars habitat prototype 2, simulating a building located upto 400 million kilometers away from Earth, is an architectural adventure, integrating ancient and extreme regions architectures. The design is inspired from the first, ancient, human settlements, villages and the cities which were constrained by limited resources. Therefore, our Mars settlement design is futuristic, based on advanced technologies on one hand, and efficiently compressed and based on limited resources on the other hand. The D-MARS habitat prototype 2 design faces many challenges; The constraints in shipping materials from Earth, the inevitable limited living space and storage volume, the requirement to be sustainable and compatible with futuristic plans which will be designed decades ahead, along with the need to protect the astronauts, resulted in a set of constraints and requirements. The new design implements innovative solutions to these problems, and demonstrates the habitat as a modular unit which is easily connected to other units. This paper presents the design, implementation and preparations of the new prototype 2 habitat for the AMADEE-20 analog mission, along with the different thinking and building methodologies D-MARS team embraced.