the relative motion of the two tubes. While drilling, the drill assembly rotates relative to the core and forces the rolling tooth to stay hidden in the slot along the inner tube wall. When the drilling depth has been reached, the drill bit assembly is rotated in the opposite direction, and the rolling tooth is engaged and penetrates into the core. Depending on the strength of the created core, the rolling tooth can score, lock the inner tube relative to the core, start the eccentric motion of the inner tube, and break the core. The tooth and the relative position of the two tubes can act as a core catcher or core-retention mechanism as well. The design was made to fit the core and hole parameters produced by an existing bit; the parts were fabricated and a series of demonstration tests were performed.

This invention is potentially applicable to sample return and *in situ* missions to planets such as Mars and Venus, to moons such as Titan and Europa, and to comets. It is also applicable to terrestrial applications like forensic sampling and geological sampling in the field.

This work was done by Mircea Badescu, Donald B. Bickler, Stewart Sherrit, Yoseph Bar-Cohen, Xiaoqi Bao, and Nicolas H. Hudson of Caltech for NASA's Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1). NPO-47354

Vibration Isolation and Stabilization System for Spacecraft Exercise Treadmill Devices

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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 onboard 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