IAF SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 3 (2C)

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MODULAR LUNAR HOTEL

Abstract

The aim of this paper is to propose an innovative modular lunar hotel or outpost that can be assembled using the load capacity of future rockets Space X is at present developing and presumably will be operational by 2025. In particular, the design is based on the Space X Starship, that will have the capability to land large and heavy payloads on the Moon. The lunar building is essentially made of four cylindrical modules assembled around one central distribution and service hub. These four modules, intended for housing, have a geodesic dome with large windows to observe the lunar environment surrounding the outpost. The entry point to the base is in the lower part of the central module, which is the only part of the building touching the ground and rests on four adjustable legs. The central module will be used for vertical connections and services as well as for hydroponic laboratories and greenhouses in which to grow the food the settlers will eat. The whole structure will be about 15m high and will be protected from cosmic radiation by a magnetic field generated by a number of electric cables laid on a spherical structure made of in a table high pressure tubes. The modules can be made of light materials since the protection from radiation is supplied by the magnetic field, and need only a thermal insulating layer, which can be fairly light. The whole structure can thus be carried from Earth without the need of manufacturing it on site. As an added advantage, large windows can be present, mainly in the a top domes/observatories, which will be the characteristic elements of the installation. The cylindrical modules have a diameter of 6m, suitable to be transported in the cargo hold of the Starship. To reach an height of 15m, they are made in sections and then assembled on site. The modules will be lowered from the hold of the Starship by means of the crane with which each spaceship is equipped. Before starting the assembly of the modules, self-propelled cranes and vehicles will be carried to the Moon so that the construction site of the hotel/outpost can be relatively distant from the landing area. These construction machines will then remain available for other construction projects on the Moon. A total of about 10 launches are expected to be required to carry to the Moon all parts needed to build the facility.