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ADVANCED TOILET RESEARCH ON ISS IN PREPARATION FOR LONG-DURATION SPACEFLIGHT AND IN SUPPORT OF EFFICIENT WASTE MANAGEMENT ON EARTH

Abstract

Six crew members on ISS sometimes need to spend their expensive crew time to fix core system problem such as exercise equipment, water processing system, and Toilet system. Also to keep privacy for each individual crew is one of important improvement point to live in ISS (this include issues odor, noise from space toilet system and also Human waste volume management.) For long-duration spaceflight, including that of the present International Space Station (ISS), it is necessary to attempt "Minimization of the spread of odor", "Minimization of the amount of water use", "Effective recycling of urine", and "Minimization of waste management cost". These demands are similar to issues which many countries are currently facing in their waste management methods. Therefore, we should effectively use the result of technological research and development in various Earth based toilet systems and past and present Space toilet systems so that we can develop more recyclable, clean, and low cost toilets for many Earth and Space applications. In this manuscript, we propose doing experiments and research of efficient waste management systems on the ISS. This manuscript consists of several studies such as "Lessons learned from previous Space based toilet systems", "Waste management system experiment conceptual designs that fit the size of an International Standard Payload Rack (ISPR)" including specific discussion such as "Human-Toilet interface improvement for comfortable use", "How we can minimize odor?", "How we can minimize volume of Human waste?", "Future option to process by microbial in soil to support space farming".