

Exercise Countermeasures Laboratory at NASA Glenn Research Center

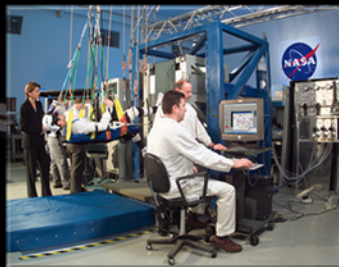


A new ground-based capability for advancing human health and performance in space

Mission Statement

The Exercise Countermeasures Laboratory at NASA Glenn Research Center serves the NASA Exercise Countermeasures Project and the exercise community as a whole by providing a ground-based laboratory to simulate inflight (0-g) and surface (fractional-g) exercise—for developing and validating advanced exercise countermeasure devices, requirements, and exercise prescriptions for space exploration.

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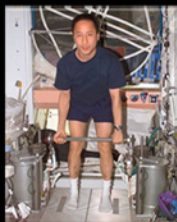


Test subject in the zero-gravity locomotion simulator (ZLS) at the Cleveland Clinic Foundation

Current International Space Station Exercise Countermeasures



Treadmill with vibration isolation system (TVIS)



Resistance exercise device (IRED)



Cycle ergometer (CEVIS)



Exercise Countermeasures Project Highlights at Glenn Research Center:

- Human health risk mitigation for space travel
- Creation of the Exercise Countermeasures Laboratory, a ground-based testbed to provide high-fidelity zero-gravity, 1/6-gravity (lunar environment), and 3/8-gravity (Martian environment) exercise simulations for developing exercise countermeasures devices, equipment, and exercise protocols for space
- Development and evaluation of advanced concepts for the next generation of exercise devices for the crew exploration vehicle and lunar applications
- Improvement in design of exercise devices, near-term application and current study focusing on improving the International Space Station treadmill harness for improved loading and comfort
- Evaluation of exercise protocols, developing ways to measure and prescribe exercise dose
- Development of portable, small diagnostics for real-time metabolic and health monitoring, the Portable Unit for Metabolic Analysis (PUMA) and BioWATCH devices
- Computational modeling of dynamic interaction between crewmember, exercise device, and space vehicle
- Ground-based applications including technology spinoffs and osteoporosis prevention
- Partnership with the Cleveland Clinic Center for Space Medicine
- Visit <http://exploration.grc.nasa.gov/Exploration/Advanced/Human/Exercise/>

exercise countermeasures laboratory

