Somewhere, something incredible is waiting to be known

INTERNATIONAL SPACE STATION

NASA. (2018, October). ISS in October 2018. DLR. https://www.dlr.de/content/de/artikel/news/2018/4/20181120_20-jahre-iss.html

The International Space Station (ISS), a behemoth of a structure naturally supported by the cosmic principle of gravity, orbits itself around the world that created it and observes the same. The International Space Station (ISS) has long been a source of fascination in the fields of engineering and astronomy, but what distinguishes it architecturally is that it has had a significant impact on the initial understanding of the human experience in an alien environment.

Its inspiration was derived from an old science fiction story called "The Brick Moon," authored by Edward Everett Hale in 1870, about a space lighthouse to guide all the ships on Earth. I like to think of this metaphor as a symbiotic relationship between the architecture on Earth and space architecture, with either of them being used to study and enhance the other.

The International Space Station (ISS) is a place for scientists, astronauts, and cosmonauts (The Russian space agency Roscosmos is one of the five countries that contribute to the ISS, and they like to call their space travellers "cosmonauts.") to live and work in space.

While human beings have been to space before through unmanned satellites and manned space missions, all the manned space missions have only been carried out for a short tenure.

The ISS offers an opportunity for human beings to establish living conditions in space for six months. What makes the ISS interesting from an architect's point of view is that, due to the presence of low gravity, the anthropometric challenges it faces are distinctive. Ranging from the use of canisters, spheres, triangles, and beams (in various components of the ISS); the ISS is a great example of form following function, where the basic geometric forms are used to bypass anthropometric challenges.

The inhabitants of the ISS have to tackle a set of problems that one would not find on Earth. For example, they float the majority of the time, if not strapped to their bunker during nap time. Hence, one would notice that the spherical shape of the habitat modules aids them in navigating through the space station. There are also footholds and handholds to help the inhabitants stay intact on their path.

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Triangles and beams help in strengthening the structure as the threats of outer space damage are potentially greater.

The Triangle, being the strongest geometry on Earth, works the same way in space despite the low gravity. The integrity of the hull is intact due to this geometry.

One of the prime aspects of the ISS is the 360° view panel that offers a view of outer space and our Earth, making it architecturally simple, while serving the purpose of a window—a portal to look back at home and beyond the final frontier.

Every day, the inhabitants witness 16 sunrises and 16 sunsets, which they can see through the six side windows and a nadir viewing window in the ISS.

One can see how every single environmental threat is countered with the use of engineering and architectural principles. Intricate details regarding a simple act of human physiology make space architecture a challenging frontier.

The makers of the ISS have been trying to perfect the etiquettes of excusing ourselves down to the smallest detail, as human excretion after leaving the human body, tends to float. In 2000, a toilet was designed to have straps to hold the thighs and prevent the astronauts from floating. In 2018, an even better alternative by NASA was proposed that had two parts: one being a hose to suck excrement by fluid and the other being a vacuum toilet that would directly collect the solid excrement into a garbage bag, which would be eventually burned. The liquid excretion, on the other hand, would be recycled and reused by the inhabitants of ISS. The toilet seats were designed comparatively smaller than those on Earth, to avoid any gaps between the inhabitants behind and the toilet seat. Moreover, space has different environments in different worlds with different challenges to tackle.

The principle that I regard most is the opportunity to remodel, reshape, and evolve modules and components of the ISS. The space frontier makes it possible for a single stand-alone structure floating in space to be enhanced, in contrast to the stable structures on Earth. Better living conditions are being created, and enhanced technologies are being installed and put to use.

Who knows, maybe in the future, space can even be a frontier for huge farming stations working on the principle of vertical farming in space. This is what the ISS has allowed us to explore through architecture and engineering, what life might be in space or the long tenures of space travel.

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