Paper ID: 13404
oral

23rd SYMPOSIUM ON SPACE ACTIVITY AND SOCIETY (E5)
Human Habitation Beyond Low Earth Orbit (3)

Author: Dr. Anna Barbara Imhof
Liquifer Systems Group (LSG), Austria, bimhof@liquifer.at

Mr. Waltraut Hoheneder
LIQUIFER, Austria, whoheneder@liquifer.at
Dr. Kaspar Vogel
Austria, kaspar.vogel@liquifer.at
Dr. Laura Drudi
McGill University, Canada, laura.drudi@mail.mcgill.ca

SLEEPING IN ZERO-G: HOW THE DESIGN OF A SLEEPING BAG CAN SUPPORT COUNTERMEASURING FATIGUE

Abstract

The paper discusses six case studies of sleeping bag designs, one used by astronauts in the Space Shuttle program and another currently being used on the ISS, which was developed by a Russian company. Two alterations of the mentioned designs were developed by the University of Technology in Munich and by Portland State University, which will complement the case study selection. There are two recent developments using the neutral body position in zero-g as a guideline for the sleeping bag cut.

The latest examples were developed by Toshiroh Ikegami from Kyoto City University of Arts, as well as the Vienna based team LIQUIFER Systems Group. With these two design case studies, the cut of the sleeping bag allows the person to relax and sleep in the neutral body position and thus set a new paradigm and option of a sleep device tailored to zero-g.

Currently there is an increased interest in astronauts' and cosmonauts' sleep quality and related comfort because analysis of their sleep quality showed that sleep during long exposure to microgravity does not always ensure good recovery of cognitive and functional capabilities. Present research in the area of sleep and performance preservation include studies by the Institute of Biomedical Problems (IBMP) in Moscow and the NASA-JSC study from the Behavioral Health and Performance Element Human Research Program about improving sleep quality on ISS.

In the context of the paper the operational medical challenges of sleep quality and circadian dysynchrony will be described in order to establish the relevance of effective sleeping bag designs to support spaceflight crewmembers' well-being.