



Extravehicular Activity Systems

Johnson Space Center (JSC) is the world leader in design, development, testing and verification, and implementation of space suits. Space suits are unique in that they are miniature, customized spacecraft. They must provide environmental protection, mobility, and life support to the crewmember during spacewalks. JSC personnel have a vast knowledge of the technical challenges associated with space suit technology, ranging from mobility, sizing, life support, ventilation, hydration, and waste management. JSC experience covers the full life cycle, starting from basic design through development, testing, and operational support.

Services Provided

- Space suit design and development
 - Pressure garment design
 - Glove design
 - Mobility and sizing
 - Helmet and visor design
 - Life support umbilical design
- Suit maintenance and operations
- Portable life support technologies
 - Thermal control
 - Ventilation
 - Oxygen systems
 - Contaminant control
 - Hydration
 - Waste control
- Space suit testing, verification, and training
 - Suit checkout
 - Altitude testing
 - Thermal-vacuum testing
 - Flight crew training



Extravehicular Activity Systems Design and Development

Advanced Suit Development

JSC personnel have a vast knowledge of the technical challenges associated with space suit technology, ranging from mobility, sizing, life support, ventilation, hydration, and waste management. JSC experience covers the full life cycle, starting from basic design through development, testing, and operational support.

Services include the following:

- Space suit requirements development
- Pressure garment design
- Ground support system considerations
- Glove design
- Mobility and sizing
- Suit checkout
- Helmet/visor design
- Life support umbilical design
- Suit maintenance and operations
- Portable Life Support Technologies – thermal control, ventilation, oxygen systems, hydration and food management, and waste control

Extravehicular Activity Systems Testing

Facility	Features
Materials Laboratory	Provides capability for measurement of thermal properties, strength, fiber bond, wear, hardness, and stress of fabric and insulation materials.
Extravehicular Activity (EVA) Life Support Systems Testing	Capabilities for space suit life support components and sub-systems. A canned-man bench is included to simulate the loads imposed by a human on the water and ventilation loops of the life support subsystems.
EMU Laboratory	The facility is configured to service and test the majority of the Life Support Subsystem and Space Suit Assembly components and systems of the Extravehicular Mobility Unit (EMU). Capabilities include development and life extension testing, testing of EMU components and systems, fit checks, and anomaly and failure investigation.

Facility	Internal Volume	Pressure Range	Features
8-Foot Chamber	8' Dia x 14' L	1×10^{-2} – 760 torr	Human metabolic simulator for Portable Life Support Systems
11-Foot Chamber	11' Dia x 19' L	1×10^{-2} – 760 torr	Space suit development and Advanced Life Support Systems testing
Space Station Airlock Test Article	Equipment Lock: 1,100 ft ³ Crew Lock: 310 ft ³ Observer Lock: 1,570 ft ³	1×10^{-2} – 760 torr	International Space Station Airlock, EVA hardware testing, and flight crew training
Dual Glove Box	42" H x 57" W x 16" L	1×10^{-5} – 760 torr	Human-rated thermal-vacuum chamber that allows the use of dual, elbow-length arms and gloves
Chamber B	25' Dia x 26' H	1×10^{-6} – 760 torr	Human-rated testing in a thermal-vacuum environment; equipped with a traversing monorail that provides weight relief to a suited crewmember

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.

Facility Testing Information

<http://jsceng.nasa.gov>

Point of Contact

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