HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)
New Technologies, Processes and Operating Modes Enabling Future Human Missions (7)

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SPACE INFLATABLE MAGIC CUBE HABITAT (SIMCH) (PATENT PENDING)

Abstract

The inflatable habitat modules provide a much compact form while deflated. It is easier to launch and in situ fabrication. But current modules are all single shell. Its heavy skin with almost two dozens layers is touched as concrete for protecting the shell from space debris, radiation and extreme temperature. But the cost is too high to be popularly used. A magic cube or honeycomb type group space inflatable habitats was designed. A three order $\{3^3\}$

magic cube habitat samples as : it was composed by 27 cube closets of the same size. The each edge is 2.3M with area $5.3M^2$

and volume $12M^3$,

total volume 328 M^3

and net weight around 1000kg. Its shell was prefabricated. All the closets are stoutly connected to each other to form a huge habitats group. Each closet wall has a free passageway with a deflated pressure transition chamber to ensure exit/entry safety of the crew /cargo to next closet while air-leaking accident happened. Usually, the crew can easily reach every closet at peacetime. The central closet with no wall facing to space where crews live with highest protection by shield of outer closets. This benefits will increase greatly upon the ordering up, such as 10^3

or 100^3

closets, where more central closets get more ideal protection, and various function closets will be gradient arranged upon its protection demands. Usually the wall facing to space is made of 2 layers of hollow durable transparent air-tight film; other walls are made of high-strength textiles mixed air-tight film. The uniform closet is easy to be replaced by air-charging a new deflated closet or repaired once the leaking and damage happened. This group array closets and grading protection result a much light, low cost and high safety space habitats than single huge module. Comparing with the Bigelow BA 330 inflatable habitat and metallic ISS, its Kg/M^3

is much lower: order 3 SIMCH / BA330 / ISS: 3 / 60 / 115. This SIMCH has same volume $\{330\ M^3\}$

but weight is 1/20 of BA330. As a 10^3

SIMCH, it can be easily assembled by 8 times launch of one 5^3

SIMCH with 4600kg each time. Combined with our project “Mini Space Farm”, SIMCH can lead to the space city, new type ISS, space estates, industries, labs, tourism, hotel, freightage and moon/Mars habitat and even beyond.