Paper ID: 87003
oral

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Human Physiology in Space (2)

Author: Dr. Oliver Opatz
Center for Space Medicine Berlin (ZWMB), Germany

Mr. Tomas Bothe
Charité Universitätsmedizin Berlin, Germany
Dr. Stefan Mendt
Charité Universitätsmedizin Berlin, Germany
Prof. Hanns-Christian Gunga
Charité Universitätsmedizin Berlin, Germany
Prof. Martina Anna Maggioni
Charité Universitätsmedizin Berlin, Germany

T-MINI MEETS EVERYWEAR: ENHANCING SPACE HEALTH THROUGH SEAMLESS INTEGRATION

Abstract

Extended periods in microgravity not only impact skeletal, muscular, and cardiovascular systems but also impair the thermoregulatory system's capacity to expel excess heat. This impairment can result in potential hyperthermia, especially under physical strain, and disturb the astronaut's circadian and sleep patterns. Observations from past missions have noted a marked increase in astronauts' head temperatures during both short and long-duration spaceflights, correlating with findings related to space-associated neuro-ocular syndrome and microgravity-induced alterations in brain structure. To mitigate these risks, we advocate for routine assessments of astronauts' thermophysiological adaptation, a measure of paramount importance for missions to deep space or extraterrestrial locations, including the lunar gateway. Our proposal includes the use of a refined, miniaturized, non-invasive temperature monitoring system, derived from technology proven in prior experiments and technical demonstrations on the ISS. This enhanced system boasts advancements in miniaturization, hardware improvement, and increased comfort for the wearer. Recently, we have further evolved this approach by integrating the T-Mini System with the "Everywear" wireless data hub, streamlining data management and enabling the possibility for live evaluations and cybernetic feedback loops. This forward-thinking integration seeks to profoundly improve astronaut healthcare, offering real-time monitoring and adaptive responses to ensure their well-being in the challenging conditions of space.