

# Mini Treadmill for Musculoskeletal Health

## *For zero-gravity and terrestrial applications*

Because NASA's approach to space exploration calls for long-term extended missions, there is a pressing need to equip astronauts with effective exercise regimens that will maintain musculoskeletal and cardiovascular health. ZIN Technologies, Inc., has developed an innovative miniature treadmill for use in both zero-gravity and terrestrial environments. The treadmill offers excellent periodic impact exercise to stimulate cardiovascular activity and bone remodeling as well as resistive capability to encourage full-body muscle maintenance. A novel speed-control algorithm allows users to modulate treadmill speed by adjusting stride, and a new subject load device provides a more Earth-like gravity replacement load.

This new and compact treadmill offers a unique approach to managing astronaut health while addressing the inherent and stringent challenges of space flight. The innovation also has the potential to offer numerous terrestrial applications, as a real-time daily load stimulus (DLS) measurement feature provides an effective mechanism to combat or manage osteoporosis, a major public health threat for 55 percent of Americans over the age of 50.

### Applications

#### NASA

- ▶ Compact treadmill for use in zero-gravity environments

#### Commercial

- ▶ Mechanism to combat and/or manage osteoporosis



### Phase II Objectives

- ▶ Build a technology demonstrator and engineering model
- ▶ Demonstrate that the model will satisfy the stringent volumetric, power, and performance requirements demanded by space missions
- ▶ Provide the active feedback necessary to control the model and display DLS
- ▶ Complete systems engineering and integration activities
- ▶ Prepare detailed mechanical and electrical data acquisition designs
- ▶ Finalize software design
- ▶ Complete component testbed and engineering model
- ▶ Demonstrate subject load device fractional gravity functionality

### Benefits

- ▶ Maintains cardiovascular and musculoskeletal health
- ▶ Provides real-time DLS measurement feedback

### Firm Contact

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