

LIFE SCIENCES GLOVEBOX (LSG)

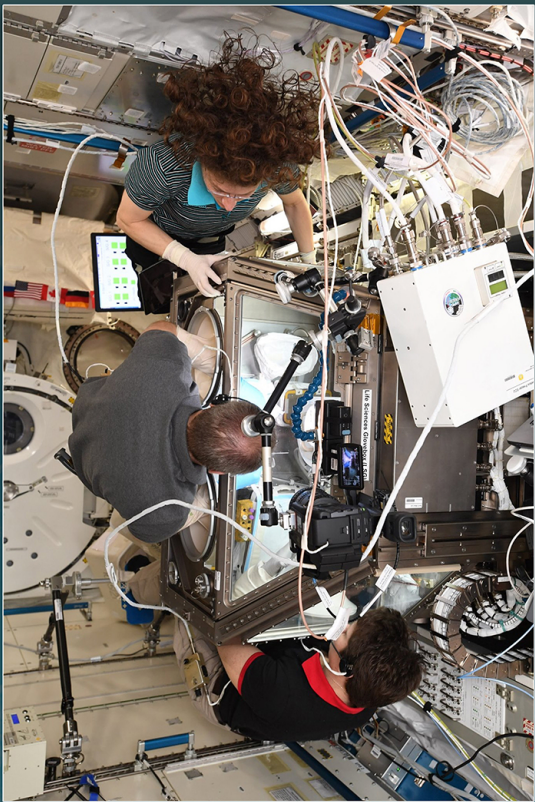


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The Life Sciences Glovebox (LSG) accommodates life science and technology investigations in a “work-bench” type environment. It is used for biological studies, including rodent research and cell biology. The facility has an enclosed Work Volume (WV) that is held at a negative pressure with respect to the crew living area. This allows the facility to provide two levels of containment for handling Biohazard Level II and lower biological materials.

This containment approach protects the crew from possible hazardous operations that take place inside the LSG WV. Research investigations operating inside the LSG are provided approximately 15 cubic feet of enclosed workspace, air filtration for contaminant removal, adjustable fan speeds, a combined 350 watts of 28Vdc and 110Vac power, video and data recording, real time downlink, adjustable overhead illumination, and ferrous surfaces for magnetic attachment of investigation hardware. In addition, a variety of ancillary hardware is available to facilitate payload hardware mounting and restraint, and the glovebox’s ultraviolet (UV) light decontamination system can be utilized to reduce the presence of biological materials in the work volume prior to and following payload ops. An airlock can be provided and attached to the LSG to allow the transfer of investigation samples and hardware to/from the WV while maintaining containment. The LSG also provides access to the moderate temperature loop (MTL) via quick disconnects (QDs) located on the rear wall of the WV as well as on the exterior of the LSG, in the aisle. These capabilities make the LSG a highly utilized facility on the ISS.

The LSG facility is operated by the Payloads Operations Integration Center at MSFC. Payloads may also operate remotely from different telescience centers located in the United States and different countries. The Glovebox Integration Engineer (GIE) is the focal to assist organizations that have payloads operating in the LSG facility. NASA provides an LSG engineering unit for payload developers, fit checks, and to verify that the hardware is operating properly before beginning actual operations on the ISS.



LSG Experiment Resource Summary	
Power	Six power interfaces are provided internal to the WV with a maximum of 350 watts total • Five 28 DC/10A connectors • One 120 AC
Containment	Two levels of containment • Negative pressure from airflow • Physical barrier of structure
Data	Six Data interfaces are provided in the WV • Two ethernet interfaces • One RS-232 connection • One RS-422 connection • One 2" USB feedthrough
Video	– LSG provides the Glovebox USB Camera system, which is a digital, multichannel video system that can record high definition/high speed video. It has up to, three USB cameras and a USB 3.0 feedthrough, and utilizes commercial Norpix Streamix 8. Investigation-provided cameras shall be USB compliant with Norpix Streamix 8.
Experiment Laptop/Computer	ISS provided Z-Book
Structural	The WV provides ferrous surfaces for mounting hardware by magnets.
Glove ports/ Gloves	The WV has two 0.254 m (10in) glove ports on the front window and two 0.20 m (8 in.) glove ports on the right side, and two 0.15 m (6 in.) glove ports on the left side. LSG specific gloves and sleeves are provided.
Thermal	A max of 250 W can be dissipated from the WV via the air cooling system. Investigations wishing to dissipate more than 250 W can connect to the MTL via QDs on the rear wall. The MTL can provide an additional 100 W of cooling.
Air Circulation	Max airflow rate of 3000 l/min and a max velocity of 0.61 m/s at the centerline of the work volume. Varying fan speed modes result in internal work volume flow rates ranging from approximately 1200 L/min to 2250 L/min
Air Filtering	Three filters provide WV filtration. Each filter consists of HEPA/charcoal/catalyst and are replaceable on-orbit. Particle filtration down to 0.3 micron size
Work Volume (WV)	The WV has approximate volume of 450 liters (15 cu ft) WV dimensions: height - 660 mm, width - 910 mm, depth - 610 mm Front Access Door dimensions: height - 660 mm, width - 660 mm
Illumination	Adjustable lighting (combined) available, up to 975 lux incident light measured at the WV center and approximately 200 mm above WV floor. Attachment available for user-provided Maglite.
Airlock	The airlock can be mounted to the WV left side. It has an approximate volume of 30 L and allows for small objects (1.8m X .41m X .41m) to be transferred into the WV without breaking containment.