

Technology Opportunity

Technology Transfer & Partnership Office

TOP3-00227

Zero Gravity Research Facility

Facility

The Zero Gravity Research Facility (Zero-G) is the largest facility of its kind in the world and continues to be the nation's most modern research tool for exploring weightlessness, or microgravity, on Earth.

Facility Description

The Zero-G is NASA's premier facility for conducting ground-based microgravity research. Operational since 1966, it is one of two drop towers located at the NASA Glenn Research Center. The facility is used by investigators from around the world to study the effects of microgravity on physical phenomena such as combustion, fluid physics, biotechnology, and materials science.

Microgravity, a condition of relative near weightlessness, can only be achieved on Earth by putting an object in a state of free fall.

Facility Benefits

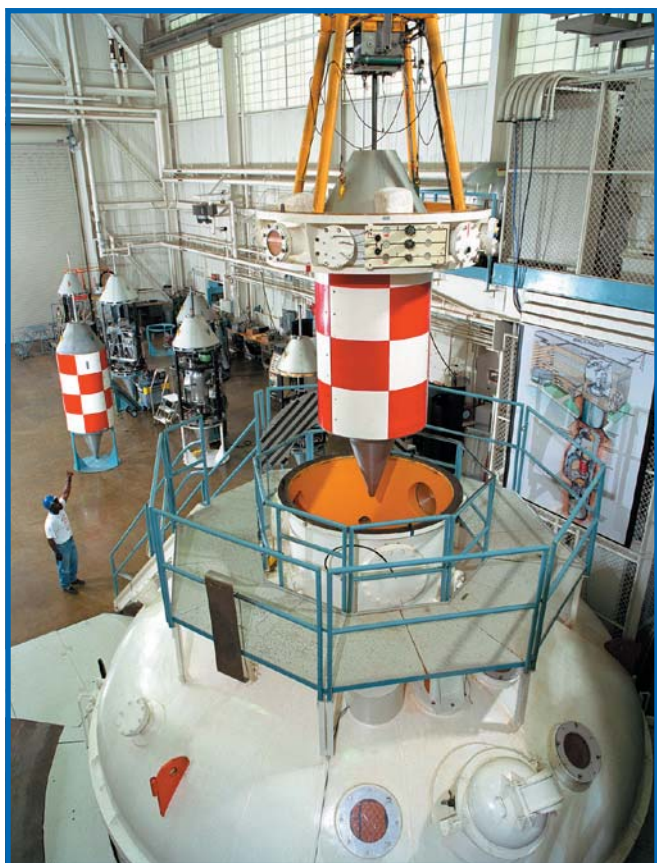
- Experiments free fall 132 meters and are weightless for 5.18 seconds during the fall
- The free fall is conducted inside a 143-meter steel vacuum chamber
- Evacuating the chamber to a pressure of 0.01 torr reduces the acceleration, due to aerodynamic drag, on the freely falling experiment vehicle to less than 0.00001 g
- Allows experimenters to quickly perform microgravity research, verify test space and experiment concepts, and develop space flight hardware at a small fraction of the cost of conducting these tests in space
- More than 300 tests have been conducted since 1966.

Commercial Applications

- Cryogenic storage
- Fundamental scientific studies of combustion, fluid physics, biotechnology, and materials science
- Feasibility of experiment concepts proposed for long-duration microgravity experiments
- Development and testing of space shuttle and International Space Station experiment hardware
- Deployment of hardware during free fall, in a vacuum environment



Retrieving the drop vehicle after a test in the Zero-G Facility.



Positioning a drop vehicle on top of the vacuum chamber.

Capabilities

Zero Gravity Research Facility Testing Capabilities	
Microgravity duration	5.18 seconds
Free-fall distance	132 meters
Gravitational acceleration	<0.00001 g
Mean deceleration	35 g
Peak deceleration	65 g
Vacuum level	0.005 torr
Vacuum chamber length	143 meters
Vacuum chamber diameter	6 meters
Drop vehicle capabilities	
Payload diameter	Up to 1 meter
Payload height	Up to 1.6 meters
Payload weight	Up to 455 kg

Facility Testing Information

<http://facilities.grc.nasa.gov>

Contacts

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Drop vehicle with gas jet combustion experiment onboard.