Fatigue Management in Spaceflight Operations

Alexandra Whitmire

Sleep loss and fatigue remain an issue for crewmembers working on the International Space Station, and the ground crews who support them. Schedule shifts on the ISS are required for conducting mission operations. These shifts lead to tasks being performed during the biological night, and sleep scheduled during the biological day, for flight crews and the ground teams who support them. Other stressors have been recognized as hindering sleep in space; these include workload, thinking about upcoming tasks, environmental factors, and inadequate day/night cues. It is unknown if and how other factors such as microgravity, carbon dioxide levels, or increased radiation, may also play a part.

Efforts are underway to standardize and provide care for crewmembers, ground controllers and other support personnel. Through collaborations between research and operations, evidenced-based clinical practice guidelines are being developed to equip flight surgeons with the tools and processes needed for treating circadian desynchrony (and subsequent sleep loss) caused by jet lag and shift work. The proper implementation of countermeasures such as schedules, lighting protocols, and cognitive behavioral education can hasten phase shifting, enhance sleep and optimize performance.

This panel will focus on Fatigue Management in Spaceflight Operations. Speakers will present on research-based recommendations and technologies aimed at mitigating sleep loss, circadian desynchronization and fatigue on-orbit. Gaps in current mitigations and future recommendations will also be discussed.