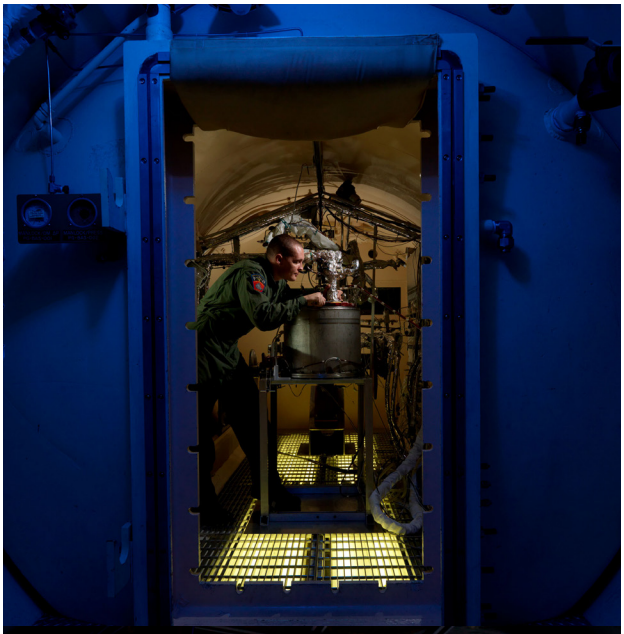
Vacuum Test Facilities (Altitude Chambers)

Johnson Space Center (JSC) provides a wide array of space environment simulation test capabilities. The altitude chambers are used primarily for development, certification, and parametric testing of life support systems for humans in the hostile environment of space. Each altitude chamber is configured for a particular type of testing; however, within the chamber's capabilities, the chamber complex may be used to perform other types of tests. JSC offers a collection of unique knowledge as to what works well within the harsh environment of space and what does not. Test capability is available for both manned and unmanned test environments.

Services Provided

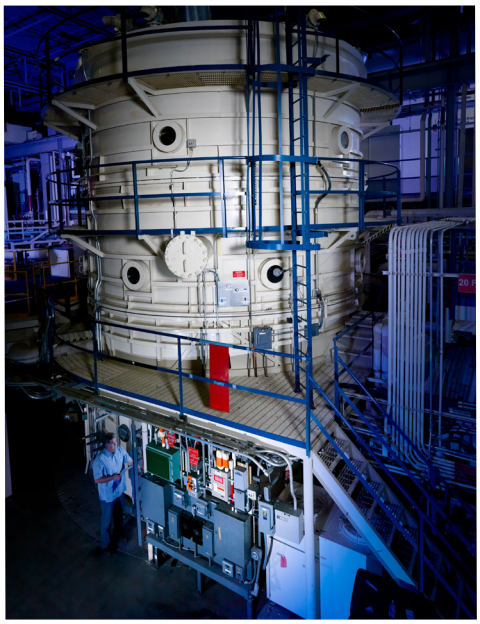
- Human-rated testing in a vacuum environment
- Space suit development testing
- Flight crew training
- Environmental control and life support system testing
  - Metabolic loading to life support systems
  - Parametric testing
  - Emergency and mobility accommodations of suited crewmember
- Air Revitalization system testing
  - Carbon dioxide removal or reduction
  - Oxygen generation
  - Trace contaminant control
- Materials and hardware testing in a vacuum environment



Johnson Space Center

Altitude Test Facility Specifications

Facility	Internal Volume	Pressure Range
8-Foot Chamber	8’ Dia x 14’ L	1 x 10^{-2} – 760 torr
11-Foot Chamber	11’ Dia x 19’ L	1 x 10^{-2} – 760 torr
Space Station Airlock Test Article	Equipment lock: 1,100 $ft.^3$ Crew lock: 310 $ft.^3$ Observer lock: 1,570 $ft.^3$	1 x 10^{-2} – 760 torr
20-Foot Chamber	20’ Dia x 27.5’ H	1 x 10^{-2} – 760 torr
Chamber I	18” Dia x 29” L	1 x 10^{-2} – 760 torr



Services Provided

20-Foot Chamber

The 20-Foot Chamber is a vacuum chamber with two airlocks, a rapid decompression chamber, and removable bulkhead on the outer lock compartment. The volume is divided into three levels by non-pressure-bearing diaphragms, which provide atmospheric isolation. Chamber configurations can support both long-duration manned habitability and unmanned testing of life support equipment and systems.

11-Foot Chamber

The 11-Foot Chamber is equipped with dual airlock compartments of 9 ft and 10 ft used for human testing in a vacuum environment and for space suit development. A third compartment, referred to as “cabin” (approximately 260 ft3 volume), is also available for reduced pressure, manned or unmanned testing.
The chamber features a treadmill, crew weight relief, and the necessary support systems for reduced pressure crew operations.

8-Foot Chamber

The 8-Foot Chamber is primarily used with a canned-man (i.e., a machine to simulate a human metabolism) to test Portable Life Support Systems. Canned-man simulators are used primarily to provide controlled metabolic loading to life support systems under evaluation and for parametric testing.

Space Station Airlock Test Article

The Space Station Airlock chamber was developed to support the International Space Station Program for Airlock and Extravehicular Activity (EVA) hardware testing, verification and certification, and flight crew training.
The chamber is a human-rated, high-fidelity, 1-g Airlock facility that provides flight-like simulation of Airlock and EVA operations in pressures ranging from vacuum to 1 atmosphere.

We have developed customer-friendly agreements to streamline business relationships and are eager to share our unique facilities and expertise with new customers. We invite your inquiries regarding application or adaptation of our capabilities to satisfy your special requirements. Briefings on general or specific subjects of mutual interest can be arranged at JSC or at your business site.

For the benefit of all

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