Paper ID: 37676
oral
student

28th IAA SYMPOSIUM ON SPACE AND SOCIETY (E5)
Interactive Presentations (IP)

Author: Mr. Craig McCormack
The University of Western Australia (UWA), Australia

Mr. John Phillips-Hungerford
University of Houston, United States

THE REQUIREMENT FOR MICROGRAVITY SPECIFIC FOOTWEAR AND ITS IMPACT ON SPACE ARCHITECTURE.

Abstract

While aboard the International Space Station (ISS), astronauts wear socks on their feet, with running shoes used when on the treadmill and whilst using the bicycle. Commonplace throughout the ISS are fabric loops and material that is wrapped in an inconsistent and ad hoc manner around mobility aids with the aim of providing comfortable restraint. However, these are not particularly universal, can be awkward to utilise, can be potentially hazardous, and can restrict use of the mobility aid to single appendage. The interior of the ISS consists of hard, smooth-surfaced materials that can also pose safety concerns and risk of injury through accidental, forceful contact. As a microgravity environment increases the amount of time it can take to heal from injuries such as bruises, mitigation of these injuries is important in providing a comprehensive approach to occupational health and safety in extreme environments.

Legs and feet are the more powerful, long-duration mobilizers, yet they are largely ignored in favour of the arms and hands. The current footwear of choice, socks, compounds this by reducing the finesse that more suitably structured footwear can afford. In all aspects of specialized vocations or activities, a specific shoe or boot was created to increase a person's effectiveness at that task. The provision of footwear that can both allow for comfortable and secure restraint whilst providing adequate protection to reduce injury to the feet in a microgravity environment is a necessary step in the evolution of habitation of humans in space.

This paper highlights a gap in the availability and development of microgravity-specific footwear and its potential to mitigate injury and provide appropriate personal restraint whilst also promoting a holistic approach to human-centred, design and the interrelated occupational health and safety of space architecture. By analysing relevant information that includes astronaut feedback and microgravity focussed occupational health and safety data, this paper aims to identify not only an opportunity to develop microgravity specific footwear but also a direction for its development.