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New architectural, Strategic and Design Approaches to the Future of Human Space Flight (1)

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HOW THE DESIGN OF HUMANIZED ZERO GRAVITY TOILET BENEFIT SPACE TOURISTS WITH DISABILITIES

Abstract

For last decades, from the 1st space tourist to stay on board the International Space Station (ISS) to a scheduled Virgin Galactic's Space Ship 2 commercial fight, our opportunity and to access space has been dramatically increased. It is believed that with rising of business on commercial space flight opens up a new era of space tourism for public society. Tours to circle the Moon is also planned by some agencies. Hence space flight is no longer an astronauts' privilege and shows an optimistic future of an eventual affordable space travel for everyone to be part of it.

Present passengers for commercial space flight undergo preflight trainings which are similar to astronauts do in many ways to adapt life on board the ISS. Nowadays limited space inside the modules for space travelers to stay are based on minimum required interface policies need special training to utilize.

However, like others, handicapped persons who are only disabled in arms or legs but physically suitable to withstand G force, may be dreaming about and affordable to having a memorable space trip would never be achieved unless current design for space transportation vehicles or accommodation facilities are improved for them.

On Earth, toilet or bathroom are crucial for body disabled travelers, as well as in orbit. Space toilet, as frequently remarked, is the first facility used when astronauts reach zero gravity state, liquid redistribution in kidney causes a feeling to urinate. Unlike terrestrial barrier-free facilities, designers analyzed handicapped individuals and their carers' behavior and required minimum space; for space tourism, in the absence of gravity to prevent space facility users and carers to keep their posture properly would cause severe body unbalancing, they may find themselves in trouble of using conventional space sanitation facility.

Therefore, we particularly give our effort to suggest certain guidelines - concluded by reviewing references in a wide variety of fields, interviewing handicapped persons (currently we focus on body disabilities), cost analysis, experiments for helping understand problems/reactions of handicapped persons (or with carers) in zero gravity - as a beginning for improving current space toilet in a humanization design manner for them on board the future possible commercial space travel to the Moon or beyond.

Scheduled experiments are also included in main paper showing how to achieve foreseeable outcomes based on this on-going research for the coming golden age of space tourism and bring new possibility to all mankind.