MICROGRAVITY SCIENCE GLOVEBOX (MSG)

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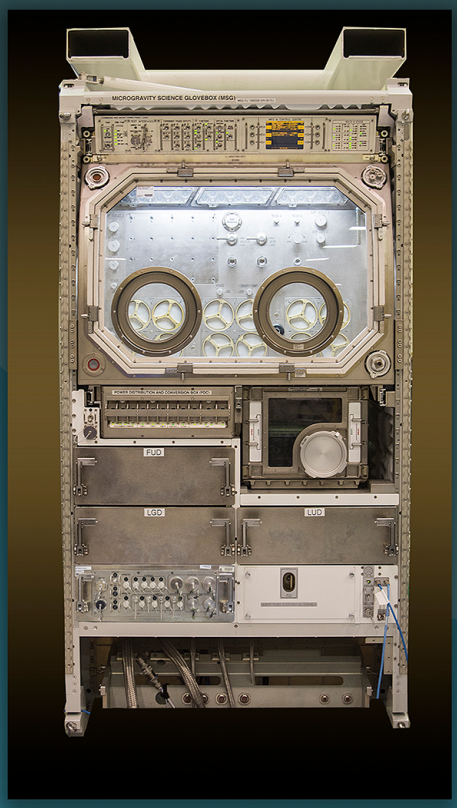

The Microgravity Science Glovebox (MSG) is a research facility located in the Destiny module on the International Space Station (ISS). This facility was designed to accommodate small science and technology experiments in a “workbench” type environment. Because the facility’s working volume is enclosed and held at a negative pressure with respect to the crew living area, the requirements on the experiments for containment of small parts, particulates, fluids, and gasses in the low-gravity Space Station environment are substantially reduced. The concept allows scientific flight hardware to be constructed in close parallel with bench experiments developed in ground based laboratories. The facility is ideally suited to provide accommodations for exploratory-type investigations that are necessary to gain an initial understanding of the role of gravity in the physics associated with new research areas.

Once experiments are transported to the International Space Station the crew installs the experiment hardware in the MSG and configures it for operations. Depending on its design, the actual experiment hardware can be operated either by the crew or by the ground-based investigator through two-way real-time data links. Images can be viewed through the several MSG video cameras, or cameras embedded in the experiment.

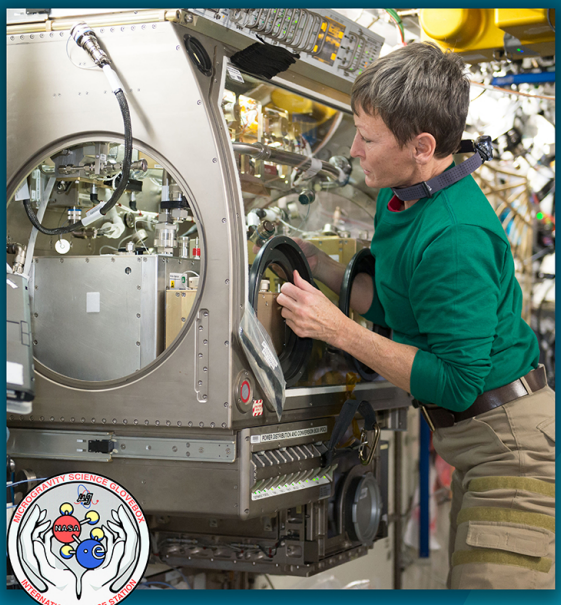

Table 1. MSG Experiment Resource Summary

RESOURCE	DESCRIPTION
POWER	Three power interfaces are provided in the WV. • one 120 V DC, 8.3 Amp • two 28V DC/7 A, ± 12V DC/2A, 5V DC/4A Continuous power allocated to experimenter is a maximum of 1000 watts.
DATA	Eight data interfaces are provide in the WV (two 1553 for MLC). • two digital (I/0) and analog input lines • two RS 422 serial lines • one connection to the Ethernet interfaces • one RS-422/RS232 feedthrough from the back wall to the front of the rack for MLC use outside the WV to an investigation inside the WV • one user configurable feedthrough at the corner of the front window.
VIDEO	• All-digital, Multi-Channel Video Recording Capability of up to 420 megabytes per second • Four HD SDI inputs and Four GigE inputs • Four MSG-provided Cameras • Accommodates Investigation-provided cameras • Two HD Monitors Display Video Images from cameras or playback • Operable on-orbit by crew from laptop or remotely by ground-ops personnel • One-Channel real-time downlink to ISS Video • Digital Video Files downlinked via ISS Ku-band
EXPERIMENT LAPTOP COMPUTER	IBM A31p with a 60 gigabyte hard drive and 1 gigabyte of RAM. 1 Ethernet, 1 RS232/422 (via converter), and USB (via operating system) interfaces. Windows 2000 (Service Pack 4) Operating System.
STRUCTURAL	The WV provides for the attachment of hardware either by M6 inserts or bungee cords. • Cold Plate: 24 M6 inserts in a 70 X 70 mm pattern • Airlock Top Lid: 18 M6 inserts in a 70 X 70 mm pattern • Rear Wall: 20 M6 inserts in a 70 X 70 mm pattern • Access Ports: 27 (each) M6 inserts at 10" pitch • Ceiling: Two locations containing 8 M6 inserts in a 70 X 70 mm pattern
THERMAL	A total of 1000 W can be dissipated from the WV. • Allowable heat dissipation to the Cold Plate = 800 W • Allowable heat dissipation to the Air = 200 W
VACUUM	Two vacuum interfaces are provided in the WV. • Vacuum resource/venting is provided via a 1/2" quick disconnect • Vacuum exhaust/waste is provided via a 1/2" quick disconnect
GN2	One GN2 interface is provided in the WV via 1/4" quick disconnect.
AIR CIRCULATION	• Max airflow rate of 1200 l/min and a max velocity of 0.044 m/s at the centerline of the work volume. • Airflow can be varied between 15% and 100% depending on fan speed settings. • Negative pressures of 1.3 mB to at least 7 mB based on facility settings.
AIR FILTERING	• Three filter banks in series provide WV air filtration. Each bank consists of 8 HEPA filters in parallel (4 front and 4 rear). • Particle filtration down to 0.3 micron size
WORK VOLUME (WV)	The WV has an approximate volume of 255 liters.
ILLUMINATION	Adjustable lighting available up to 1000 Lux incident light measured at the WV center approximately 200 mm off the WV floor.
AIRLOCK	26 liter volume allows access to the WV during operation without compromising containment.