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FEASIBILITY STUDY ON COMFORTABLE SPACE ENVIRONMENT UNDER LOW GRAVITY

Abstract

Today when even ordinary people could visit the International Space Station (ISS) as travelers, a new question is raised whether the current cabin environment of ISS set for professional astronauts such as temperature, humidity, air quality, and noise levels are really good for everyone. Above all, for the Asian people, whose habitus are different from Westerners, the comfortable environment and the air conditioning system that creates it must be different. In particular, when we travel to the deep space or the lunar surface, the duration of stay extends no less than a few weeks. Consequently, the Crew Quarter (CQ), the relaxing and sleeping place, requires individually customized air-conditioning and noise suppression. Therefore, in this research, we investigated the desirable environmental conditions based on ASHRAE, ISO, and the standards of comfort in Japan by comparing and evaluating the ISS standards with them. In this paper, we propose an air conditioning method that realizes customization in temperature, humidity, airflow in the CQ with low noise and proper diffusion of carbon dioxide from exhaled breath, using computational fluid dynamics (CFD) analysis.