A novel, passive system has been developed for isolating an exercise treadmill device from a spacecraft in a zero-G environment. The Treadmill 2 Vibration Isolation and Stabilization System (T2-VIS) mechanically isolates the exercise treadmill from the spacecraft/ space station, thereby eliminating the detrimental effect that high impact loads generated during walking/ running would have on the spacecraft structure and sensitive microgravity science experiments. This design uses a second-stage spring, in series with the first stage, to achieve an order of magnitude higher exercise-frequency isolation than conventional systems have done, while maintaining desirable low-frequency stability performance. This novel isolator design, in conjunction with appropriately configured treadmill platform inertia properties, has been shown (by on-orbit zero-G testing on-board the International Space Station) to deliver exceedingly high levels of isolation/ stability performance.

This work was done by Ian Fialho, Craig Tyer, Bryan Murphy, Paul Cotter, and Sreekumar Thampi of The Boeing Company for Johnson Space Center. For further information contact the JSC Innovation Partnerships Office at (281) 483-3809. MSC-24847-1

Vibration Isolation and Stabilization System for Spacecraft Exercise Treadmill Devices

Lyndon B. Johnson Space Center, Houston, Texas

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