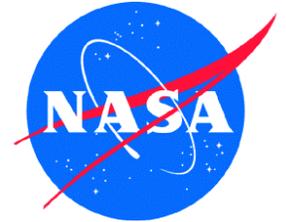


NASA INFORMATION

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058
281/483-5111



Astronaut Fitness/Physical Conditioning

How do astronauts maintain balance while in microgravity? It's a question researchers at NASA Johnson Space Center study daily. They are trying to learn more about growth and maintenance of muscle and bone. That's where NASA's Astronaut Rehabilitation Facility comes into play.

It is here that astronauts learn exercises and techniques to keep them fit while they are in space and when they return home. For example, a **thera ball exercise** is used for pre- and post-flight testing and training. Astronauts' eye and body coordination is tested when they try to throw a ball to a designated area while trying to maintain their balance.

A **30-movement agility** test also tackles eye and body coordination. In this physical challenge, astronauts are tested on how long it takes them to complete 30 movements. This exercise in particular is very challenging for astronauts when they return from space since their eye and body coordination is off.

In addition to pre- and post-flight training, there is also a need for in-flight exercise to maintain good health. Three types of equipment are being used on orbit to address this issue.

One is the **RED** or Resistive Exercise Device. The RED hardware is located in the Unity node on the International Space Station. With this device, astronauts can perform weight-training exercises similar to what they do on Earth.

It is lightweight and portable, and it offers a relatively constant resistance throughout its full range of motion. The device duplicates the effects of gravity and is easily adjusted to a predetermined amount.

Astronaut Fitness & Physical Conditioning

The **CEVIS** or Cycle Ergometer with Vibration Isolation System is very similar to a mechanical bicycle. It is bolted to the floor. Astronauts snap their shoes on to the pedals. A seat belt holds them down on to the mechanical bicycle. Astronauts can get a good workout by changing the resistance of this bicycle.

And finally is the **TVIS** or Treadmill Vibration Isolation System. This is a free-floating treadmill. It helps prevent bone loss by astronauts. Highly flexible wire rope isolators (bungee like) hold it together. Astronauts strap a belt cord around them and walk for fitness.

Overall the strength, conditioning and rehabilitation program is designed to enable crewmembers to meet the physical performance demands of space missions. NASA specialists conduct annual fitness assessments, prescribe individualized exercise programs, and provide one-on-one pre-flight and post-flight conditioning activities.